

$$I(J^P) = \frac{1}{2}(0^-)$$

Quantum numbers not measured. Values shown are quark-model predictions.

See also the  $B^\pm/B^0$  ADMIXTURE and  $B^\pm/B^0/B_s^0/b$ -baryon ADMIXTURE sections.

## $B^\pm$ MASS

The fit uses  $m_{B^+}$ ,  $(m_{B^0} - m_{B^+})$ , and  $m_{B^0}$  to determine  $m_{B^+}$ ,  $m_{B^0}$ , and the mass difference.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>5279.34 ± 0.12 OUR FIT</b>				
<b>5279.25 ± 0.26 OUR AVERAGE</b>				
5279.38 ± 0.11 ± 0.33		<sup>1</sup> AAIJ	12E	LHCB $pp$ at 7 TeV
5279.10 ± 0.41 ± 0.36		<sup>2</sup> ACOSTA	06	CDF $p\bar{p}$ at 1.96 TeV
5279.1 ± 0.4 ± 0.4	526	<sup>3</sup> CSORNA	00	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
5279.1 ± 1.7 ± 1.4	147	ABE	96B	CDF $p\bar{p}$ at 1.8 TeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
5278.8 ± 0.54 ± 2.0	362	ALAM	94	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
5278.3 ± 0.4 ± 2.0		BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
5280.5 ± 1.0 ± 2.0		<sup>4</sup> ALBRECHT	90J	ARG $e^+e^- \rightarrow \Upsilon(4S)$
5275.8 ± 1.3 ± 3.0	32	ALBRECHT	87C	ARG $e^+e^- \rightarrow \Upsilon(4S)$
5278.2 ± 1.8 ± 3.0	12	<sup>5</sup> ALBRECHT	87D	ARG $e^+e^- \rightarrow \Upsilon(4S)$
5278.6 ± 0.8 ± 2.0		BEBEK	87	CLEO $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses  $B^+ \rightarrow J/\psi K^+$  fully reconstructed decays.

<sup>2</sup> Uses exclusively reconstructed final states containing a  $J/\psi \rightarrow \mu^+\mu^-$  decays.

<sup>3</sup> CSORNA 00 uses fully reconstructed 526  $B^+ \rightarrow J/\psi(^1)K^+$  events and invariant masses without beam constraint.

<sup>4</sup> ALBRECHT 90J assumes 10580 for  $\Upsilon(4S)$  mass. Supersedes ALBRECHT 87C and ALBRECHT 87D.

<sup>5</sup> Found using fully reconstructed decays with  $J/\psi(1S)$ . ALBRECHT 87D assume  $m_{\Upsilon(4S)} = 10577$  MeV.

## $B^\pm$ MEAN LIFE

See  $B^\pm/B^0/B_s^0/b$ -baryon ADMIXTURE section for data on  $B$ -hadron mean life averaged over species of bottom particles.

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFLAV) and are described at <https://hflav.web.cern.ch/>.

The averaging/rescaling procedure takes into account correlations between the measurements and asymmetric lifetime errors.

<u>VALUE (<math>10^{-12}</math> s)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.638±0.004 OUR EVALUATION</b>				
1.637±0.004±0.003		AAIJ	14E	LHCB $p\bar{p}$ at 7 TeV
1.639±0.009±0.009		<sup>1</sup> AALTONEN	11	CDF $p\bar{p}$ at 1.96 TeV
1.663±0.023±0.015		<sup>2</sup> AALTONEN	11B	CDF $p\bar{p}$ at 1.96 TeV
1.635±0.011±0.011		<sup>3</sup> ABE	05B	BELL $e^+e^- \rightarrow \Upsilon(4S)$
1.624±0.014±0.018		<sup>4</sup> ABDALLAH	04E	DLPH $e^+e^- \rightarrow Z$
1.636±0.058±0.025		<sup>5</sup> ACOSTA	02C	CDF $p\bar{p}$ at 1.8 TeV
1.673±0.032±0.023		<sup>6</sup> AUBERT	01F	BABR $e^+e^- \rightarrow \Upsilon(4S)$
1.648±0.049±0.035		<sup>7</sup> BARATE	00R	ALEP $e^+e^- \rightarrow Z$
1.643±0.037±0.025		<sup>8</sup> ABBIENDI	99J	OPAL $e^+e^- \rightarrow Z$
1.637±0.058 <sup>+0.045</sup> <sub>-0.043</sub>		<sup>7</sup> ABE	98Q	CDF $p\bar{p}$ at 1.8 TeV
1.66 ±0.06 ±0.03		<sup>8</sup> ACCIARRI	98S	L3 $e^+e^- \rightarrow Z$
1.66 ±0.06 ±0.05		<sup>8</sup> ABE	97J	SLD $e^+e^- \rightarrow Z$
1.58 <sup>+0.21</sup> <sub>-0.18</sub> <sup>+0.04</sup> <sub>-0.03</sub>	94	<sup>5</sup> BUSKULIC	96J	ALEP $e^+e^- \rightarrow Z$
1.61 ±0.16 ±0.12		<sup>7,9</sup> ABREU	95Q	DLPH $e^+e^- \rightarrow Z$
1.72 ±0.08 ±0.06		<sup>10</sup> ADAM	95	DLPH $e^+e^- \rightarrow Z$
1.52 ±0.14 ±0.09		<sup>7</sup> AKERS	95T	OPAL $e^+e^- \rightarrow Z$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1.695±0.026±0.015		<sup>6</sup> ABE	02H	BELL Repl. by ABE 05B
1.68 ±0.07 ±0.02		<sup>5</sup> ABE	98B	CDF Repl. by ACOSTA 02C
1.56 ±0.13 ±0.06		<sup>7</sup> ABE	96C	CDF Repl. by ABE 98Q
1.58 ±0.09 ±0.03		<sup>11</sup> BUSKULIC	96J	ALEP $e^+e^- \rightarrow Z$
1.58 ±0.09 ±0.04		<sup>7</sup> BUSKULIC	96J	ALEP Repl. by BARATE 00R
1.70 ±0.09		<sup>12</sup> ADAM	95	DLPH $e^+e^- \rightarrow Z$
1.61 ±0.16 ±0.05	148	<sup>5</sup> ABE	94D	CDF Repl. by ABE 98B
1.30 <sup>+0.33</sup> <sub>-0.29</sub> ±0.16	92	<sup>7</sup> ABREU	93D	DLPH Sup. by ABREU 95Q
1.56 ±0.19 ±0.13	134	<sup>10</sup> ABREU	93G	DLPH Sup. by ADAM 95
1.51 <sup>+0.30</sup> <sub>-0.28</sub> <sup>+0.12</sup> <sub>-0.14</sub>	59	<sup>7</sup> ACTON	93C	OPAL Sup. by AKERS 95T
1.47 <sup>+0.22</sup> <sub>-0.19</sub> <sup>+0.15</sup> <sub>-0.14</sub>	77	<sup>7</sup> BUSKULIC	93D	ALEP Sup. by BUSKULIC 96J

<sup>1</sup> Measured mean life using fully reconstructed decays ( $J/\psi K^{(*)}$ ).

<sup>2</sup> Measured using  $B^- \rightarrow D^0 \pi^-$  with  $D^0 \rightarrow K^- \pi^+$  events that were selected using a silicon vertex trigger.

<sup>3</sup> Measurement performed using a combined fit of  $CP$ -violation, mixing and lifetimes.

<sup>4</sup> Measurement performed using an inclusive reconstruction and  $B$  flavor identification technique.

<sup>5</sup> Measured mean life using fully reconstructed decays.

<sup>6</sup> Events are selected in which one  $B$  meson is fully reconstructed while the second  $B$  meson is reconstructed inclusively.

<sup>7</sup> Data analyzed using  $D/D^* \ell X$  event vertices.

<sup>8</sup> Data analyzed using charge of secondary vertex.

<sup>9</sup> ABREU 95Q assumes  $B(B^0 \rightarrow D^{*-} \ell^+ \nu_\ell) = 3.2 \pm 1.7\%$ .

<sup>10</sup> Data analyzed using vertex-charge technique to tag  $B$  charge.

<sup>11</sup> Combined result of  $D/D^* \ell X$  analysis and fully reconstructed  $B$  analysis.

<sup>12</sup> Combined ABREU 95Q and ADAM 95 result.

$\tau_{B^+}/\tau_{B^-}$

VALUE	DOCUMENT ID	TECN	COMMENT
$1.002 \pm 0.004 \pm 0.002$	<sup>1</sup> AAIJ	14E LHCB	$pp$ at 7 TeV

<sup>1</sup> Measured using  $B^\pm \rightarrow J/\psi K^\pm$  decays.

**$B^+$  DECAY MODES**

$B^-$  modes are charge conjugates of the modes below. Modes which do not identify the charge state of the  $B$  are listed in the  $B^\pm/B^0$  ADMIXTURE section.

The branching fractions listed below assume 50%  $B^0\bar{B}^0$  and 50%  $B^+B^-$  production at the  $\Upsilon(4S)$ . We have attempted to bring older measurements up to date by rescaling their assumed  $\Upsilon(4S)$  production ratio to 50:50 and their assumed  $D, D_s, D^*$ , and  $\psi$  branching ratios to current values whenever this would affect our averages and best limits significantly.

Indentation is used to indicate a subchannel of a previous reaction. All resonant subchannels have been corrected for resonance branching fractions to the final state so the sum of the subchannel branching fractions can exceed that of the final state.

For inclusive branching fractions, e.g.,  $B \rightarrow D^\pm X$ , the values usually are multiplicities, not branching fractions. They can be greater than one.

Mode	Fraction ( $\Gamma_i/\Gamma$ )	Scale factor/ Confidence level
<b>Semileptonic and leptonic modes</b>		
$\Gamma_1$ $l^+ \nu_l X$	[a] ( 10.99 ± 0.28 ) %	
$\Gamma_2$ $e^+ \nu_e X_c$	( 10.8 ± 0.4 ) %	
$\Gamma_3$ $l^+ \nu_l X_u$	( 1.65 ± 0.21 ) × 10 <sup>-3</sup>	
$\Gamma_4$ $D l^+ \nu_l X$	( 9.6 ± 0.7 ) %	
$\Gamma_5$ $\bar{D}^0 l^+ \nu_l$	[a] ( 2.30 ± 0.09 ) %	
$\Gamma_6$ $\bar{D}^0 \tau^+ \nu_\tau$	( 7.7 ± 2.5 ) × 10 <sup>-3</sup>	
$\Gamma_7$ $\bar{D}^*(2007)^0 l^+ \nu_l$	[a] ( 5.58 ± 0.22 ) %	
$\Gamma_8$ $\bar{D}^*(2007)^0 \tau^+ \nu_\tau$	( 1.88 ± 0.20 ) %	
$\Gamma_9$ $D^- \pi^+ l^+ \nu_l$	( 4.4 ± 0.4 ) × 10 <sup>-3</sup>	
$\Gamma_{10}$ $\bar{D}_0^*(2420)^0 l^+ \nu_l, \bar{D}_0^{*0} \rightarrow$	( 2.5 ± 0.5 ) × 10 <sup>-3</sup>	
$\Gamma_{11}$ $\bar{D}_2^*(2460)^0 l^+ \nu_l, \bar{D}_2^{*0} \rightarrow$	( 1.53 ± 0.16 ) × 10 <sup>-3</sup>	
$\Gamma_{12}$ $D^{(*)} n \pi l^+ \nu_l (n \geq 1)$	( 1.85 ± 0.25 ) %	
$\Gamma_{13}$ $D^{*-} \pi^+ l^+ \nu_l$	( 6.0 ± 0.4 ) × 10 <sup>-3</sup>	
$\Gamma_{14}$ $\bar{D}_1(2420)^0 l^+ \nu_l, \bar{D}_1^0 \rightarrow$	( 3.03 ± 0.20 ) × 10 <sup>-3</sup>	
$\Gamma_{15}$ $\bar{D}'_1(2430)^0 l^+ \nu_l, \bar{D}_1'^0 \rightarrow$ $D^{*-} \pi^+$	( 2.7 ± 0.6 ) × 10 <sup>-3</sup>	

$\Gamma_{16}$	$\bar{D}_2^*(2460)^0 \ell^+ \nu_\ell, \bar{D}_2^{*0} \rightarrow$	$( 1.01 \pm 0.24 ) \times 10^{-3}$	S=2.0
$\Gamma_{17}$	$D^{*-} \pi^+$	$( 1.6 \pm 0.4 ) \times 10^{-3}$	
$\Gamma_{18}$	$\bar{D}^0 \pi^+ \pi^- \ell^+ \nu_\ell$	$( 8 \pm 5 ) \times 10^{-4}$	
$\Gamma_{19}$	$D_s^{(*)-} K^+ \ell^+ \nu_\ell$	$( 6.1 \pm 1.0 ) \times 10^{-4}$	
$\Gamma_{20}$	$D_s^- K^+ \ell^+ \nu_\ell$	$( 3.0 \begin{smallmatrix} + 1.4 \\ - 1.2 \end{smallmatrix} ) \times 10^{-4}$	
$\Gamma_{21}$	$D_s^{*-} K^+ \ell^+ \nu_\ell$	$( 2.9 \pm 1.9 ) \times 10^{-4}$	
$\Gamma_{22}$	$\pi^0 \ell^+ \nu_\ell$	$( 7.80 \pm 0.27 ) \times 10^{-5}$	
$\Gamma_{23}$	$\pi^0 e^+ \nu_e$		
$\Gamma_{24}$	$\eta \ell^+ \nu_\ell$	$( 3.9 \pm 0.5 ) \times 10^{-5}$	
$\Gamma_{25}$	$\eta' \ell^+ \nu_\ell$	$( 2.3 \pm 0.8 ) \times 10^{-5}$	
$\Gamma_{26}$	$\omega \ell^+ \nu_\ell$	[a] $( 1.19 \pm 0.09 ) \times 10^{-4}$	
$\Gamma_{27}$	$\omega \mu^+ \nu_\mu$		
$\Gamma_{28}$	$\rho^0 \ell^+ \nu_\ell$	[a] $( 1.58 \pm 0.11 ) \times 10^{-4}$	
$\Gamma_{29}$	$\pi^+ \pi^- \ell^+ \nu_\ell$	$( 2.3 \pm 0.4 ) \times 10^{-4}$	
$\Gamma_{30}$	$\rho \bar{\rho} \ell^+ \nu_\ell$	$( 5.8 \begin{smallmatrix} + 2.6 \\ - 2.3 \end{smallmatrix} ) \times 10^{-6}$	
$\Gamma_{31}$	$\rho \bar{\rho} \mu^+ \nu_\mu$	$( 5.32 \pm 0.34 ) \times 10^{-6}$	
$\Gamma_{32}$	$\rho \bar{\rho} e^+ \nu_e$	$( 8.2 \begin{smallmatrix} + 4.0 \\ - 3.3 \end{smallmatrix} ) \times 10^{-6}$	
$\Gamma_{33}$	$e^+ \nu_e$	$< 9.8 \times 10^{-7}$	CL=90%
$\Gamma_{34}$	$\mu^+ \nu_\mu$	$< 8.6 \times 10^{-7}$	CL=90%
$\Gamma_{35}$	$\tau^+ \nu_\tau$	$( 1.09 \pm 0.24 ) \times 10^{-4}$	S=1.2
$\Gamma_{36}$	$\ell^+ \nu_\ell \gamma$	$< 3.0 \times 10^{-6}$	CL=90%
$\Gamma_{37}$	$e^+ \nu_e \gamma$	$< 4.3 \times 10^{-6}$	CL=90%
$\Gamma_{38}$	$\mu^+ \nu_\mu \gamma$	$< 3.4 \times 10^{-6}$	CL=90%
$\Gamma_{39}$	$\mu^+ \mu^- \mu^+ \nu_\mu$	$< 1.6 \times 10^{-8}$	CL=95%

### Inclusive modes

$\Gamma_{40}$	$D^0 X$	$( 8.6 \pm 0.7 ) \%$
$\Gamma_{41}$	$\bar{D}^0 X$	$( 79 \pm 4 ) \%$
$\Gamma_{42}$	$D^+ X$	$( 2.5 \pm 0.5 ) \%$
$\Gamma_{43}$	$D^- X$	$( 9.9 \pm 1.2 ) \%$
$\Gamma_{44}$	$D_s^+ X$	$( 7.9 \begin{smallmatrix} + 1.4 \\ - 1.3 \end{smallmatrix} ) \%$
$\Gamma_{45}$	$D_s^- X$	$( 1.10 \begin{smallmatrix} + 0.40 \\ - 0.32 \end{smallmatrix} ) \%$
$\Gamma_{46}$	$\Lambda_c^+ X$	$( 2.1 \begin{smallmatrix} + 0.9 \\ - 0.6 \end{smallmatrix} ) \%$
$\Gamma_{47}$	$\bar{\Lambda}_c^- X$	$( 2.8 \begin{smallmatrix} + 1.1 \\ - 0.9 \end{smallmatrix} ) \%$
$\Gamma_{48}$	$\bar{c} X$	$( 97 \pm 4 ) \%$
$\Gamma_{49}$	$c X$	$( 23.4 \begin{smallmatrix} + 2.2 \\ - 1.8 \end{smallmatrix} ) \%$
$\Gamma_{50}$	$c / \bar{c} X$	$( 120 \pm 6 ) \%$

**$D$ ,  $D^*$ , or  $D_s$  modes**

$\Gamma_{51}$	$\bar{D}^0 \pi^+$		$( 4.68 \pm 0.13 ) \times 10^{-3}$
$\Gamma_{52}$	$D_{CP(+1)} \pi^+$	[b]	$( 2.05 \pm 0.20 ) \times 10^{-3}$
$\Gamma_{53}$	$D_{CP(-1)} \pi^+$	[b]	$( 2.1 \pm 0.4 ) \times 10^{-3}$
$\Gamma_{54}$	$\bar{D}^0 \rho^+$		$( 1.34 \pm 0.18 ) \%$
$\Gamma_{55}$	$\bar{D}^0 K^+$		$( 3.69 \pm 0.16 ) \times 10^{-4}$
$\Gamma_{56}$	$D_{CP(+1)} K^+$	[b]	$( 1.83 \pm 0.08 ) \times 10^{-4}$
$\Gamma_{57}$	$D_{CP(-1)} K^+$	[b]	$( 1.99 \pm 0.19 ) \times 10^{-4}$
$\Gamma_{58}$	$D^0 K^+$		$( 3.64 \pm 0.25 ) \times 10^{-6}$
$\Gamma_{59}$	$[K^- \pi^+]_D K^+$	[c]	$< 2.8 \times 10^{-7}$ CL=90%
$\Gamma_{60}$	$[K^+ \pi^-]_D K^+$	[c]	$< 2.0 \times 10^{-5}$ CL=90%
$\Gamma_{61}$	$[K^- \pi^+ \pi^0]_D K^+$		seen
$\Gamma_{62}$	$[K^+ \pi^- \pi^0]_D K^+$		seen
$\Gamma_{63}$	$[K^- \pi^+ \pi^+ \pi^-]_D K^+$		seen
$\Gamma_{64}$	$[K^+ \pi^- \pi^+ \pi^-]_D K^+$		seen
$\Gamma_{65}$	$[\pi^+ \pi^+ \pi^- \pi^-] K^+$		
$\Gamma_{66}$	$[\pi^+ \pi^- \pi^+ \pi^-]_D K^*(892)^+$		
$\Gamma_{67}$	$[K^- \pi^+]_D K^*(892)^+$	[c]	
$\Gamma_{68}$	$[K^+ \pi^-]_D K^*(892)^+$	[c]	
$\Gamma_{69}$	$[K^- \pi^+ \pi^- \pi^+]_D K^*(892)^+$		
$\Gamma_{70}$	$[K^+ \pi^- \pi^+ \pi^-]_D K^*(892)^+$		
$\Gamma_{71}$	$[K^- \pi^+]_D \pi^+$	[c]	$( 6.3 \pm 1.1 ) \times 10^{-7}$
$\Gamma_{72}$	$[K^+ \pi^-]_D \pi^+$		$( 1.7 \pm 0.4 ) \times 10^{-4}$
$\Gamma_{73}$	$[K^- \pi^+ \pi^0]_D \pi^+$		seen
$\Gamma_{74}$	$[K^+ \pi^- \pi^0]_D \pi^+$		seen
$\Gamma_{75}$	$[K^- \pi^+ \pi^+ \pi^-]_D \pi^+$		seen
$\Gamma_{76}$	$[K^+ \pi^- \pi^+ \pi^-]_D \pi^+$		seen
$\Gamma_{77}$	$[K^- \pi^+]_{(D\pi)} \pi^+$		
$\Gamma_{78}$	$[K^+ \pi^-]_{(D\pi)} \pi^+$		
$\Gamma_{79}$	$[K^- \pi^+]_{(D\gamma)} \pi^+$		
$\Gamma_{80}$	$[K^+ \pi^-]_{(D\gamma)} \pi^+$		
$\Gamma_{81}$	$[K^- \pi^+]_{(D\pi)} K^+$		
$\Gamma_{82}$	$[K^+ \pi^-]_{(D\pi)} K^+$		
$\Gamma_{83}$	$[K^- \pi^+]_{(D\gamma)} K^+$		
$\Gamma_{84}$	$[K^+ \pi^-]_{(D\gamma)} K^+$		
$\Gamma_{85}$	$[\pi^+ \pi^- \pi^0]_D K^-$		$( 4.6 \pm 0.9 ) \times 10^{-6}$
$\Gamma_{86}$	$[K_S^0 K^+ \pi^-]_D K^+$		seen
$\Gamma_{87}$	$[K^*(892)^- K^+]_D K^+$		
$\Gamma_{88}$	$[K_S^0 K^- \pi^+]_D K^+$		seen
$\Gamma_{89}$	$[K^*(892)^+ K^-]_D K^+$		seen
$\Gamma_{90}$	$[K_S^0 K^- \pi^+]_D \pi^+$		seen
$\Gamma_{91}$	$[K^*(892)^+ K^-]_D \pi^+$		seen

$\Gamma_{92}$	$[K_S^0 K^+ \pi^-]_D \pi^+$	seen	
$\Gamma_{93}$	$[K^*(892)^- K^+]_D \pi^+$	seen	
$\Gamma_{94}$	$[K^+ K^- \pi^0]_D K^+$		
$\Gamma_{95}$	$[K^+ K^- \pi^0]_D \pi^+$		
$\Gamma_{96}$	$[\pi^+ \pi^- \pi^0]_D K^+$		
$\Gamma_{97}$	$[\pi^+ \pi^- \pi^0]_D \pi^+$		
$\Gamma_{98}$	$\bar{D}^0 K^*(892)^+$		$( 5.3 \pm 0.4 ) \times 10^{-4}$
$\Gamma_{99}$	$D_{CP(-1)} K^*(892)^+$	[b]	$( 2.7 \pm 0.8 ) \times 10^{-4}$
$\Gamma_{100}$	$D_{CP(+1)} K^*(892)^+$	[b]	$( 6.2 \pm 0.7 ) \times 10^{-4}$
$\Gamma_{101}$	$D^0 K^*(892)^+$		$( 5.4 \pm 1.8 ) \times 10^{-6}$ $- 4.0$
$\Gamma_{102}$	$\bar{D}^0 K^+ \pi^+ \pi^-$		$( 5.2 \pm 2.1 ) \times 10^{-4}$
$\Gamma_{103}$	$[K^+ \pi^-]_D K^+ \pi^- \pi^+$		
$\Gamma_{104}$	$[K^- \pi^+]_D K^+ \pi^- \pi^+$		
$\Gamma_{105}$	$D_{CP(+1)} K^+ \pi^- \pi^+$		
$\Gamma_{106}$	$\bar{D}^0 K^+ \bar{K}^0$		$( 5.5 \pm 1.6 ) \times 10^{-4}$
$\Gamma_{107}$	$\bar{D}^0 K^+ \bar{K}^*(892)^0$		$( 7.5 \pm 1.7 ) \times 10^{-4}$
$\Gamma_{108}$	$\bar{D}^0 \pi^+ \pi^+ \pi^-$		$( 5.6 \pm 2.1 ) \times 10^{-3}$ S=3.6
$\Gamma_{109}$	$[K^- \pi^+]_D \pi^+ \pi^- \pi^+$		
$\Gamma_{110}$	$\bar{D}^0 \pi^+ \pi^+ \pi^-$ nonresonant		$( 5 \pm 4 ) \times 10^{-3}$
$\Gamma_{111}$	$\bar{D}^0 \pi^+ \rho^0$		$( 4.2 \pm 3.0 ) \times 10^{-3}$
$\Gamma_{112}$	$\bar{D}^0 a_1(1260)^+$		$( 4 \pm 4 ) \times 10^{-3}$
$\Gamma_{113}$	$\bar{D}^0 \omega \pi^+$		$( 4.1 \pm 0.9 ) \times 10^{-3}$
$\Gamma_{114}$	$D^*(2010)^- \pi^+ \pi^+$		$( 1.35 \pm 0.22 ) \times 10^{-3}$
$\Gamma_{115}$	$D^*(2010)^- K^+ \pi^+$		$( 8.2 \pm 1.4 ) \times 10^{-5}$
$\Gamma_{116}$	$\bar{D}_1(2420)^0 \pi^+, \bar{D}_1^0 \rightarrow$ $D^*(2010)^- \pi^+$		$( 8.4 \pm 1.5 ) \times 10^{-4}$
$\Gamma_{117}$	$D^- \pi^+ \pi^+$		$( 1.07 \pm 0.05 ) \times 10^{-3}$
$\Gamma_{118}$	$D^- K^+ \pi^+$		$( 7.7 \pm 0.5 ) \times 10^{-5}$
$\Gamma_{119}$	$D_0^*(2300)^0 K^+, D_0^{*0} \rightarrow$ $D^- \pi^+$		$( 6.1 \pm 2.4 ) \times 10^{-6}$
$\Gamma_{120}$	$D_2^*(2460)^0 K^+, D_2^{*0} \rightarrow$ $D^- \pi^+$		$( 2.32 \pm 0.23 ) \times 10^{-5}$
$\Gamma_{121}$	$D_1^*(2760)^0 K^+, D_1^{*0} \rightarrow$ $D^- \pi^+$		$( 3.6 \pm 1.2 ) \times 10^{-6}$
$\Gamma_{122}$	$D^+ K^0$	<	$2.9 \times 10^{-6}$ CL=90%
$\Gamma_{123}$	$D^+ K^+ \pi^-$		$( 5.6 \pm 1.1 ) \times 10^{-6}$
$\Gamma_{124}$	$D_2^*(2460)^0 K^+, D_2^{*0} \rightarrow$ $D^+ \pi^-$	<	$6.3 \times 10^{-7}$ CL=90%
$\Gamma_{125}$	$D^+ K^{*0}$	<	$4.9 \times 10^{-7}$ CL=90%
$\Gamma_{126}$	$D^+ \bar{K}^{*0}$	<	$1.4 \times 10^{-6}$ CL=90%
$\Gamma_{127}$	$\bar{D}^*(2007)^0 \pi^+$		$( 5.18 \pm 0.15 ) \times 10^{-3}$
$\Gamma_{128}$	$\bar{D}_{CP(+1)}^{*0} \pi^+$	[d]	$( 2.9 \pm 0.6 ) \times 10^{-3}$
$\Gamma_{129}$	$D_{CP(-1)}^{*0} \pi^+$	[d]	$( 2.6 \pm 1.0 ) \times 10^{-3}$

$\Gamma_{130}$	$\bar{D}^*(2007)^0 \omega \pi^+$		$( 4.5 \pm 1.2 ) \times 10^{-3}$
$\Gamma_{131}$	$\bar{D}^*(2007)^0 \rho^+$		$( 9.8 \pm 1.7 ) \times 10^{-3}$
$\Gamma_{132}$	$\bar{D}^*(2007)^0 K^+$		$( 4.20 \pm_{-0.28}^{0.31} ) \times 10^{-4}$
$\Gamma_{133}$	$\bar{D}_{CP(+1)}^{*0} K^+$	[d]	$( 2.75 \pm 0.35 ) \times 10^{-4}$
$\Gamma_{134}$	$\bar{D}_{CP(-1)}^{*0} K^+$	[d]	$( 2.31 \pm 0.31 ) \times 10^{-4}$
$\Gamma_{135}$	$D^*(2007)^0 K^+$		$( 4.5 \pm 1.2 ) \times 10^{-6}$
$\Gamma_{136}$	$\bar{D}^*(2007)^0 K^*(892)^+$		$( 8.1 \pm 1.4 ) \times 10^{-4}$
$\Gamma_{137}$	$\bar{D}^*(2007)^0 K^+ \bar{K}^0$		$< 1.06 \times 10^{-3}$ CL=90%
$\Gamma_{138}$	$\bar{D}^*(2007)^0 K^+ \bar{K}^*(892)^0$		$( 1.5 \pm 0.4 ) \times 10^{-3}$
$\Gamma_{139}$	$\bar{D}^*(2007)^0 \pi^+ \pi^+ \pi^-$		$( 1.03 \pm 0.12 ) \%$
$\Gamma_{140}$	$\bar{D}^*(2007)^0 a_1(1260)^+$		$( 1.9 \pm 0.5 ) \%$
$\Gamma_{141}$	$\bar{D}^*(2007)^0 \pi^- \pi^+ \pi^+ \pi^0$		$( 1.8 \pm 0.4 ) \%$
$\Gamma_{142}$	$\bar{D}^{*0} 3\pi^+ 2\pi^-$		$( 5.7 \pm 1.2 ) \times 10^{-3}$
$\Gamma_{143}$	$D^*(2010)^+ \pi^0$		$< 3.6 \times 10^{-6}$
$\Gamma_{144}$	$D^*(2010)^+ K^0$		$< 9.0 \times 10^{-6}$ CL=90%
$\Gamma_{145}$	$D^*(2010)^- \pi^+ \pi^+ \pi^0$		$( 1.5 \pm 0.7 ) \%$
$\Gamma_{146}$	$D^*(2010)^- \pi^+ \pi^+ \pi^+ \pi^-$		$( 2.6 \pm 0.4 ) \times 10^{-3}$
$\Gamma_{147}$	$\bar{D}^{*0} \pi^+$	[e]	$( 5.7 \pm 1.2 ) \times 10^{-3}$
$\Gamma_{148}$	$\bar{D}_1^*(2420)^0 \pi^+$		$( 1.5 \pm 0.6 ) \times 10^{-3}$ S=1.3
$\Gamma_{149}$	$\bar{D}_1(2420)^0 \pi^+ \times B(\bar{D}_1^0 \rightarrow \bar{D}^0 \pi^+ \pi^-)$		$( 2.5 \pm_{-1.4}^{1.6} ) \times 10^{-4}$ S=3.9
$\Gamma_{150}$	$\bar{D}_1(2420)^0 \pi^+ \times B(\bar{D}_1^0 \rightarrow \bar{D}^0 \pi^+ \pi^- \text{ (nonresonant)})$		$( 2.2 \pm 1.0 ) \times 10^{-4}$
$\Gamma_{151}$	$\bar{D}_1(2430)^0 \pi^+, \bar{D}_1^0 \rightarrow D^*(2010)^- \pi^+$		$( 3.5 \pm 0.6 ) \times 10^{-4}$
$\Gamma_{152}$	$\bar{D}(2550)^0 \pi^+, \bar{D}^0 \rightarrow D^*(2010)^- \pi^+$		$( 7.2 \pm 1.4 ) \times 10^{-5}$
$\Gamma_{153}$	$\bar{D}_J^*(2600)^0 \pi^+, \bar{D}_J^{*0} \rightarrow D^*(2010)^- \pi^+$		$( 6.8 \pm 1.3 ) \times 10^{-5}$
$\Gamma_{154}$	$\bar{D}_2^*(2462)^0 \pi^+, \bar{D}_2^{*0} \rightarrow D^- \pi^+$		$( 3.56 \pm 0.24 ) \times 10^{-4}$
$\Gamma_{155}$	$\bar{D}_2^*(2462)^0 \pi^+, \bar{D}_2^{*0} \rightarrow \bar{D}^0 \pi^- \pi^+$		$( 2.2 \pm 1.0 ) \times 10^{-4}$
$\Gamma_{156}$	$\bar{D}_2^*(2462)^0 \pi^+, \bar{D}_2^{*0} \rightarrow \bar{D}^0 \pi^- \pi^+ \text{ (nonresonant)}$		$< 1.7 \times 10^{-4}$ CL=90%
$\Gamma_{157}$	$\bar{D}_2^*(2462)^0 \pi^+, \bar{D}_2^{*0} \rightarrow D^*(2010)^- \pi^+$		$( 2.2 \pm 1.1 ) \times 10^{-4}$
$\Gamma_{158}$	$\bar{D}_0^*(2400)^0 \pi^+ \times B(\bar{D}_0^*(2400)^0 \rightarrow D^- \pi^+)$		$( 6.4 \pm 1.4 ) \times 10^{-4}$
$\Gamma_{159}$	$\bar{D}_1(2421)^0 \pi^+, \bar{D}_1^0 \rightarrow D^{*-} \pi^+$		$( 7.4 \pm 1.0 ) \times 10^{-4}$
$\Gamma_{160}$	$\bar{D}_2^*(2462)^0 \pi^+, \bar{D}_2^{*0} \rightarrow D^{*-} \pi^+$		$( 1.98 \pm 0.30 ) \times 10^{-4}$
$\Gamma_{161}$	$\bar{D}'_1(2427)^0 \pi^+, \bar{D}'_1{}^0 \rightarrow D^{*-} \pi^+$		$( 3.5 \pm 0.9 ) \times 10^{-4}$ S=1.5

$\Gamma_{162}$	$\bar{D}_1(2420)^0 \pi^+ \times B(\bar{D}_1^0 \rightarrow \bar{D}^{*0} \pi^+ \pi^-)$	$< 6$	$\times 10^{-6}$	CL=90%
$\Gamma_{163}$	$\bar{D}_1^*(2420)^0 \rho^+$	$< 1.4$	$\times 10^{-3}$	CL=90%
$\Gamma_{164}$	$\bar{D}_2^*(2460)^0 \pi^+$	$< 1.3$	$\times 10^{-3}$	CL=90%
$\Gamma_{165}$	$\bar{D}_2^*(2460)^0 \pi^+ \times B(\bar{D}_2^{*0} \rightarrow \bar{D}^{*0} \pi^+ \pi^-)$	$< 2.2$	$\times 10^{-5}$	CL=90%
$\Gamma_{166}$	$\bar{D}_1^*(2680)^0 \pi^+, \bar{D}_1^*(2680)^0 \rightarrow D^- \pi^+$	$( 8.4 \pm 2.1 )$	$\times 10^{-5}$	
$\Gamma_{167}$	$\bar{D}(2740)^0 \pi^+, \bar{D}^0 \rightarrow D^*(2010)^- \pi^+$	$( 3.3 \pm 1.5 )$	$\times 10^{-5}$	
$\Gamma_{168}$	$\bar{D}_3^*(2750)^0 \pi^+, \bar{D}_3^0 \rightarrow D^*(2010)^- \pi^+$	$( 1.10 \pm 0.32 )$	$\times 10^{-5}$	
$\Gamma_{169}$	$\bar{D}_3^*(2760)^0 \pi^+, \bar{D}_3^*(2760)^0 \pi^+ \rightarrow D^- \pi^+$	$( 1.00 \pm 0.22 )$	$\times 10^{-5}$	
$\Gamma_{170}$	$\bar{D}_2^*(3000)^0 \pi^+, \bar{D}_2^*(3000)^0 \pi^+ \rightarrow D^- \pi^+$	$( 2.0 \pm 1.4 )$	$\times 10^{-6}$	
$\Gamma_{171}$	$\bar{D}_2^*(2460)^0 \rho^+$	$< 4.7$	$\times 10^{-3}$	CL=90%
$\Gamma_{172}$	$\bar{D}^0 D_s^+$	$( 9.0 \pm 0.9 )$	$\times 10^{-3}$	
$\Gamma_{173}$	$D_{s0}^*(2317)^+ \bar{D}^0, D_{s0}^{*+} \rightarrow D_s^+ \pi^0$	$( 8.0 \begin{smallmatrix} + 1.6 \\ - 1.3 \end{smallmatrix} )$	$\times 10^{-4}$	
$\Gamma_{174}$	$D_{s0}(2317)^+ \bar{D}^0 \times B(D_{s0}(2317)^+ \rightarrow D_s^{*+} \gamma)$	$< 7.6$	$\times 10^{-4}$	CL=90%
$\Gamma_{175}$	$D_{s0}(2317)^+ \bar{D}^*(2007)^0 \times B(D_{s0}(2317)^+ \rightarrow D_s^+ \pi^0)$	$( 9 \pm 7 )$	$\times 10^{-4}$	
$\Gamma_{176}$	$D_{sJ}(2457)^+ \bar{D}^0$	$( 3.1 \begin{smallmatrix} + 1.0 \\ - 0.9 \end{smallmatrix} )$	$\times 10^{-3}$	
$\Gamma_{177}$	$D_{sJ}(2457)^+ \bar{D}^0 \times B(D_{sJ}(2457)^+ \rightarrow D_s^+ \gamma)$	$( 4.6 \begin{smallmatrix} + 1.3 \\ - 1.1 \end{smallmatrix} )$	$\times 10^{-4}$	
$\Gamma_{178}$	$D_{sJ}(2457)^+ \bar{D}^0 \times B(D_{sJ}(2457)^+ \rightarrow D_s^+ \pi^+ \pi^-)$	$< 2.2$	$\times 10^{-4}$	CL=90%
$\Gamma_{179}$	$D_{sJ}(2457)^+ \bar{D}^0 \times B(D_{sJ}(2457)^+ \rightarrow D_s^+ \pi^0)$	$< 2.7$	$\times 10^{-4}$	CL=90%
$\Gamma_{180}$	$D_{sJ}(2457)^+ \bar{D}^0 \times B(D_{sJ}(2457)^+ \rightarrow D_s^{*+} \gamma)$	$< 9.8$	$\times 10^{-4}$	CL=90%
$\Gamma_{181}$	$D_{sJ}(2457)^+ \bar{D}^*(2007)^0$	$( 1.20 \pm 0.30 )$		%
$\Gamma_{182}$	$D_{sJ}(2457)^+ \bar{D}^*(2007)^0 \times B(D_{sJ}(2457)^+ \rightarrow D_s^+ \gamma)$	$( 1.4 \begin{smallmatrix} + 0.7 \\ - 0.6 \end{smallmatrix} )$	$\times 10^{-3}$	



$\Gamma_{183}$	$\bar{D}^0 D_{s1}(2536)^+ \times$ $B(D_{s1}(2536)^+ \rightarrow$ $D^*(2007)^0 K^+ +$ $D^*(2010)^+ K^0)$	$( 4.0 \pm 1.0 ) \times 10^{-4}$	
$\Gamma_{184}$	$\bar{D}^0 D_{s1}(2536)^+ \times$ $B(D_{s1}(2536)^+ \rightarrow$ $D^*(2007)^0 K^+)$	$( 2.2 \pm 0.7 ) \times 10^{-4}$	
$\Gamma_{185}$	$\bar{D}^*(2007)^0 D_{s1}(2536)^+ \times$ $B(D_{s1}(2536)^+ \rightarrow$ $D^*(2007)^0 K^+)$	$( 5.5 \pm 1.6 ) \times 10^{-4}$	
$\Gamma_{186}$	$\bar{D}^0 D_{s1}(2536)^+ \times$ $B(D_{s1}(2536)^+ \rightarrow D^{*+} K^0)$	$( 2.3 \pm 1.1 ) \times 10^{-4}$	
$\Gamma_{187}$	$\bar{D}^0 D_{sJ}(2700)^+ \times$ $B(D_{sJ}(2700)^+ \rightarrow D^0 K^+)$	$( 5.6 \pm 1.8 ) \times 10^{-4}$	S=1.7
$\Gamma_{188}$	$\bar{D}^{*0} D_{s1}(2536)^+, D_{s1}^+ \rightarrow$ $D^{*+} K^0$	$( 3.9 \pm 2.6 ) \times 10^{-4}$	
$\Gamma_{189}$	$\bar{D}^0 D_{sJ}(2573)^+, D_{sJ}^+ \rightarrow$ $D^0 K^+$	$( 8 \pm 15 ) \times 10^{-6}$	
$\Gamma_{190}$	$\bar{D}^{*0} D_{sJ}(2573), D_{sJ}^+ \rightarrow D^0 K^+$	$< 2$	$\times 10^{-4}$ CL=90%
$\Gamma_{191}$	$\bar{D}^*(2007)^0 D_{sJ}(2573), D_{sJ}^+ \rightarrow$ $D^0 K^+$	$< 5$	$\times 10^{-4}$ CL=90%
$\Gamma_{192}$	$\bar{D}^0 D_s^{*+}$	$( 7.6 \pm 1.6 ) \times 10^{-3}$	
$\Gamma_{193}$	$\bar{D}^*(2007)^0 D_s^+$	$( 8.2 \pm 1.7 ) \times 10^{-3}$	
$\Gamma_{194}$	$\bar{D}^*(2007)^0 D_s^{*+}$	$( 1.71 \pm 0.24 ) \%$	
$\Gamma_{195}$	$D_s^{(*)+} \bar{D}^{*0}$	$( 2.7 \pm 1.2 ) \%$	
$\Gamma_{196}$	$\bar{D}^*(2007)^0 D^*(2010)^+$	$( 8.1 \pm 1.7 ) \times 10^{-4}$	
$\Gamma_{197}$	$\bar{D}^0 D^*(2010)^+ +$ $\bar{D}^*(2007)^0 D^+$	$< 1.30$	$\%$ CL=90%
$\Gamma_{198}$	$\bar{D}^0 D^*(2010)^+$	$( 3.9 \pm 0.5 ) \times 10^{-4}$	
$\Gamma_{199}$	$\bar{D}^0 D^+$	$( 3.8 \pm 0.4 ) \times 10^{-4}$	
$\Gamma_{200}$	$\bar{D}^0 D^+ K^0$	$( 1.55 \pm 0.21 ) \times 10^{-3}$	
$\Gamma_{201}$	$D^+ \bar{D}^*(2007)^0$	$( 6.3 \pm 1.7 ) \times 10^{-4}$	
$\Gamma_{202}$	$\bar{D}^*(2007)^0 D^+ K^0$	$( 2.1 \pm 0.5 ) \times 10^{-3}$	
$\Gamma_{203}$	$\bar{D}^0 D^*(2010)^+ K^0$	$( 3.8 \pm 0.4 ) \times 10^{-3}$	
$\Gamma_{204}$	$\bar{D}^*(2007)^0 D^*(2010)^+ K^0$	$( 9.2 \pm 1.2 ) \times 10^{-3}$	
$\Gamma_{205}$	$\bar{D}^0 D^0 K^+$	$( 1.45 \pm 0.33 ) \times 10^{-3}$	S=2.6
$\Gamma_{206}$	$\bar{D}^*(2007)^0 D^0 K^+$	$( 2.26 \pm 0.23 ) \times 10^{-3}$	
$\Gamma_{207}$	$\bar{D}^0 D^*(2007)^0 K^+$	$( 6.3 \pm 0.5 ) \times 10^{-3}$	
$\Gamma_{208}$	$\bar{D}^*(2007)^0 D^*(2007)^0 K^+$	$( 1.12 \pm 0.13 ) \%$	
$\Gamma_{209}$	$D^- D^+ K^+$	$( 2.2 \pm 0.7 ) \times 10^{-4}$	
$\Gamma_{210}$	$X_0(2900) D^+, X_0 \rightarrow D^- K^+$	$( 1.2 \pm 0.5 ) \times 10^{-5}$	
$\Gamma_{211}$	$X_1(2900) D^+, X_1 \rightarrow D^- K^+$	$( 6.7 \pm 2.3 ) \times 10^{-5}$	
$\Gamma_{212}$	$D^- D^+ K^+$ nonresonant	$( 5.3 \pm 1.8 ) \times 10^{-5}$	

$\Gamma_{213}$	$D^- D^*(2010)^+ K^+$	$( 6.3 \pm 1.1 ) \times 10^{-4}$
$\Gamma_{214}$	$D^*(2010)^- D^+ K^+$	$( 6.0 \pm 1.3 ) \times 10^{-4}$
$\Gamma_{215}$	$D^*(2010)^- D^*(2010)^+ K^+$	$( 1.32 \pm 0.18 ) \times 10^{-3}$
$\Gamma_{216}$	$(\bar{D}^+ \bar{D}^*)(D + D^*) K$	$( 4.05 \pm 0.30 ) \%$
$\Gamma_{217}$	$D_s^+ \pi^0$	$( 1.6 \pm 0.5 ) \times 10^{-5}$
$\Gamma_{218}$	$D_s^{*+} \pi^0$	$< 2.6 \times 10^{-4}$ CL=90%
$\Gamma_{219}$	$D_s^+ \eta$	$< 4 \times 10^{-4}$ CL=90%
$\Gamma_{220}$	$D_s^{*+} \eta$	$< 6 \times 10^{-4}$ CL=90%
$\Gamma_{221}$	$D_s^+ \rho^0$	$< 3.0 \times 10^{-4}$ CL=90%
$\Gamma_{222}$	$D_s^{*+} \rho^0$	$< 4 \times 10^{-4}$ CL=90%
$\Gamma_{223}$	$D_s^+ \omega$	$< 4 \times 10^{-4}$ CL=90%
$\Gamma_{224}$	$D_s^{*+} \omega$	$< 6 \times 10^{-4}$ CL=90%
$\Gamma_{225}$	$D_s^+ a_1(1260)^0$	$< 1.8 \times 10^{-3}$ CL=90%
$\Gamma_{226}$	$D_s^{*+} a_1(1260)^0$	$< 1.3 \times 10^{-3}$ CL=90%
$\Gamma_{227}$	$D_s^+ K^+ K^-$	$( 7.2 \pm 1.1 ) \times 10^{-6}$
$\Gamma_{228}$	$D_s^+ \phi$	$< 4.2 \times 10^{-7}$ CL=90%
$\Gamma_{229}$	$D_s^{*+} \phi$	$< 1.2 \times 10^{-5}$ CL=90%
$\Gamma_{230}$	$D_s^+ \bar{K}^0$	$< 8 \times 10^{-4}$ CL=90%
$\Gamma_{231}$	$D_s^{*+} \bar{K}^0$	$< 9 \times 10^{-4}$ CL=90%
$\Gamma_{232}$	$D_s^+ \bar{K}^*(892)^0$	$< 4.4 \times 10^{-6}$ CL=90%
$\Gamma_{233}$	$D_s^+ K^{*0}$	$< 3.5 \times 10^{-6}$ CL=90%
$\Gamma_{234}$	$D_s^{*+} \bar{K}^*(892)^0$	$< 3.5 \times 10^{-4}$ CL=90%
$\Gamma_{235}$	$D_s^- \pi^+ K^+$	$( 1.80 \pm 0.22 ) \times 10^{-4}$
$\Gamma_{236}$	$D_s^{*-} \pi^+ K^+$	$( 1.45 \pm 0.24 ) \times 10^{-4}$
$\Gamma_{237}$	$D_s^- \pi^+ K^*(892)^+$	$< 5 \times 10^{-3}$ CL=90%
$\Gamma_{238}$	$D_s^{*-} \pi^+ K^*(892)^+$	$< 7 \times 10^{-3}$ CL=90%
$\Gamma_{239}$	$D_s^- K^+ K^+$	$( 9.7 \pm 2.1 ) \times 10^{-6}$
$\Gamma_{240}$	$D_s^{*-} K^+ K^+$	$< 1.5 \times 10^{-5}$ CL=90%

### Charmonium modes

$\Gamma_{241}$	$\eta_c K^+$	$( 1.09 \pm 0.08 ) \times 10^{-3}$
$\Gamma_{242}$	$\eta_c K^+, \eta_c \rightarrow K_S^0 K^\mp \pi^\pm$	$( 2.7 \pm 0.6 ) \times 10^{-5}$
$\Gamma_{243}$	$\eta_c K^*(892)^+$	$( 1.1 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 0.5 \\ 0.4 \end{smallmatrix} ) \times 10^{-3}$
$\Gamma_{244}$	$\eta_c K^+ \pi^+ \pi^-$	$< 3.9 \times 10^{-4}$ CL=90%
$\Gamma_{245}$	$\eta_c K^+ \omega(782)$	$< 5.3 \times 10^{-4}$ CL=90%
$\Gamma_{246}$	$\eta_c K^+ \eta$	$< 2.2 \times 10^{-4}$ CL=90%
$\Gamma_{247}$	$\eta_c K^+ \pi^0$	$< 6.2 \times 10^{-5}$ CL=90%
$\Gamma_{248}$	$\eta_c(2S) K^+$	$( 4.4 \pm 1.0 ) \times 10^{-4}$
$\Gamma_{249}$	$\eta_c(2S) K^+, \eta_c \rightarrow p \bar{p}$	$( 3.5 \pm 0.8 ) \times 10^{-8}$
$\Gamma_{250}$	$\eta_c(2S) K^+, \eta_c \rightarrow K_S^0 K^\mp \pi^\pm$	$( 3.4 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 2.3 \\ 1.6 \end{smallmatrix} ) \times 10^{-6}$
$\Gamma_{251}$	$\eta_c(2S) K^+, \eta_c \rightarrow p \bar{p} \pi^+ \pi^-$	$( 1.12 \pm 0.18 ) \times 10^{-6}$

Γ <sub>252</sub>	$h_c(1P)K^+$ , $h_c \rightarrow J/\psi \pi^+ \pi^-$	< 3.4	$\times 10^{-6}$	CL=90%
Γ <sub>253</sub>	$X(3730)^0 K^+$ , $X^0 \rightarrow \eta_c \eta$	< 4.6	$\times 10^{-5}$	CL=90%
Γ <sub>254</sub>	$X(3730)^0 K^+$ , $X^0 \rightarrow \eta_c \pi^0$	< 5.7	$\times 10^{-6}$	CL=90%
Γ <sub>255</sub>	$\eta_{c2}(1D)K^+$ , $\eta_{c2} \rightarrow h_c \gamma$	< 3.7	$\times 10^{-5}$	CL=90%
Γ <sub>256</sub>	$\eta_{c2}(1D)\pi^+ K_S^0$ , $\eta_{c2} \rightarrow h_c \gamma$	< 1.1	$\times 10^{-4}$	CL=90%
Γ <sub>257</sub>	$\psi_2(3823)K^+$ , $\psi_2 \rightarrow J/\psi \pi^+ \pi^-$	( 2.8 ± 0.6 )	$\times 10^{-7}$	
Γ <sub>258</sub>	$\chi_{c1}(3872)K^+$	( 2.1 ± 0.7 )	$\times 10^{-4}$	
Γ <sub>259</sub>	$\chi_{c0}(3915)K^+$	< 2.8	$\times 10^{-4}$	CL=90%
Γ <sub>260</sub>	$\chi_{c0}(3915)K^+$ , $\chi_{c0} \rightarrow D^+ D^-$	( 8.1 ± 3.3 )	$\times 10^{-6}$	
Γ <sub>261</sub>	$\chi_{c0}(3915)K^+$ , $\chi_{c0} \rightarrow \eta_c \eta$	< 4.7	$\times 10^{-5}$	CL=90%
Γ <sub>262</sub>	$(Xchi)_{c0}(3915)K^+$ , $\chi_{c0} \rightarrow \eta_c \pi^0$	< 1.7	$\times 10^{-5}$	CL=90%
Γ <sub>263</sub>	$X(4014)^0 K^+$ , $X^0 \rightarrow \eta_c \eta$	< 3.9	$\times 10^{-5}$	CL=90%
Γ <sub>264</sub>	$X(4014)^0 K^+$ , $X^0 \rightarrow \eta_c \pi^0$	< 1.2	$\times 10^{-5}$	CL=90%
Γ <sub>265</sub>	$Z_c(3900)^0 K^+$ , $Z_c^0 \rightarrow \eta_c \pi^+ \pi^-$	< 4.7	$\times 10^{-5}$	CL=90%
Γ <sub>266</sub>	$X(4020)^0 K^+$ , $X^0 \rightarrow \eta_c \pi^+ \pi^-$	< 1.6	$\times 10^{-5}$	CL=90%
Γ <sub>267</sub>	$\chi_{c1}(3872)K^*(892)^+$	< 6	$\times 10^{-4}$	CL=90%
Γ <sub>268</sub>	$\chi_{c1}(3872)^+ K^0$ , $\chi_{c1}^+ \rightarrow J/\psi(1S)\pi^+ \pi^0$	[f] < 6.1	$\times 10^{-6}$	CL=90%
Γ <sub>269</sub>	$\chi_{c1}(3872)K^0 \pi^+$	( 2.8 ± 1.2 )	$\times 10^{-4}$	
Γ <sub>270</sub>	$Z_c(4430)^+ K^0$ , $Z_c^+ \rightarrow J/\psi \pi^+$	< 1.5	$\times 10^{-5}$	CL=95%
Γ <sub>271</sub>	$Z_c(4430)^+ K^0$ , $Z_c^+ \rightarrow \psi(2S)\pi^+$	< 4.7	$\times 10^{-5}$	CL=95%
Γ <sub>272</sub>	$\psi(4230)^0 K^+$ , $\psi^0 \rightarrow J/\psi \pi^+ \pi^-$	< 1.56	$\times 10^{-5}$	CL=95%
Γ <sub>273</sub>	$\chi_{c0}(3915)K^+$ , $\chi_{c0} \rightarrow J/\psi \gamma$	< 1.4	$\times 10^{-5}$	CL=90%
Γ <sub>274</sub>	$\chi_{c0}(3915)K^+$ , $\chi_{c0} \rightarrow \chi_{c1}(1P)\pi^0$	< 3.8	$\times 10^{-5}$	CL=90%
Γ <sub>275</sub>	$X(3930)^0 K^+$ , $X^0 \rightarrow J/\psi \gamma$	< 2.5	$\times 10^{-6}$	CL=90%
Γ <sub>276</sub>	$J/\psi(1S)K^+$	( 1.020 ± 0.019 )	$\times 10^{-3}$	
Γ <sub>277</sub>	$J/\psi(1S)K^0 \pi^+$	( 1.14 ± 0.11 )	$\times 10^{-3}$	
Γ <sub>278</sub>	$J/\psi(1S)K^+ \pi^+ \pi^-$	( 8.1 ± 1.3 )	$\times 10^{-4}$	S=2.5
Γ <sub>279</sub>	$J/\psi(1S)K^+ K^- K^+$	( 3.37 ± 0.29 )	$\times 10^{-5}$	
Γ <sub>280</sub>	$\chi_{c0}(3915)K^+$ , $\chi_{c0} \rightarrow p \bar{p}$	< 7.1	$\times 10^{-8}$	CL=95%
Γ <sub>281</sub>	$J/\psi(1S)K^*(892)^+$	( 1.43 ± 0.08 )	$\times 10^{-3}$	
Γ <sub>282</sub>	$J/\psi(1S)K(1270)^+$	( 1.8 ± 0.5 )	$\times 10^{-3}$	
Γ <sub>283</sub>	$J/\psi(1S)K(1400)^+$	< 5	$\times 10^{-4}$	CL=90%
Γ <sub>284</sub>	$J/\psi(1S)\eta K^+$	( 1.24 ± 0.14 )	$\times 10^{-4}$	
Γ <sub>285</sub>	$\chi_{c1-odd}(3872)K^+$ , $\chi_{c1-odd} \rightarrow J/\psi \eta$	< 3.8	$\times 10^{-6}$	CL=90%
Γ <sub>286</sub>	$\psi(4160)K^+$ , $\psi \rightarrow J/\psi \eta$	< 7.4	$\times 10^{-6}$	CL=90%
Γ <sub>287</sub>	$J/\psi(1S)\eta' K^+$	< 8.8	$\times 10^{-5}$	CL=90%

$\Gamma_{288}$	$J/\psi(1S)\phi K^+$	$( 5.0 \pm 0.4 ) \times 10^{-5}$
$\Gamma_{289}$	$J/\psi(1S)K_1(1650), K_1 \rightarrow \phi K^+$	$( 6 \begin{smallmatrix} +10 \\ -6 \end{smallmatrix} ) \times 10^{-6}$
$\Gamma_{290}$	$J/\psi(1S)K^*(1680)^+, K^* \rightarrow \phi K^+$	$( 3.4 \begin{smallmatrix} + 1.9 \\ - 2.2 \end{smallmatrix} ) \times 10^{-6}$
$\Gamma_{291}$	$J/\psi(1S)K_2^*(1980), K_2^* \rightarrow \phi K^+$	$( 1.5 \begin{smallmatrix} + 0.9 \\ - 0.5 \end{smallmatrix} ) \times 10^{-6}$
$\Gamma_{292}$	$J/\psi(1S)K(1830)^+, K(1830)^+ \rightarrow \phi K^+$	$( 1.3 \begin{smallmatrix} + 1.3 \\ - 1.1 \end{smallmatrix} ) \times 10^{-6}$
$\Gamma_{293}$	$\chi_{c1}(4140)K^+, \chi_{c1} \rightarrow J/\psi(1S)\phi$	$( 10 \pm 4 ) \times 10^{-6}$
$\Gamma_{294}$	$\chi_{c1}(4274)K^+, \chi_{c1} \rightarrow J/\psi(1S)\phi$	$( 3.6 \begin{smallmatrix} + 2.2 \\ - 1.8 \end{smallmatrix} ) \times 10^{-6}$
$\Gamma_{295}$	$\chi_{c0}(4500)K^+, \chi_c^0 \rightarrow J/\psi(1S)\phi$	$( 3.3 \begin{smallmatrix} + 2.1 \\ - 1.7 \end{smallmatrix} ) \times 10^{-6}$
$\Gamma_{296}$	$\chi_{c0}(4700)K^+, \chi_{c0} \rightarrow J/\psi(1S)\phi$	$( 6 \begin{smallmatrix} + 5 \\ - 4 \end{smallmatrix} ) \times 10^{-6}$
$\Gamma_{297}$	$J/\psi(1S)\omega K^+$	$( 3.20 \begin{smallmatrix} + 0.60 \\ - 0.32 \end{smallmatrix} ) \times 10^{-4}$
$\Gamma_{298}$	$\chi_{c0}(3915)K^+, \chi_{c0} \rightarrow J/\psi\omega$	$( 3.0 \begin{smallmatrix} + 0.9 \\ - 0.7 \end{smallmatrix} ) \times 10^{-5}$
$\Gamma_{299}$	$J/\psi(1S)\pi^+$	$( 3.92 \pm 0.08 ) \times 10^{-5}$
$\Gamma_{300}$	$J/\psi(1S)\pi^+\pi^+\pi^+\pi^-\pi^-$	$( 1.17 \pm 0.13 ) \times 10^{-5}$
$\Gamma_{301}$	$\psi(2S)\pi^+\pi^+\pi^-$	$( 1.9 \pm 0.4 ) \times 10^{-5}$
$\Gamma_{302}$	$J/\psi(1S)\rho^+$	$( 4.1 \pm 0.5 ) \times 10^{-5}$ S=1.4
$\Gamma_{303}$	$J/\psi(1S)\pi^+\pi^0$ nonresonant	$< 7.3 \times 10^{-6}$ CL=90%
$\Gamma_{304}$	$J/\psi(1S)a_1(1260)^+$	$< 1.2 \times 10^{-3}$ CL=90%
$\Gamma_{305}$	$J/\psi(1S)p\bar{p}\pi^+$	$< 5.0 \times 10^{-7}$ CL=90%
$\Gamma_{306}$	$J/\psi(1S)\rho\bar{\Lambda}$	$( 1.46 \pm 0.12 ) \times 10^{-5}$
$\Gamma_{307}$	$J/\psi(1S)\bar{\Sigma}^0\rho$	$< 1.1 \times 10^{-5}$ CL=90%
$\Gamma_{308}$	$J/\psi(1S)D^+$	$< 1.2 \times 10^{-4}$ CL=90%
$\Gamma_{309}$	$J/\psi(1S)\bar{D}^0\pi^+$	$< 2.5 \times 10^{-5}$ CL=90%
$\Gamma_{310}$	$\psi(2S)\pi^+$	$( 2.44 \pm 0.30 ) \times 10^{-5}$
$\Gamma_{311}$	$\psi(2S)K^+$	$( 6.24 \pm 0.20 ) \times 10^{-4}$
$\Gamma_{312}$	$\psi(2S)K^*(892)^+$	$( 6.7 \pm 1.4 ) \times 10^{-4}$ S=1.3
$\Gamma_{313}$	$\psi(2S)K^0\pi^+$	
$\Gamma_{314}$	$\psi(2S)K^+\pi^+\pi^-$	$( 4.3 \pm 0.5 ) \times 10^{-4}$
$\Gamma_{315}$	$\psi(2S)\phi(1020)K^+$	$( 4.0 \pm 0.7 ) \times 10^{-6}$
$\Gamma_{316}$	$\psi(3770)K^+$	$( 4.3 \pm 1.1 ) \times 10^{-4}$
$\Gamma_{317}$	$\psi(3770)K^+, \psi \rightarrow D^0\bar{D}^0$	$( 1.5 \pm 0.5 ) \times 10^{-4}$ S=1.4
$\Gamma_{318}$	$\psi(3770)K^+, \psi \rightarrow D^+D^-$	$( 9.4 \pm 3.5 ) \times 10^{-5}$
$\Gamma_{319}$	$\psi(3770)K^+, \psi \rightarrow p\bar{p}$	$< 2 \times 10^{-7}$ CL=95%
$\Gamma_{320}$	$\psi(4040)K^+$	$< 1.3 \times 10^{-4}$ CL=90%

$\Gamma_{321}$	$\psi(4040)K^+, \psi \rightarrow D^+D^-$	$(1.1 \pm 0.5) \times 10^{-5}$	
$\Gamma_{322}$	$\psi(4160)K^+$	$(5.1 \pm 2.7) \times 10^{-4}$	
$\Gamma_{323}$	$\psi(4160)K^+, \psi \rightarrow \bar{D}^0D^0$	$(8 \pm 5) \times 10^{-5}$	
$\Gamma_{324}$	$\psi(4160)K^+, \psi \rightarrow D^+D^-$	$(1.5 \pm 0.6) \times 10^{-5}$	
$\Gamma_{325}$	$\psi(4415)K^+, \psi \rightarrow D^+D^-$	$(2.0 \pm 0.8) \times 10^{-5}$	
$\Gamma_{326}$	$\chi_{c0}\pi^+, \chi_{c0} \rightarrow \pi^+\pi^-$	$< 1 \times 10^{-7}$	CL=90%
$\Gamma_{327}$	$\chi_{c0}K^+$	$(1.51^{+0.15}_{-0.13}) \times 10^{-4}$	
$\Gamma_{328}$	$\chi_{c0}K^*(892)^+$	$< 2.1 \times 10^{-4}$	CL=90%
$\Gamma_{329}$	$\chi_{c1}(1P)\pi^+$	$(2.2 \pm 0.5) \times 10^{-5}$	
$\Gamma_{330}$	$\chi_{c1}(1P)K^+$	$(4.74 \pm 0.22) \times 10^{-4}$	
$\Gamma_{331}$	$\chi_{c1}(1P)K^*(892)^+$	$(3.0 \pm 0.6) \times 10^{-4}$	S=1.1
$\Gamma_{332}$	$\chi_{c1}(1P)K^0\pi^+$	$(5.8 \pm 0.4) \times 10^{-4}$	
$\Gamma_{333}$	$\chi_{c1}(1P)K^+\pi^0$	$(3.29 \pm 0.35) \times 10^{-4}$	
$\Gamma_{334}$	$\chi_{c1}(1P)K^+\pi^+\pi^-$	$(3.74 \pm 0.30) \times 10^{-4}$	
$\Gamma_{335}$	$\chi_{c1}(2P)K^+, \chi_{c1}(2P) \rightarrow \pi^+\pi^-\chi_{c1}(1P)$	$< 1.1 \times 10^{-5}$	CL=90%
$\Gamma_{336}$	$\chi_{c2}K^+$	$(1.1 \pm 0.4) \times 10^{-5}$	
$\Gamma_{337}$	$\chi_{c2}K^+, \chi_{c2} \rightarrow p\bar{p}\pi^+\pi^-$	$< 1.9 \times 10^{-7}$	
$\Gamma_{338}$	$\chi_{c2}K^*(892)^+$	$< 1.2 \times 10^{-4}$	CL=90%
$\Gamma_{339}$	$\chi_{c2}K^0\pi^+$	$(1.16 \pm 0.25) \times 10^{-4}$	
$\Gamma_{340}$	$\chi_{c2}K^+\pi^0$	$< 6.2 \times 10^{-5}$	CL=90%
$\Gamma_{341}$	$\chi_{c2}K^+\pi^+\pi^-$	$(1.34 \pm 0.19) \times 10^{-4}$	
$\Gamma_{342}$	$\chi_{c2}(3930)K^+, \chi_{c2} \rightarrow D^+D^-$	$(1.6 \pm 0.6) \times 10^{-5}$	
$\Gamma_{343}$	$\chi_{c2}(3930)\pi^+, \chi_{c2} \rightarrow \pi^+\pi^-$	$< 1 \times 10^{-7}$	CL=90%
$\Gamma_{344}$	$h_c(1P)K^+$	$(3.7 \pm 1.2) \times 10^{-5}$	
$\Gamma_{345}$	$h_c(1P)K^+, h_c \rightarrow p\bar{p}$	$< 6.4 \times 10^{-8}$	CL=95%

**K or K\* modes**

$\Gamma_{346}$	$K^0\pi^+$	$(2.37 \pm 0.08) \times 10^{-5}$	
$\Gamma_{347}$	$K^+\pi^0$	$(1.29 \pm 0.05) \times 10^{-5}$	
$\Gamma_{348}$	$\eta'K^+$	$(7.04 \pm 0.25) \times 10^{-5}$	
$\Gamma_{349}$	$\eta'K^*(892)^+$	$(4.8^{+1.8}_{-1.6}) \times 10^{-6}$	
$\Gamma_{350}$	$\eta'K_0^*(1430)^+$	$(5.2 \pm 2.1) \times 10^{-6}$	
$\Gamma_{351}$	$\eta'K_2^*(1430)^+$	$(2.8 \pm 0.5) \times 10^{-5}$	
$\Gamma_{352}$	$\eta K^+$	$(2.4 \pm 0.4) \times 10^{-6}$	S=1.7
$\Gamma_{353}$	$\eta K^*(892)^+$	$(1.93 \pm 0.16) \times 10^{-5}$	
$\Gamma_{354}$	$\eta K_0^*(1430)^+$	$(1.8 \pm 0.4) \times 10^{-5}$	
$\Gamma_{355}$	$\eta K_2^*(1430)^+$	$(9.1 \pm 3.0) \times 10^{-6}$	
$\Gamma_{356}$	$\eta(1295)K^+ \times B(\eta(1295) \rightarrow \eta\pi\pi)$	$(2.9^{+0.8}_{-0.7}) \times 10^{-6}$	
$\Gamma_{357}$	$\eta(1405)K^+ \times B(\eta(1405) \rightarrow \eta\pi\pi)$	$< 1.3 \times 10^{-6}$	CL=90%

$\Gamma_{358}$	$\eta(1405) K^+ \times B(\eta(1405) \rightarrow K^* K)$	$< 1.2$	$\times 10^{-6}$	CL=90%
$\Gamma_{359}$	$\eta(1475) K^+ \times B(\eta(1475) \rightarrow K^* K)$	$( 1.38 \pm_{-0.18}^{0.21} )$	$\times 10^{-5}$	
$\Gamma_{360}$	$f_1(1285) K^+$	$< 2.0$	$\times 10^{-6}$	CL=90%
$\Gamma_{361}$	$f_1(1420) K^+ \times B(f_1(1420) \rightarrow \eta \pi \pi)$	$< 2.9$	$\times 10^{-6}$	CL=90%
$\Gamma_{362}$	$f_1(1420) K^+ \times B(f_1(1420) \rightarrow K^* K)$	$< 4.1$	$\times 10^{-6}$	CL=90%
$\Gamma_{363}$	$\phi(1680) K^+ \times B(\phi(1680) \rightarrow K^* K)$	$< 3.4$	$\times 10^{-6}$	CL=90%
$\Gamma_{364}$	$f_0(1500) K^+$	$( 3.7 \pm 2.2 )$	$\times 10^{-6}$	
$\Gamma_{365}$	$\omega K^+$	$( 6.5 \pm 0.4 )$	$\times 10^{-6}$	
$\Gamma_{366}$	$\omega K^*(892)^+$	$< 7.4$	$\times 10^{-6}$	CL=90%
$\Gamma_{367}$	$\omega (K\pi)_0^{*+}$	$( 2.8 \pm 0.4 )$	$\times 10^{-5}$	
$\Gamma_{368}$	$\omega K_0^*(1430)^+$	$( 2.4 \pm 0.5 )$	$\times 10^{-5}$	
$\Gamma_{369}$	$\omega K_2^*(1430)^+$	$( 2.1 \pm 0.4 )$	$\times 10^{-5}$	
$\Gamma_{370}$	$a_0(980)^+ K^0 \times B(a_0(980)^+ \rightarrow \eta \pi^+)$	$< 3.9$	$\times 10^{-6}$	CL=90%
$\Gamma_{371}$	$a_0(980)^0 K^+ \times B(a_0(980)^0 \rightarrow \eta \pi^0)$	$< 2.5$	$\times 10^{-6}$	CL=90%
$\Gamma_{372}$	$K^*(892)^0 \pi^+$	$( 1.01 \pm 0.08 )$	$\times 10^{-5}$	
$\Gamma_{373}$	$K^*(892)^+ \pi^0$	$( 6.8 \pm 0.9 )$	$\times 10^{-6}$	
$\Gamma_{374}$	$K^+ \pi^- \pi^+$	$( 5.10 \pm 0.29 )$	$\times 10^{-5}$	
$\Gamma_{375}$	$K^+ \pi^- \pi^+$ nonresonant	$( 1.63 \pm_{-0.15}^{0.21} )$	$\times 10^{-5}$	
$\Gamma_{376}$	$\omega(782) K^+$	$( 6 \pm 9 )$	$\times 10^{-6}$	
$\Gamma_{377}$	$K^+ f_0(980) \times B(f_0(980) \rightarrow \pi^+ \pi^-)$	$( 9.4 \pm_{-1.2}^{1.0} )$	$\times 10^{-6}$	
$\Gamma_{378}$	$f_2(1270)^0 K^+$	$( 1.07 \pm 0.27 )$	$\times 10^{-6}$	
$\Gamma_{379}$	$f_0(1370)^0 K^+ \times B(f_0(1370)^0 \rightarrow \pi^+ \pi^-)$	$< 1.07$	$\times 10^{-5}$	CL=90%
$\Gamma_{380}$	$\rho^0(1450) K^+ \times B(\rho^0(1450) \rightarrow \pi^+ \pi^-)$	$< 1.17$	$\times 10^{-5}$	CL=90%
$\Gamma_{381}$	$f_2'(1525) K^+ \times B(f_2'(1525) \rightarrow \pi^+ \pi^-)$	$< 3.4$	$\times 10^{-6}$	CL=90%
$\Gamma_{382}$	$K^+ \rho^0$	$( 3.7 \pm 0.5 )$	$\times 10^{-6}$	
$\Gamma_{383}$	$K_0^*(1430)^0 \pi^+$	$( 3.9 \pm_{-0.5}^{0.6} )$	$\times 10^{-5}$	S=1.4
$\Gamma_{384}$	$K_2^*(1430)^0 \pi^+$	$( 5.6 \pm_{-1.5}^{2.2} )$	$\times 10^{-6}$	
$\Gamma_{385}$	$K^*(1410)^0 \pi^+$	$< 4.5$	$\times 10^{-5}$	CL=90%
$\Gamma_{386}$	$K^*(1680)^0 \pi^+$	$< 1.2$	$\times 10^{-5}$	CL=90%
$\Gamma_{387}$	$K^+ \pi^0 \pi^0$	$( 1.62 \pm 0.19 )$	$\times 10^{-5}$	

$\Gamma_{388}$	$f_0(980)K^+ \times B(f_0 \rightarrow \pi^0\pi^0)$	$( 2.8 \pm 0.8 ) \times 10^{-6}$	
$\Gamma_{389}$	$K^- \pi^+ \pi^+$	$< 4.6$	$\times 10^{-8}$ CL=90%
$\Gamma_{390}$	$K^- \pi^+ \pi^+$ nonresonant	$< 5.6$	$\times 10^{-5}$ CL=90%
$\Gamma_{391}$	$K_1(1270)^0 \pi^+$	$< 4.0$	$\times 10^{-5}$ CL=90%
$\Gamma_{392}$	$K_1(1400)^0 \pi^+$	$< 3.9$	$\times 10^{-5}$ CL=90%
$\Gamma_{393}$	$K^0 \pi^+ \pi^0$	$< 6.6$	$\times 10^{-5}$ CL=90%
$\Gamma_{394}$	$K_0^*(1430)^+ \pi^0$	$( 1.19 \begin{smallmatrix} + 0.20 \\ - 0.23 \end{smallmatrix} ) \times 10^{-5}$	
$\Gamma_{395}$	$K^0 \rho^+$	$( 7.3 \begin{smallmatrix} + 1.0 \\ - 1.2 \end{smallmatrix} ) \times 10^{-6}$	
$\Gamma_{396}$	$K^*(892)^+ \pi^+ \pi^-$	$( 7.5 \pm 1.0 ) \times 10^{-5}$	
$\Gamma_{397}$	$K^*(892)^+ \rho^0$	$( 4.6 \pm 1.1 ) \times 10^{-6}$	
$\Gamma_{398}$	$K^*(892)^+ f_0(980)$	$( 4.2 \pm 0.7 ) \times 10^{-6}$	
$\Gamma_{399}$	$a_1^+ K^0$	$( 3.5 \pm 0.7 ) \times 10^{-5}$	
$\Gamma_{400}$	$b_1^+ K^0 \times B(b_1^+ \rightarrow \omega \pi^+)$	$( 9.6 \pm 1.9 ) \times 10^{-6}$	
$\Gamma_{401}$	$K^*(892)^0 \rho^+$	$( 9.2 \pm 1.5 ) \times 10^{-6}$	
$\Gamma_{402}$	$K_1(1400)^+ \rho^0$	$< 7.8$	$\times 10^{-4}$ CL=90%
$\Gamma_{403}$	$K_2^*(1430)^+ \rho^0$	$< 1.5$	$\times 10^{-3}$ CL=90%
$\Gamma_{404}$	$b_1^0 K^+ \times B(b_1^0 \rightarrow \omega \pi^0)$	$( 9.1 \pm 2.0 ) \times 10^{-6}$	
$\Gamma_{405}$	$b_1^+ K^{*0} \times B(b_1^+ \rightarrow \omega \pi^+)$	$< 5.9$	$\times 10^{-6}$ CL=90%
$\Gamma_{406}$	$b_1^0 K^{*+} \times B(b_1^0 \rightarrow \omega \pi^0)$	$< 6.7$	$\times 10^{-6}$ CL=90%
$\Gamma_{407}$	$K^+ \bar{K}^0$	$( 1.31 \pm 0.17 ) \times 10^{-6}$	S=1.2
$\Gamma_{408}$	$\bar{K}^0 K^+ \pi^0$	$< 2.4$	$\times 10^{-5}$ CL=90%
$\Gamma_{409}$	$K^+ K_S^0 K_S^0$	$( 1.05 \pm 0.04 ) \times 10^{-5}$	
$\Gamma_{410}$	$f_0(980)K^+, f_0 \rightarrow K_S^0 K_S^0$	$( 1.47 \pm 0.33 ) \times 10^{-5}$	
$\Gamma_{411}$	$f_0(1710)K^+, f_0 \rightarrow K_S^0 K_S^0$	$( 4.8 \begin{smallmatrix} + 4.0 \\ - 2.6 \end{smallmatrix} ) \times 10^{-7}$	
$\Gamma_{412}$	$K^+ K_S^0 K_S^0$ nonresonant	$( 2.0 \pm 0.4 ) \times 10^{-5}$	
$\Gamma_{413}$	$K_S^0 K_S^0 \pi^+$	$< 5.1$	$\times 10^{-7}$ CL=90%
$\Gamma_{414}$	$K^+ K^- \pi^+$	$( 5.2 \pm 0.4 ) \times 10^{-6}$	
$\Gamma_{415}$	$K^+ K^- \pi^+$ nonresonant	$( 1.68 \pm 0.26 ) \times 10^{-6}$	
$\Gamma_{416}$	$K^+ \bar{K}^*(892)^0$	$( 5.9 \pm 0.8 ) \times 10^{-7}$	
$\Gamma_{417}$	$K^+ \bar{K}_0^*(1430)^0$	$( 3.8 \pm 1.3 ) \times 10^{-7}$	
$\Gamma_{418}$	$\pi^+ (K^+ K^-)_{S-wave}$	$( 8.5 \pm 0.9 ) \times 10^{-7}$	
$\Gamma_{419}$	$K^+ K^+ \pi^-$	$< 1.1$	$\times 10^{-8}$ CL=90%
$\Gamma_{420}$	$K^+ K^+ \pi^-$ nonresonant	$< 8.79$	$\times 10^{-5}$ CL=90%
$\Gamma_{421}$	$f_2'(1525)K^+$	$( 1.8 \pm 0.5 ) \times 10^{-6}$	S=1.1
$\Gamma_{422}$	$K^+ f_J(2220)$		
$\Gamma_{423}$	$K^{*+} \pi^+ K^-$	$< 1.18$	$\times 10^{-5}$ CL=90%
$\Gamma_{424}$	$K^*(892)^+ K^*(892)^0$	$( 9.1 \pm 2.9 ) \times 10^{-7}$	
$\Gamma_{425}$	$K^{*+} K^+ \pi^-$	$< 6.1$	$\times 10^{-6}$ CL=90%
$\Gamma_{426}$	$K^+ K^- K^+$	$( 3.40 \pm 0.14 ) \times 10^{-5}$	S=1.4
$\Gamma_{427}$	$K^+ \phi$	$( 8.8 \begin{smallmatrix} + 0.7 \\ - 0.6 \end{smallmatrix} ) \times 10^{-6}$	S=1.1

$\Gamma_{428}$	$f_0(980)K^+ \times B(f_0(980) \rightarrow K^+K^-)$	$( 9.4 \pm 3.2 ) \times 10^{-6}$	
$\Gamma_{429}$	$a_2(1320)K^+ \times B(a_2(1320) \rightarrow K^+K^-)$	$< 1.1$	$\times 10^{-6}$ CL=90%
$\Gamma_{430}$	$X_0(1550)K^+ \times B(X_0(1550) \rightarrow K^+K^-)$	$( 4.3 \pm 0.7 ) \times 10^{-6}$	
$\Gamma_{431}$	$\phi(1680)K^+ \times B(\phi(1680) \rightarrow K^+K^-)$	$< 8$	$\times 10^{-7}$ CL=90%
$\Gamma_{432}$	$f_0(1710)K^+ \times B(f_0(1710) \rightarrow K^+K^-)$	$( 1.1 \pm 0.6 ) \times 10^{-6}$	
$\Gamma_{433}$	$K^+K^-K^+$ nonresonant	$( 2.38 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 0.28 \\ 0.50 \end{smallmatrix} ) \times 10^{-5}$	
$\Gamma_{434}$	$K^*(892)^+K^+K^-$	$( 3.6 \pm 0.5 ) \times 10^{-5}$	
$\Gamma_{435}$	$K^*(892)^+\phi$	$( 10.0 \pm 2.0 ) \times 10^{-6}$	S=1.7
$\Gamma_{436}$	$\phi(K\pi)_0^{*+}$	$( 8.3 \pm 1.6 ) \times 10^{-6}$	
$\Gamma_{437}$	$\phi K_1(1270)^+$	$( 6.1 \pm 1.9 ) \times 10^{-6}$	
$\Gamma_{438}$	$\phi K_1(1400)^+$	$< 3.2$	$\times 10^{-6}$ CL=90%
$\Gamma_{439}$	$\phi K^*(1410)^+$	$< 4.3$	$\times 10^{-6}$ CL=90%
$\Gamma_{440}$	$\phi K_0^*(1430)^+$	$( 7.0 \pm 1.6 ) \times 10^{-6}$	
$\Gamma_{441}$	$\phi K_2^*(1430)^+$	$( 8.4 \pm 2.1 ) \times 10^{-6}$	
$\Gamma_{442}$	$\phi K_2^*(1770)^+$	$< 1.50$	$\times 10^{-5}$ CL=90%
$\Gamma_{443}$	$\phi K_2^*(1820)^+$	$< 1.63$	$\times 10^{-5}$ CL=90%
$\Gamma_{444}$	$a_1^+K^{*0}$	$< 3.6$	$\times 10^{-6}$ CL=90%
$\Gamma_{445}$	$K^+\phi\phi$	$( 4.2 \pm 0.8 ) \times 10^{-6}$	S=2.2
$\Gamma_{446}$	$\eta'\eta'K^+$	$< 2.5$	$\times 10^{-5}$ CL=90%
$\Gamma_{447}$	$\omega\phi K^+$	$< 1.9$	$\times 10^{-6}$ CL=90%
$\Gamma_{448}$	$X(1812)K^+ \times B(X \rightarrow \omega\phi)$	$< 3.2$	$\times 10^{-7}$ CL=90%
$\Gamma_{449}$	$K^*(892)^+\gamma$	$( 3.92 \pm 0.22 ) \times 10^{-5}$	S=1.7
$\Gamma_{450}$	$K_1(1270)^+\gamma$	$( 4.4 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 0.7 \\ 0.6 \end{smallmatrix} ) \times 10^{-5}$	
$\Gamma_{451}$	$\eta K^+\gamma$	$( 7.9 \pm 0.9 ) \times 10^{-6}$	
$\Gamma_{452}$	$\eta' K^+\gamma$	$( 2.9 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 1.0 \\ 0.9 \end{smallmatrix} ) \times 10^{-6}$	
$\Gamma_{453}$	$\phi K^+\gamma$	$( 2.7 \pm 0.4 ) \times 10^{-6}$	S=1.2
$\Gamma_{454}$	$K^+\pi^-\pi^+\gamma$	$( 2.58 \pm 0.15 ) \times 10^{-5}$	S=1.3
$\Gamma_{455}$	$K^*(892)^0\pi^+\gamma$	$( 2.33 \pm 0.12 ) \times 10^{-5}$	
$\Gamma_{456}$	$K^+\rho^0\gamma$	$( 8.2 \pm 0.9 ) \times 10^{-6}$	
$\Gamma_{457}$	$(K^+\pi^-)_{NR}\pi^+\gamma$	$( 9.9 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 1.7 \\ 2.0 \end{smallmatrix} ) \times 10^{-6}$	
$\Gamma_{458}$	$K^0\pi^+\pi^0\gamma$	$( 4.6 \pm 0.5 ) \times 10^{-5}$	
$\Gamma_{459}$	$K_1(1400)^+\gamma$	$( 10 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 5 \\ 4 \end{smallmatrix} ) \times 10^{-6}$	
$\Gamma_{460}$	$K^*(1410)^+\gamma$	$( 2.7 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 0.8 \\ 0.6 \end{smallmatrix} ) \times 10^{-5}$	
$\Gamma_{461}$	$K_0^*(1430)^0\pi^+\gamma$	$( 1.32 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 0.26 \\ 0.32 \end{smallmatrix} ) \times 10^{-6}$	



$\Gamma_{462}$	$K_2^*(1430)^+ \gamma$	$( 1.4 \pm 0.4 ) \times 10^{-5}$	
$\Gamma_{463}$	$K^*(1680)^+ \gamma$	$( 6.7 \begin{smallmatrix} + 1.7 \\ - 1.4 \end{smallmatrix} ) \times 10^{-5}$	
$\Gamma_{464}$	$K_3^*(1780)^+ \gamma$	$< 3.9$	$\times 10^{-5}$ CL=90%
$\Gamma_{465}$	$K_4^*(2045)^+ \gamma$	$< 9.9$	$\times 10^{-3}$ CL=90%

**Light unflavored meson modes**

$\Gamma_{466}$	$\rho^+ \gamma$	$( 9.8 \pm 2.5 ) \times 10^{-7}$	
$\Gamma_{467}$	$\pi^+ \pi^0$	$( 5.5 \pm 0.4 ) \times 10^{-6}$	S=1.2
$\Gamma_{468}$	$\pi^+ \pi^+ \pi^-$	$( 1.52 \pm 0.14 ) \times 10^{-5}$	
$\Gamma_{469}$	$\rho^0 \pi^+$	$( 8.3 \pm 1.2 ) \times 10^{-6}$	
$\Gamma_{470}$	$\pi^+ f_0(980), f_0 \rightarrow \pi^+ \pi^-$	$< 1.5$	$\times 10^{-6}$ CL=90%
$\Gamma_{471}$	$\pi^+ f_2(1270)$	$( 2.2 \begin{smallmatrix} + 0.7 \\ - 0.4 \end{smallmatrix} ) \times 10^{-6}$	
$\Gamma_{472}$	$\rho(1450)^0 \pi^+, \rho^0 \rightarrow \pi^+ \pi^-$	$( 1.4 \begin{smallmatrix} + 0.6 \\ - 0.9 \end{smallmatrix} ) \times 10^{-6}$	
$\Gamma_{473}$	$\rho(1450)^0 \pi^+, \rho^0 \rightarrow K^+ K^-$	$( 1.60 \pm 0.14 ) \times 10^{-6}$	
$\Gamma_{474}$	$f_0(1370) \pi^+, f_0 \rightarrow \pi^+ \pi^-$	$< 4.0$	$\times 10^{-6}$ CL=90%
$\Gamma_{475}$	$f_0(500) \pi^+, f_0 \rightarrow \pi^+ \pi^-$	$< 4.1$	$\times 10^{-6}$ CL=90%
$\Gamma_{476}$	$\pi^+ \pi^- \pi^+$ nonresonant	$( 5.3 \begin{smallmatrix} + 1.5 \\ - 1.1 \end{smallmatrix} ) \times 10^{-6}$	
$\Gamma_{477}$	$\pi^+ \pi^0 \pi^0$	$< 8.9$	$\times 10^{-4}$ CL=90%
$\Gamma_{478}$	$\rho^+ \pi^0$	$( 1.09 \pm 0.14 ) \times 10^{-5}$	
$\Gamma_{479}$	$\pi^+ \pi^- \pi^+ \pi^0$	$< 4.0$	$\times 10^{-3}$ CL=90%
$\Gamma_{480}$	$\rho^+ \rho^0$	$( 2.40 \pm 0.19 ) \times 10^{-5}$	
$\Gamma_{481}$	$\rho^+ f_0(980), f_0 \rightarrow \pi^+ \pi^-$	$< 2.0$	$\times 10^{-6}$ CL=90%
$\Gamma_{482}$	$a_1(1260)^+ \pi^0$	$( 2.6 \pm 0.7 ) \times 10^{-5}$	
$\Gamma_{483}$	$a_1(1260)^0 \pi^+$	$( 2.0 \pm 0.6 ) \times 10^{-5}$	
$\Gamma_{484}$	$\omega \pi^+$	$( 6.9 \pm 0.5 ) \times 10^{-6}$	
$\Gamma_{485}$	$\omega \rho^+$	$( 1.59 \pm 0.21 ) \times 10^{-5}$	
$\Gamma_{486}$	$\eta \pi^+$	$( 4.02 \pm 0.27 ) \times 10^{-6}$	
$\Gamma_{487}$	$\eta \rho^+$	$( 7.0 \pm 2.9 ) \times 10^{-6}$	S=2.8
$\Gamma_{488}$	$\eta' \pi^+$	$( 2.7 \pm 0.9 ) \times 10^{-6}$	S=1.9
$\Gamma_{489}$	$\eta' \rho^+$	$( 9.7 \pm 2.2 ) \times 10^{-6}$	
$\Gamma_{490}$	$\phi \pi^+$	$( 3.2 \pm 1.5 ) \times 10^{-8}$	
$\Gamma_{491}$	$\phi \rho^+$	$< 3.0$	$\times 10^{-6}$ CL=90%
$\Gamma_{492}$	$a_0(980)^0 \pi^+, a_0^0 \rightarrow \eta \pi^0$	$< 5.8$	$\times 10^{-6}$ CL=90%
$\Gamma_{493}$	$a_0(980)^+ \pi^0, a_0^+ \rightarrow \eta \pi^+$	$< 1.4$	$\times 10^{-6}$ CL=90%
$\Gamma_{494}$	$\pi^+ \pi^+ \pi^+ \pi^- \pi^-$	$< 8.6$	$\times 10^{-4}$ CL=90%
$\Gamma_{495}$	$\rho^0 a_1(1260)^+$	$< 6.2$	$\times 10^{-4}$ CL=90%
$\Gamma_{496}$	$\rho^0 a_2(1320)^+$	$< 7.2$	$\times 10^{-4}$ CL=90%
$\Gamma_{497}$	$b_1^0 \pi^+, b_1^0 \rightarrow \omega \pi^0$	$( 6.7 \pm 2.0 ) \times 10^{-6}$	
$\Gamma_{498}$	$b_1^+ \pi^0, b_1^+ \rightarrow \omega \pi^+$	$< 3.3$	$\times 10^{-6}$ CL=90%
$\Gamma_{499}$	$\pi^+ \pi^+ \pi^+ \pi^- \pi^- \pi^0$	$< 6.3$	$\times 10^{-3}$ CL=90%

$\Gamma_{500}$	$b_1^+ \rho^0, b_1^+ \rightarrow \omega \pi^+$	$< 5.2$	$\times 10^{-6}$	CL=90%
$\Gamma_{501}$	$a_1(1260)^+ a_1(1260)^0$	$< 1.3$	%	CL=90%
$\Gamma_{502}$	$b_1^0 \rho^+, b_1^0 \rightarrow \omega \pi^0$	$< 3.3$	$\times 10^{-6}$	CL=90%

### Charged particle ( $h^\pm$ ) modes

$$h^\pm = K^\pm \text{ or } \pi^\pm$$

$\Gamma_{503}$	$h^+ \pi^0$	$( 1.6 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 0.7 \\ 0.6 \end{smallmatrix} ) \times 10^{-5}$		
$\Gamma_{504}$	$\omega h^+$	$( 1.38 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 0.27 \\ 0.24 \end{smallmatrix} ) \times 10^{-5}$		
$\Gamma_{505}$	$h^+ X^0$ (Familon)	$< 4.9$	$\times 10^{-5}$	CL=90%
$\Gamma_{506}$	$K^+ X^0, X^0 \rightarrow \mu^+ \mu^-$	$< 1$	$\times 10^{-7}$	CL=95%

### Baryon modes

$\Gamma_{507}$	$p \bar{p} \pi^+$	$( 1.62 \pm 0.20 ) \times 10^{-6}$		
$\Gamma_{508}$	$p \bar{p} \pi^+$ nonresonant	$< 5.3$	$\times 10^{-5}$	CL=90%
$\Gamma_{509}$	$p \bar{p} \pi^+ \pi^0$	$( 4.6 \pm 1.3 ) \times 10^{-6}$		
$\Gamma_{510}$	$p \bar{p} \pi^+ \pi^+ \pi^-$			
$\Gamma_{511}$	$p \bar{p} K^+$	$( 5.9 \pm 0.5 ) \times 10^{-6}$	S=1.5	
$\Gamma_{512}$	$\Theta(1710)^{++} \bar{p}, \Theta^{++} \rightarrow p K^+$	[g] $< 9.1$	$\times 10^{-8}$	CL=90%
$\Gamma_{513}$	$f_J(2220) K^+, f_J \rightarrow p \bar{p}$	[g] $< 4.1$	$\times 10^{-7}$	CL=90%
$\Gamma_{514}$	$p \bar{\Lambda}(1520)$	$( 3.1 \pm 0.6 ) \times 10^{-7}$		
$\Gamma_{515}$	$p \bar{p} K^+$ nonresonant	$< 8.9$	$\times 10^{-5}$	CL=90%
$\Gamma_{516}$	$p \bar{p} K^*(892)^+$	$( 3.6 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 0.8 \\ 0.7 \end{smallmatrix} ) \times 10^{-6}$		
$\Gamma_{517}$	$f_J(2220) K^{*+}, f_J \rightarrow p \bar{p}$	$< 7.7$	$\times 10^{-7}$	CL=90%
$\Gamma_{518}$	$p \bar{\Lambda}$	$( 2.4 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 1.0 \\ 0.9 \end{smallmatrix} ) \times 10^{-7}$		
$\Gamma_{519}$	$p \bar{\Lambda} \gamma$	$( 2.4 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 0.5 \\ 0.4 \end{smallmatrix} ) \times 10^{-6}$		
$\Gamma_{520}$	$p \bar{\Lambda} \pi^0$	$( 3.0 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 0.7 \\ 0.6 \end{smallmatrix} ) \times 10^{-6}$		
$\Gamma_{521}$	$p \bar{\Sigma}(1385)^0$	$< 4.7$	$\times 10^{-7}$	CL=90%
$\Gamma_{522}$	$\Delta^+ \bar{\Lambda}$	$< 8.2$	$\times 10^{-7}$	CL=90%
$\Gamma_{523}$	$p \bar{\Sigma} \gamma$	$< 4.6$	$\times 10^{-6}$	CL=90%
$\Gamma_{524}$	$p \bar{\Lambda} \pi^+ \pi^-$	$( 1.13 \pm 0.13 ) \times 10^{-5}$		
$\Gamma_{525}$	$p \bar{\Lambda} \pi^+ \pi^-$ nonresonant	$( 5.9 \pm 1.1 ) \times 10^{-6}$		
$\Gamma_{526}$	$p \bar{\Lambda} \rho^0, \rho^0 \rightarrow \pi^+ \pi^-$	$( 4.8 \pm 0.9 ) \times 10^{-6}$		
$\Gamma_{527}$	$p \bar{\Lambda} f_2(1270), f_2 \rightarrow \pi^+ \pi^-$	$( 2.0 \pm 0.8 ) \times 10^{-6}$		
$\Gamma_{528}$	$p \bar{\Lambda} K^+ K^-$	$( 4.1 \pm 0.7 ) \times 10^{-6}$		
$\Gamma_{529}$	$p \bar{\Lambda} \phi$	$( 8.0 \pm 2.2 ) \times 10^{-7}$		
$\Gamma_{530}$	$\bar{p} \Lambda K^+ K^-$	$( 3.7 \pm 0.6 ) \times 10^{-6}$		
$\Gamma_{531}$	$\Lambda \bar{\Lambda} \pi^+$	$< 9.4$	$\times 10^{-7}$	CL=90%
$\Gamma_{532}$	$\Lambda \bar{\Lambda} K^+$	$( 3.4 \pm 0.6 ) \times 10^{-6}$		
$\Gamma_{533}$	$\Lambda \bar{\Lambda} K^{*+}$	$( 2.2 \begin{smallmatrix} + \\ - \end{smallmatrix} \begin{smallmatrix} 1.2 \\ 0.9 \end{smallmatrix} ) \times 10^{-6}$		

$\Gamma_{534}$	$\Lambda(1520)\bar{\Lambda}K^+$		$( 2.2 \pm 0.7 ) \times 10^{-6}$
$\Gamma_{535}$	$\Lambda\bar{\Lambda}(1520)K^+$		$< 2.08 \times 10^{-6}$
$\Gamma_{536}$	$\bar{\Delta}^0 p$		$< 1.38 \times 10^{-6}$ CL=90%
$\Gamma_{537}$	$\Delta^{++}\bar{p}$		$< 1.4 \times 10^{-7}$ CL=90%
$\Gamma_{538}$	$D^+ p\bar{p}$		$< 1.5 \times 10^{-5}$ CL=90%
$\Gamma_{539}$	$D^*(2010)^+ p\bar{p}$		$< 1.5 \times 10^{-5}$ CL=90%
$\Gamma_{540}$	$\bar{D}^0 p\bar{p}\pi^+$		$( 3.72 \pm 0.27 ) \times 10^{-4}$
$\Gamma_{541}$	$\bar{D}^{*0} p\bar{p}\pi^+$		$( 3.73 \pm 0.32 ) \times 10^{-4}$
$\Gamma_{542}$	$D^- p\bar{p}\pi^+\pi^-$		$( 1.66 \pm 0.30 ) \times 10^{-4}$
$\Gamma_{543}$	$D^{*-} p\bar{p}\pi^+\pi^-$		$( 1.86 \pm 0.25 ) \times 10^{-4}$
$\Gamma_{544}$	$p\bar{\Lambda}^0\bar{D}^0$		$( 1.43 \pm 0.32 ) \times 10^{-5}$
$\Gamma_{545}$	$p\bar{\Lambda}^0\bar{D}^*(2007)^0$		$< 5 \times 10^{-5}$ CL=90%
$\Gamma_{546}$	$\bar{\Lambda}_c^- p\pi^+$		$( 2.3 \pm 0.4 ) \times 10^{-4}$ S=2.2
$\Gamma_{547}$	$\bar{\Lambda}_c^- \Delta(1232)^{++}$		$< 1.9 \times 10^{-5}$ CL=90%
$\Gamma_{548}$	$\bar{\Lambda}_c^- \Delta_X(1600)^{++}$		$( 4.7 \pm 1.0 ) \times 10^{-5}$
$\Gamma_{549}$	$\bar{\Lambda}_c^- \Delta_X(2420)^{++}$		$( 3.7 \pm 0.8 ) \times 10^{-5}$
$\Gamma_{550}$	$(\bar{\Lambda}_c^- p)_s \pi^+$	[h]	$( 3.1 \pm 0.7 ) \times 10^{-5}$
$\Gamma_{551}$	$\bar{\Sigma}_c(2520)^0 p$		$< 3 \times 10^{-6}$ CL=90%
$\Gamma_{552}$	$\bar{\Sigma}_c(2800)^0 p$		$( 2.6 \pm 0.9 ) \times 10^{-5}$
$\Gamma_{553}$	$\bar{\Lambda}_c^- p\pi^+\pi^0$		$( 1.8 \pm 0.6 ) \times 10^{-3}$
$\Gamma_{554}$	$\bar{\Lambda}_c^- p\pi^+\pi^+\pi^-$		$( 2.2 \pm 0.7 ) \times 10^{-3}$
$\Gamma_{555}$	$\bar{\Lambda}_c^- p\pi^+\pi^+\pi^-\pi^0$		$< 1.34$ % CL=90%
$\Gamma_{556}$	$\Lambda_c^+ \Lambda_c^- K^+$		$( 4.9 \pm 0.7 ) \times 10^{-4}$
$\Gamma_{557}$	$\Xi_c(2930)\Lambda_c^+, \Xi_c \rightarrow K^+ \Lambda_c^-$		$( 1.7 \pm 0.5 ) \times 10^{-4}$
$\Gamma_{558}$	$\bar{\Sigma}_c(2455)^0 p$		$( 2.9 \pm 0.7 ) \times 10^{-5}$
$\Gamma_{559}$	$\bar{\Sigma}_c(2455)^0 p\pi^0$		$( 3.5 \pm 1.1 ) \times 10^{-4}$
$\Gamma_{560}$	$\bar{\Sigma}_c(2455)^0 p\pi^-\pi^+$		$( 3.5 \pm 1.1 ) \times 10^{-4}$
$\Gamma_{561}$	$\bar{\Sigma}_c(2455)^{--} p\pi^+\pi^+$		$( 2.37 \pm 0.20 ) \times 10^{-4}$
$\Gamma_{562}$	$\bar{\Lambda}_c(2593)^- / \bar{\Lambda}_c(2625)^- p\pi^+$		$< 1.9 \times 10^{-4}$ CL=90%
$\Gamma_{563}$	$\Xi_c^0 \Lambda_c^+$		$( 9.5 \pm 2.3 ) \times 10^{-4}$
$\Gamma_{564}$	$\Xi_c^0 \Lambda_c^+, \Xi_c^0 \rightarrow \Xi^+ \pi^-$		$( 1.76 \pm 0.29 ) \times 10^{-5}$
$\Gamma_{565}$	$\Xi_c^0 \Lambda_c^+, \Xi_c^0 \rightarrow \Lambda K^+ \pi^-$		$( 1.14 \pm 0.26 ) \times 10^{-5}$
$\Gamma_{566}$	$\Xi_c^0 \Lambda_c^+, \Xi_c^0 \rightarrow pK^- K^- \pi^+$		$( 5.5 \pm 1.9 ) \times 10^{-6}$
$\Gamma_{567}$	$\Lambda_c^+ \Xi_c^0$		$< 6.5 \times 10^{-4}$ CL=90%
$\Gamma_{568}$	$\Lambda_c^+ \Xi_c(2645)^0$		$< 7.9 \times 10^{-4}$ CL=90%
$\Gamma_{569}$	$\Lambda_c^+ \Xi_c(2790)^0$		$( 1.1 \pm 0.4 ) \times 10^{-3}$

**Lepton Family number (LF) or Lepton number (L) or Baryon number (B) violating modes, or/and  $\Delta B = 1$  weak neutral current (B1) modes**

$\Gamma_{570}$	$\pi^+ \ell^+ \ell^-$	B1	$< 4.9 \times 10^{-8}$ CL=90%
$\Gamma_{571}$	$\pi^+ e^+ e^-$	B1	$< 8.0 \times 10^{-8}$ CL=90%
$\Gamma_{572}$	$\pi^+ \mu^+ \mu^-$	B1	$( 1.78 \pm 0.23 ) \times 10^{-8}$

Γ <sub>573</sub>	$\pi^+ \nu \bar{\nu}$	<i>B1</i>	< 1.4	$\times 10^{-5}$	CL=90%
Γ <sub>574</sub>	$K^+ \ell^+ \ell^-$	<i>B1</i>	[a] ( 4.7 ± 0.5 )	$\times 10^{-7}$	S=2.3
Γ <sub>575</sub>	$K^+ e^+ e^-$	<i>B1</i>	( 5.6 ± 0.6 )	$\times 10^{-7}$	
Γ <sub>576</sub>	$K^+ \mu^+ \mu^-$	<i>B1</i>	( 4.53 ± 0.35 )	$\times 10^{-7}$	S=1.8
Γ <sub>577</sub>	$K^+ \mu^+ \mu^-$ nonreso- nant	<i>B1</i>	( 4.37 ± 0.27 )	$\times 10^{-7}$	
Γ <sub>578</sub>	$K^+ \tau^+ \tau^-$	<i>B1</i>	< 2.25	$\times 10^{-3}$	CL=90%
Γ <sub>579</sub>	$K^+ \bar{\nu} \nu$	<i>B1</i>	< 1.6	$\times 10^{-5}$	CL=90%
Γ <sub>580</sub>	$\rho^+ \nu \bar{\nu}$	<i>B1</i>	< 3.0	$\times 10^{-5}$	CL=90%
Γ <sub>581</sub>	$K^*(892)^+ \ell^+ \ell^-$	<i>B1</i>	[a] ( 1.01 ± 0.11 )	$\times 10^{-6}$	S=1.1
Γ <sub>582</sub>	$K^*(892)^+ e^+ e^-$	<i>B1</i>	( 1.55 $\begin{smallmatrix} + 0.40 \\ - 0.31 \end{smallmatrix}$ )	$\times 10^{-6}$	
Γ <sub>583</sub>	$K^*(892)^+ \mu^+ \mu^-$	<i>B1</i>	( 9.6 ± 1.0 )	$\times 10^{-7}$	
Γ <sub>584</sub>	$K^*(892)^+ \nu \bar{\nu}$	<i>B1</i>	< 4.0	$\times 10^{-5}$	CL=90%
Γ <sub>585</sub>	$K^+ \pi^+ \pi^- \mu^+ \mu^-$	<i>B1</i>	( 4.3 ± 0.4 )	$\times 10^{-7}$	
Γ <sub>586</sub>	$\phi K^+ \mu^+ \mu^-$	<i>B1</i>	( 7.9 $\begin{smallmatrix} + 2.1 \\ - 1.7 \end{smallmatrix}$ )	$\times 10^{-8}$	
Γ <sub>587</sub>	$\bar{\Lambda} p \nu \bar{\nu}$		< 3.0	$\times 10^{-5}$	CL=90%
Γ <sub>588</sub>	$\pi^+ e^+ \mu^-$	<i>LF</i>	< 6.4	$\times 10^{-3}$	CL=90%
Γ <sub>589</sub>	$\pi^+ e^- \mu^+$	<i>LF</i>	< 6.4	$\times 10^{-3}$	CL=90%
Γ <sub>590</sub>	$\pi^+ e^\pm \mu^\mp$	<i>LF</i>	< 1.7	$\times 10^{-7}$	CL=90%
Γ <sub>591</sub>	$\pi^+ e^+ \tau^-$	<i>LF</i>	< 7.4	$\times 10^{-5}$	CL=90%
Γ <sub>592</sub>	$\pi^+ e^- \tau^+$	<i>LF</i>	< 2.0	$\times 10^{-5}$	CL=90%
Γ <sub>593</sub>	$\pi^+ e^\pm \tau^\mp$	<i>LF</i>	< 7.5	$\times 10^{-5}$	CL=90%
Γ <sub>594</sub>	$\pi^+ \mu^+ \tau^-$	<i>LF</i>	< 6.2	$\times 10^{-5}$	CL=90%
Γ <sub>595</sub>	$\pi^+ \mu^- \tau^+$	<i>LF</i>	< 4.5	$\times 10^{-5}$	CL=90%
Γ <sub>596</sub>	$\pi^+ \mu^\pm \tau^\mp$	<i>LF</i>	< 7.2	$\times 10^{-5}$	CL=90%
Γ <sub>597</sub>	$K^+ e^+ \mu^-$	<i>LF</i>	< 7.0	$\times 10^{-9}$	CL=90%
Γ <sub>598</sub>	$K^+ e^- \mu^+$	<i>LF</i>	< 6.4	$\times 10^{-9}$	CL=90%
Γ <sub>599</sub>	$K^+ e^\pm \mu^\mp$	<i>LF</i>	< 9.1	$\times 10^{-8}$	CL=90%
Γ <sub>600</sub>	$K^+ e^+ \tau^-$	<i>LF</i>	< 4.3	$\times 10^{-5}$	CL=90%
Γ <sub>601</sub>	$K^+ e^- \tau^+$	<i>LF</i>	< 1.5	$\times 10^{-5}$	CL=90%
Γ <sub>602</sub>	$K^+ e^\pm \tau^\mp$	<i>LF</i>	< 3.0	$\times 10^{-5}$	CL=90%
Γ <sub>603</sub>	$K^+ \mu^+ \tau^-$	<i>LF</i>	< 4.5	$\times 10^{-5}$	CL=90%
Γ <sub>604</sub>	$K^+ \mu^- \tau^+$	<i>LF</i>	< 2.8	$\times 10^{-5}$	CL=90%
Γ <sub>605</sub>	$K^+ \mu^\pm \tau^\mp$	<i>LF</i>	< 4.8	$\times 10^{-5}$	CL=90%
Γ <sub>606</sub>	$K^*(892)^+ e^+ \mu^-$	<i>LF</i>	< 1.3	$\times 10^{-6}$	CL=90%
Γ <sub>607</sub>	$K^*(892)^+ e^- \mu^+$	<i>LF</i>	< 9.9	$\times 10^{-7}$	CL=90%
Γ <sub>608</sub>	$K^*(892)^+ e^\pm \mu^\mp$	<i>LF</i>	< 1.4	$\times 10^{-6}$	CL=90%
Γ <sub>609</sub>	$\pi^- e^+ e^+$	<i>L</i>	< 2.3	$\times 10^{-8}$	CL=90%
Γ <sub>610</sub>	$\pi^- \mu^+ \mu^+$	<i>L</i>	< 4.0	$\times 10^{-9}$	CL=95%
Γ <sub>611</sub>	$\pi^- e^+ \mu^+$	<i>L</i>	< 1.5	$\times 10^{-7}$	CL=90%
Γ <sub>612</sub>	$\rho^- e^+ e^+$	<i>L</i>	< 1.7	$\times 10^{-7}$	CL=90%
Γ <sub>613</sub>	$\rho^- \mu^+ \mu^+$	<i>L</i>	< 4.2	$\times 10^{-7}$	CL=90%
Γ <sub>614</sub>	$\rho^- e^+ \mu^+$	<i>L</i>	< 4.7	$\times 10^{-7}$	CL=90%

$\Gamma_{615}$	$K^- e^+ e^+$	$L$	$< 3.0$	$\times 10^{-8}$	CL=90%
$\Gamma_{616}$	$K^- \mu^+ \mu^+$	$L$	$< 4.1$	$\times 10^{-8}$	CL=90%
$\Gamma_{617}$	$K^- e^+ \mu^+$	$L$	$< 1.6$	$\times 10^{-7}$	CL=90%
$\Gamma_{618}$	$K^*(892)^- e^+ e^+$	$L$	$< 4.0$	$\times 10^{-7}$	CL=90%
$\Gamma_{619}$	$K^*(892)^- \mu^+ \mu^+$	$L$	$< 5.9$	$\times 10^{-7}$	CL=90%
$\Gamma_{620}$	$K^*(892)^- e^+ \mu^+$	$L$	$< 3.0$	$\times 10^{-7}$	CL=90%
$\Gamma_{621}$	$D^- e^+ e^+$	$L$	$< 2.6$	$\times 10^{-6}$	CL=90%
$\Gamma_{622}$	$D^- e^+ \mu^+$	$L$	$< 1.8$	$\times 10^{-6}$	CL=90%
$\Gamma_{623}$	$D^- \mu^+ \mu^+$	$L$	$< 6.9$	$\times 10^{-7}$	CL=95%
$\Gamma_{624}$	$D^{*-} \mu^+ \mu^+$	$L$	$< 2.4$	$\times 10^{-6}$	CL=95%
$\Gamma_{625}$	$D_s^- \mu^+ \mu^+$	$L$	$< 5.8$	$\times 10^{-7}$	CL=95%
$\Gamma_{626}$	$\bar{D}_s^0 \pi^- \mu^+ \mu^+$	$L$	$< 1.5$	$\times 10^{-6}$	CL=95%
$\Gamma_{627}$	$\Lambda^0 \mu^+$	$L, B$	$< 6$	$\times 10^{-8}$	CL=90%
$\Gamma_{628}$	$\Lambda^0 e^+$	$L, B$	$< 3.2$	$\times 10^{-8}$	CL=90%
$\Gamma_{629}$	$\bar{\Lambda}^0 \mu^+$	$L, B$	$< 6$	$\times 10^{-8}$	CL=90%
$\Gamma_{630}$	$\bar{\Lambda}^0 e^+$	$L, B$	$< 8$	$\times 10^{-8}$	CL=90%

- [a] An  $\ell$  indicates an  $e$  or a  $\mu$  mode, not a sum over these modes.
- [b] An  $CP(\pm 1)$  indicates the  $CP=+1$  and  $CP=-1$  eigenstates of the  $D^0-\bar{D}^0$  system.
- [c]  $D$  denotes  $D^0$  or  $\bar{D}^0$ .
- [d]  $D_{CP+}^{*0}$  decays into  $D^0 \pi^0$  with the  $D^0$  reconstructed in  $CP$ -even eigenstates  $K^+ K^-$  and  $\pi^+ \pi^-$ .
- [e]  $\bar{D}^{**}$  represents an excited state with mass  $2.2 < M < 2.8 \text{ GeV}/c^2$ .
- [f]  $\chi_{c1}(3872)^+$  is a hypothetical charged partner of the  $\chi_{c1}(3872)$ .
- [g]  $\Theta(1710)^{++}$  is a possible narrow pentaquark state and  $G(2220)$  is a possible glueball resonance.
- [h]  $(\bar{\Lambda}_c^- \rho)_s$  denotes a low-mass enhancement near  $3.35 \text{ GeV}/c^2$ .

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## CONSTRAINED FIT INFORMATION

An overall fit to 3 branching ratios uses 6 measurements and one constraint to determine 3 parameters. The overall fit has a  $\chi^2 = 3.7$  for 4 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients  $\langle \delta x_i \delta x_j \rangle / (\delta x_i \delta x_j)$ , in percent, from the fit to the branching fractions,  $x_i \equiv \Gamma_i / \Gamma_{\text{total}}$ . The fit constrains the  $x_i$  whose labels appear in this array to sum to one.

$$x_{407} \begin{vmatrix} & 10 \\ & x_{346} \end{vmatrix}$$


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## CONSTRAINED FIT INFORMATION

An overall fit to 18 branching ratios uses 58 measurements and one constraint to determine 12 parameters. The overall fit has a  $\chi^2 = 64.2$  for 47 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients  $\langle \delta x_i \delta x_j \rangle / (\delta x_i \delta x_j)$ , in percent, from the fit to the branching fractions,  $x_i \equiv \Gamma_i / \Gamma_{\text{total}}$ . The fit constrains the  $x_i$  whose labels appear in this array to sum to one.

$x_8$	33									
$x_{51}$	0	0								
$x_{108}$	0	0	7							
$x_{149}$	0	0	1	13						
$x_{276}$	0	0	0	0	0					
$x_{281}$	0	0	0	0	0	0				
$x_{299}$	0	0	0	0	0	86	0			
$x_{311}$	0	0	0	0	0	40	0	35		
$x_{576}$	0	0	0	0	0	14	0	12	6	
$x_{583}$	0	0	0	0	0	0	5	0	0	0
	$x_7$	$x_8$	$x_{51}$	$x_{108}$	$x_{149}$	$x_{276}$	$x_{281}$	$x_{299}$	$x_{311}$	$x_{576}$

## $B^+$ BRANCHING RATIOS

$\Gamma(\ell^+ \nu_e X) / \Gamma_{\text{total}}$   $\Gamma_1 / \Gamma$

“OUR EVALUATION” is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFLAV) and are described at <https://hflav.web.cern.ch/>. The averaging/rescaling procedure takes into account correlations between the measurements.

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
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**10.99 ± 0.28 OUR EVALUATION**

**10.76 ± 0.32 OUR AVERAGE** Error includes scale factor of 1.1.

11.17 ± 0.25 ± 0.28 <sup>1</sup> URQUIJO 07 BELL  $e^+ e^- \rightarrow \gamma(4S)$

10.28 ± 0.26 ± 0.39 <sup>2</sup> AUBERT,B 06Y BABR  $e^+ e^- \rightarrow \gamma(4S)$

10.25 ± 0.57 ± 0.65 <sup>3</sup> ARTUSO 97 CLE2  $e^+ e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

11.15 ± 0.26 ± 0.41 <sup>4</sup> OKABE 05 BELL Repl. by URQUIJO 07

10.1 ± 1.8 ± 1.5 ATHANAS 94 CLE2 Sup. by ARTUSO 97

<sup>1</sup> URQUIJO 07 report a measurement of  $(10.34 \pm 0.23 \pm 0.25)\%$  for the partial branching fraction of  $B^+ \rightarrow e^+ \nu_e X_c$  decay with electron energy above 0.6 GeV. We converted the result to  $B^+ \rightarrow e^+ \nu_e X$  branching fraction.

<sup>2</sup> The measurements are obtained for charged and neutral  $B$  mesons partial rates of semileptonic decay to electrons with momentum above 0.6 GeV/c in the  $B$  rest frame. The best precision on the ratio is achieved for a momentum threshold of 1.0 GeV:  $B(B^+ \rightarrow e^+ \nu_e X) / B(B^0 \rightarrow e^+ \nu_e X) = 1.074 \pm 0.041 \pm 0.026$ .

<sup>3</sup> ARTUSO 97 uses partial reconstruction of  $B \rightarrow D^* \ell \nu_\ell$  and inclusive semileptonic branching ratio from BARISH 96B ( $0.1049 \pm 0.0017 \pm 0.0043$ ).

<sup>4</sup> The measurements are obtained for charged and neutral  $B$  mesons partial rates of semileptonic decay to electrons with momentum above 0.6 GeV/c in the  $B$  rest frame, and their ratio of  $B(B^+ \rightarrow e^+ \nu_e X)/B(B^0 \rightarrow e^+ \nu_e X) = 1.08 \pm 0.05 \pm 0.02$ .

### $\Gamma(e^+ \nu_e X_c)/\Gamma_{\text{total}}$ $\Gamma_2/\Gamma$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>10.79 \pm 0.25 \pm 0.27</math></b>	<sup>1</sup> URQUIJO	07	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Measure the independent  $B^+$  and  $B^0$  partial branching fractions with electron threshold energies of 0.4 GeV.

### $\Gamma(\ell^+ \nu_\ell X_u)/\Gamma_{\text{total}}$ $\Gamma_3/\Gamma$

Requires  $E_\ell^* > 1$  GeV, where  $E_\ell^*$  is lepton energy in  $B$  rest frame.

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>1.65 \pm 0.10 \pm 0.18</math></b>	<sup>1</sup> CAO	21A	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> The correlation of 50% with  $B(B^0 \rightarrow \ell^+ \nu_\ell X_u)$  (lepton energy in  $B$  rest frame  $E_\ell^* > 1$  GeV) was reported.

### $\Gamma(\overline{D}^0 \ell^+ \nu_\ell)/\Gamma_{\text{total}}$ $\Gamma_5/\Gamma$

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFLAV) and are described at <https://hflav.web.cern.ch/>. The averaging/rescaling procedure takes into account correlations between the measurements.  $\ell = e$  or  $\mu$ , not sum over  $e$  and  $\mu$  modes.

VALUE (%)	DOCUMENT ID	TECN	COMMENT
<b><math>2.30 \pm 0.09</math> OUR EVALUATION</b>			
<b><math>2.29 \pm 0.08</math> OUR AVERAGE</b>			
$2.29 \pm 0.08 \pm 0.09$	<sup>1</sup> AUBERT	10	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
$2.34 \pm 0.03 \pm 0.13$	AUBERT	09A	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
$2.21 \pm 0.13 \pm 0.19$	<sup>2</sup> BARTELT	99	CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$
$1.6 \pm 0.6 \pm 0.3$	<sup>3</sup> FULTON	91	CLEO $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$2.33 \pm 0.09 \pm 0.09$	<sup>1</sup> AUBERT	08Q	BABR Repl. by AUBERT 09A
$1.94 \pm 0.15 \pm 0.34$	<sup>4</sup> ATHANAS	97	CLE2 Repl. by BARTELT 99

<sup>1</sup> Uses a fully reconstructed  $B$  meson as a tag on the recoil side.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> FULTON 91 assumes equal production of  $B^0 \overline{B}^0$  and  $B^+ B^-$  at the  $\Upsilon(4S)$ .

<sup>4</sup> ATHANAS 97 uses missing energy and missing momentum to reconstruct neutrino.

### $\Gamma(\overline{D}^0 \ell^+ \nu_\ell)/\Gamma(\ell^+ \nu_\ell X)$ $\Gamma_5/\Gamma_1$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.255 \pm 0.009 \pm 0.009</math></b>	<sup>1</sup> AUBERT	10	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses a fully reconstructed  $B$  meson on the recoil side.

$$\Gamma(\overline{D}^0 \ell^+ \nu_\ell) / \Gamma(D \ell^+ \nu_\ell X) \quad \Gamma_5 / \Gamma_4$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.230 ± 0.020 OUR AVERAGE</b>			
0.25 ± 0.06	<sup>1</sup> AAIJ	19AC	LHCB $p\bar{p}$ at 7 and 8 TeV
0.227 ± 0.014 ± 0.016	<sup>2</sup> AUBERT	07AN	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> The relative branching fractions of  $B^- \rightarrow D^0, D^{*0}, D^{**0}$  in the  $B^- \rightarrow D^0 X \mu^- \bar{\nu}$  channel are determined by fitting the distribution of the missing mass in  $\overline{B}_{s2}^{*0} \rightarrow B^- K^+$  decays.

<sup>2</sup> Uses a fully reconstructed  $B$  meson on the recoil side.

$$\Gamma(\overline{D}^0 \tau^+ \nu_\tau) / \Gamma_{\text{total}} \quad \Gamma_6 / \Gamma$$

<u>VALUE (units <math>10^{-2}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.77 ± 0.22 ± 0.12</b>	<sup>1</sup> BOZEK	10	BELL $e^+e^- \rightarrow \Upsilon(4S)$
0.67 ± 0.37 ± 0.13	<sup>2</sup> AUBERT	08N	BABR Repl. by AUBERT 09S

• • • We do not use the following data for averages, fits, limits, etc. • • •

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Uses a fully reconstructed  $B$  meson as a tag on the recoil side.

$$\Gamma(\overline{D}^0 \tau^+ \nu_\tau) / \Gamma(\overline{D}^0 \ell^+ \nu_\ell) \quad \Gamma_6 / \Gamma_5$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.429 ± 0.082 ± 0.052</b>	<sup>1,2</sup> LEES	12D	BABR $e^+e^- \rightarrow \Upsilon(4S)$
0.314 ± 0.170 ± 0.049	<sup>1</sup> AUBERT	09S	BABR Repl. by LEES 12D

• • • We do not use the following data for averages, fits, limits, etc. • • •

<sup>1</sup> Uses a fully reconstructed  $B$  meson as a tag on the recoil side.

<sup>2</sup> Uses  $\tau^+ \rightarrow e^+ \nu_e \bar{\nu}_\tau$  and  $\tau^+ \rightarrow \mu^+ \nu_\mu \bar{\nu}_\tau$  and  $e^+$  or  $\mu^+$  as  $\ell^+$ .

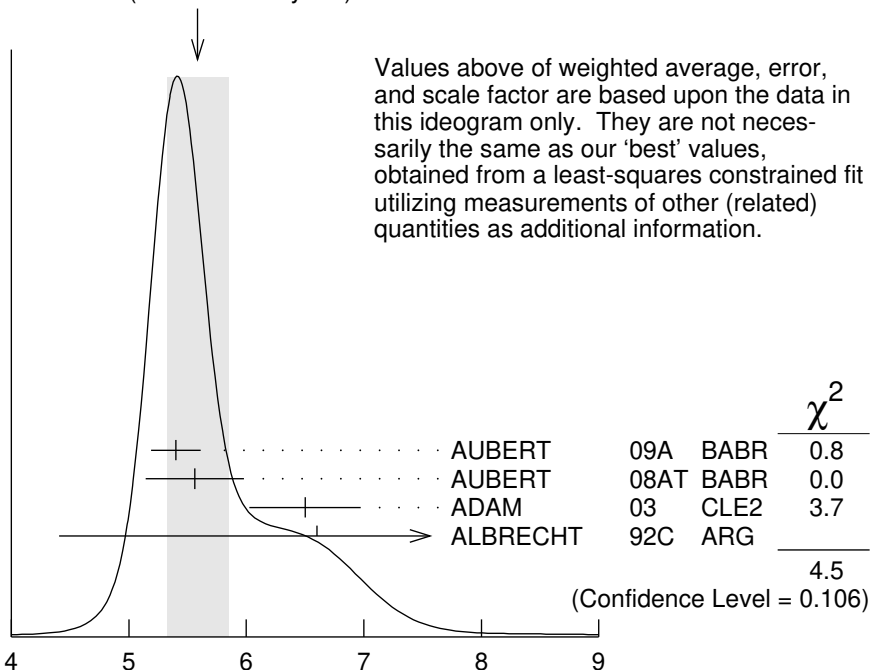
$$\Gamma(\overline{D}^{*(2007)0} \ell^+ \nu_\ell) / \Gamma_{\text{total}} \quad \Gamma_7 / \Gamma$$

“OUR EVALUATION” is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFLAV) and are described at <https://hflav.web.cern.ch/>. The averaging/rescaling procedure takes into account correlations between the measurements.  $\ell = e$  or  $\mu$ , not sum over  $e$  and  $\mu$  modes.

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>5.58 ± 0.22 OUR EVALUATION</b>				
<b>5.60 ± 0.26 OUR FIT</b>				Error includes scale factor of 1.5.
<b>5.58 ± 0.26 OUR AVERAGE</b>				Error includes scale factor of 1.5. See the ideogram below.
5.40 ± 0.02 ± 0.21		AUBERT	09A	BABR $e^+e^- \rightarrow \Upsilon(4S)$
5.56 ± 0.08 ± 0.41		<sup>1</sup> AUBERT	08AT	BABR $e^+e^- \rightarrow \Upsilon(4S)$
6.50 ± 0.20 ± 0.43		<sup>2</sup> ADAM	03	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
6.6 ± 1.6 ± 1.5		<sup>3</sup> ALBRECHT	92C	ARG $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
5.83 ± 0.15 ± 0.30		<sup>4</sup> AUBERT	08Q	BABR Repl. by AUBERT 09A
6.50 ± 0.20 ± 0.43		<sup>5</sup> BRIERE	02	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
5.13 ± 0.54 ± 0.64	302	<sup>6</sup> BARISH	95	CLE2 Repl. by ADAM 03
seen	398	<sup>7</sup> SANGHERA	93	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
4.1 ± 0.8 <sup>+0.8</sup> / <sub>-0.9</sub>		<sup>8</sup> FULTON	91	CLEO $e^+e^- \rightarrow \Upsilon(4S)$
7.0 ± 1.8 ± 1.4		<sup>9</sup> ANTREASYAN	90B	CBAL $e^+e^- \rightarrow \Upsilon(4S)$



WEIGHTED AVERAGE  
 $5.58 \pm 0.26$  (Error scaled by 1.5)



Values above of weighted average, error, and scale factor are based upon the data in this ideogram only. They are not necessarily the same as our 'best' values, obtained from a least-squares constrained fit utilizing measurements of other (related) quantities as additional information.

- <sup>1</sup> Measured using the dependence of  $B^- \rightarrow D^{*0} e^- \bar{\nu}_e$  decay differential rate and the form factor description by CAPRINI 98.
- <sup>2</sup> Simultaneous measurements of both  $B^0 \rightarrow D^*(2010)^- \ell \nu$  and  $B^+ \rightarrow \bar{D}^*(2007)^0 \ell \nu$ .
- <sup>3</sup> ALBRECHT 92C reports  $0.058 \pm 0.014 \pm 0.013$ . We rescale using the method described in STONE 94 but with the updated PDG 94  $B(D^0 \rightarrow K^- \pi^+)$ . Assumes equal production of  $B^0 \bar{B}^0$  and  $B^+ B^-$  at the  $\Upsilon(4S)$ .
- <sup>4</sup> Uses a fully reconstructed  $B$  meson as a tag on the recoil side.
- <sup>5</sup> The results are based on the same analysis and data sample reported in ADAM 03.
- <sup>6</sup> BARISH 95 use  $B(D^0 \rightarrow K^- \pi^+) = (3.91 \pm 0.08 \pm 0.17)\%$  and  $B(D^{*0} \rightarrow D^0 \pi^0) = (63.6 \pm 2.3 \pm 3.3)\%$ .
- <sup>7</sup> Combining  $\bar{D}^{*0} \ell^+ \nu_\ell$  and  $\bar{D}^{*-} \ell^+ \nu_\ell$  SANGHERA 93 test  $V-A$  structure and fit the decay angular distributions to obtain  $A_{FB} = 3/4 * (\Gamma^- - \Gamma^+) / \Gamma = 0.14 \pm 0.06 \pm 0.03$ . Assuming a value of  $V_{cb}$ , they measure  $V$ ,  $A_1$ , and  $A_2$ , the three form factors for the  $D^* \ell \nu_\ell$  decay, where results are slightly dependent on model assumptions.
- <sup>8</sup> Assumes equal production of  $B^0 \bar{B}^0$  and  $B^+ B^-$  at the  $\Upsilon(4S)$ . Uncorrected for  $D$  and  $D^*$  branching ratio assumptions.
- <sup>9</sup> ANTREASYAN 90B is average over  $B$  and  $\bar{D}^*(2010)$  charge states.

$$\frac{\Gamma(\bar{D}^*(2007)^0 \ell^+ \nu_\ell)}{\Gamma_{\text{total}}} \qquad \Gamma_7 / \Gamma$$

$$\frac{\Gamma(\bar{D}^*(2007)^0 \ell^+ \nu_\ell)}{\Gamma(D \ell^+ \nu_\ell X)} \qquad \Gamma_7 / \Gamma_4$$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.582 \pm 0.018 \pm 0.030</math></b>	<sup>1</sup> AUBERT	07AN BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

- <sup>1</sup> Uses a fully reconstructed  $B$  meson on the recoil side.

$$\Gamma(\overline{D}^*(2007)^0 \tau^+ \nu_\tau) / \Gamma_{\text{total}} \quad \Gamma_8 / \Gamma$$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.88 ± 0.20 OUR FIT</b>			

<b>2.12<sup>+0.28</sup><sub>-0.27</sub> ± 0.29</b>	<sup>1</sup> BOZEK	10	BELL $e^+ e^- \rightarrow \gamma(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

2.25 ± 0.48 ± 0.28	<sup>2</sup> AUBERT	08N	BABR Repl. by AUBERT 09S
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

<sup>2</sup> Uses a fully reconstructed  $B$  meson as a tag on the recoil side.

$$\Gamma(\overline{D}^*(2007)^0 \tau^+ \nu_\tau) / \Gamma(\overline{D}^*(2007)^0 \ell^+ \nu_\ell) \quad \Gamma_8 / \Gamma_7$$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.335 ± 0.034 OUR FIT</b>			

<b>0.322 ± 0.032 ± 0.022</b>	<sup>1,2</sup> LEES	12D	BABR $e^+ e^- \rightarrow \gamma(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.346 ± 0.073 ± 0.034	<sup>1</sup> AUBERT	09S	BABR Repl. by LEES 12D
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<sup>1</sup> Uses a fully reconstructed  $B$  meson as a tag on the recoil side.

<sup>2</sup> Uses  $\tau^+ \rightarrow e^+ \nu_e \overline{\nu}_\tau$  and  $\tau^+ \rightarrow \mu^+ \nu_\mu \overline{\nu}_\tau$  and  $e^+$  or  $\mu^+$  as  $\ell^+$ .

$$\Gamma(D^- \pi^+ \ell^+ \nu_\ell) / \Gamma_{\text{total}} \quad \Gamma_9 / \Gamma$$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>4.4 ± 0.4 OUR AVERAGE</b>			

4.55 ± 0.27 ± 0.39	VOSSSEN	18	BELL $e^+ e^- \rightarrow \gamma(4S)$
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4.2 ± 0.6 ± 0.3	<sup>1</sup> AUBERT	08Q	BABR $e^+ e^- \rightarrow \gamma(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

4.3 ± 0.6 ± 0.2	<sup>1,2</sup> LIVENTSEV	08	BELL Repl. by VOSSSEN 18
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5.6 ± 1.0 ± 0.2	<sup>3</sup> LIVENTSEV	05	BELL Repl. by LIVENTSEV 08
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<sup>1</sup> Uses a fully reconstructed  $B$  meson as a tag on the recoil side.

<sup>2</sup> LIVENTSEV 08 reports  $(4.0 \pm 0.4 \pm 0.6) \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D^- \pi^+ \ell^+ \nu_\ell) / \Gamma_{\text{total}}] / [B(B^+ \rightarrow \overline{D}^0 \ell^+ \nu_\ell)]$  assuming  $B(B^+ \rightarrow \overline{D}^0 \ell^+ \nu_\ell) = (2.15 \pm 0.22) \times 10^{-2}$ , which we rescale to our best value  $B(B^+ \rightarrow \overline{D}^0 \ell^+ \nu_\ell) = (2.30 \pm 0.09) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup> LIVENTSEV 05 reports  $[\Gamma(B^+ \rightarrow D^- \pi^+ \ell^+ \nu_\ell) / \Gamma_{\text{total}}] / [B(B^0 \rightarrow D^- \ell^+ \nu_\ell)] = 0.25 \pm 0.03 \pm 0.03$  which we multiply by our best value  $B(B^0 \rightarrow D^- \ell^+ \nu_\ell) = (2.24 \pm 0.09) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(\overline{D}_0^*(2420)^0 \ell^+ \nu_\ell, \overline{D}_0^{*0} \rightarrow D^- \pi^+) / \Gamma_{\text{total}} \quad \Gamma_{10} / \Gamma$$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>2.5 ± 0.5 OUR AVERAGE</b>			

2.6 ± 0.5 ± 0.4	<sup>1</sup> AUBERT	08BL	BABR $e^+ e^- \rightarrow \gamma(4S)$
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2.4 ± 0.4 ± 0.6	<sup>1</sup> LIVENTSEV	08	BELL $e^+ e^- \rightarrow \gamma(4S)$
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<sup>1</sup> Uses a fully reconstructed  $B$  meson as a tag on the recoil side.

$$\Gamma(\overline{D}_2^*(2460)^0 \ell^+ \nu_\ell, \overline{D}_2^{*0} \rightarrow D^- \pi^+) / \Gamma_{\text{total}} \quad \Gamma_{11} / \Gamma$$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.53 ± 0.16 OUR AVERAGE</b>			

1.42 ± 0.15 ± 0.15	<sup>1</sup> AUBERT	09Y	BABR $e^+ e^- \rightarrow \gamma(4S)$
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1.5 ± 0.2 ± 0.2	<sup>2</sup> AUBERT	08BL	BABR $e^+ e^- \rightarrow \gamma(4S)$
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2.2 ± 0.3 ± 0.4 <sup>2</sup> LIVENTSEV 08 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses a simultaneous fit of all  $B$  semileptonic decays without full reconstruction of events. AUBERT 09Y reports  $B(B^+ \rightarrow \bar{D}_2^*(2460)^0 \ell^+ \nu_\ell) \cdot B(\bar{D}_2^*(2460)^0 \rightarrow D^{(*)-} \pi^+) = (2.29 \pm 0.23 \pm 0.21) \times 10^{-3}$  and the authors have provided us the individual measurement.

<sup>2</sup> Uses a fully reconstructed  $B$  meson as a tag on the recoil side.

$\Gamma(D^{(*)} n \pi \ell^+ \nu_\ell (n \geq 1)) / \Gamma(D \ell^+ \nu_\ell X)$   $\Gamma_{12} / \Gamma_4$

VALUE DOCUMENT ID TECN COMMENT

**0.193 ± 0.022 OUR AVERAGE**

0.21 ± 0.07 <sup>1,2</sup> AAIJ 19AC LHCb  $pp$  at 7 and 8 TeV

0.191 ± 0.013 ± 0.019 <sup>3</sup> AUBERT 07AN BABR  $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> The relative branching fractions of  $B^- \rightarrow D^0, D^{*0}, D^{**0}$  in the  $B^- \rightarrow D^0 X \mu^- \bar{\nu}$  channel are determined by fitting the distribution of the missing mass in  $\bar{B}_{s2}^{*0} \rightarrow B^- K^+$  decays.

<sup>2</sup> In this measurement of  $f_{D^{**0}} = B(B^- \rightarrow (D^{**0} \rightarrow D^0 X) \mu^- \bar{\nu}) / B(B^- \rightarrow D^0 X \mu^- \bar{\nu})$ ,  $D^{**0}$  refers collectively to  $L = 1$  states  $D_0^*(2400), D_1(2420), D_1(2430)$ , and  $D_2^*(2460)$ , as well as other resonances such as radially excited  $D$  mesons, and to nonresonant contributions with additional pions.

<sup>3</sup> Uses a fully reconstructed  $B$  meson on the recoil side.

$\Gamma(D^{*-} \pi^+ \ell^+ \nu_\ell) / \Gamma_{\text{total}}$   $\Gamma_{13} / \Gamma$

VALUE (units  $10^{-3}$ ) DOCUMENT ID TECN COMMENT

**6.0 ± 0.4 OUR AVERAGE**

6.03 ± 0.43 ± 0.38 VOSSEN 18 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

5.9 ± 0.5 ± 0.4 <sup>1</sup> AUBERT 08Q BABR  $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

6.8 ± 1.1 ± 0.3 <sup>1,2</sup> LIVENTSEV 08 BELL Repl. by VOSSEN 18

6.0 ± 1.4 ± 0.1 <sup>3,4</sup> LIVENTSEV 05 BELL Repl. by LIVENTSEV 08

<sup>1</sup> Uses a fully reconstructed  $B$  meson as a tag on the recoil side.

<sup>2</sup> LIVENTSEV 08 reports  $(6.4 \pm 0.8 \pm 0.9) \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D^{*-} \pi^+ \ell^+ \nu_\ell) / \Gamma_{\text{total}}] / [B(B^+ \rightarrow \bar{D}^0 \ell^+ \nu_\ell)]$  assuming  $B(B^+ \rightarrow \bar{D}^0 \ell^+ \nu_\ell) = (2.15 \pm 0.22) \times 10^{-2}$ , which we rescale to our best value  $B(B^+ \rightarrow \bar{D}^0 \ell^+ \nu_\ell) = (2.30 \pm 0.09) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup> Excludes  $D^{*+}$  contribution to  $D\pi$  modes.

<sup>4</sup> LIVENTSEV 05 reports  $[\Gamma(B^+ \rightarrow D^{*-} \pi^+ \ell^+ \nu_\ell) / \Gamma_{\text{total}}] / [B(B^0 \rightarrow D^*(2010)^- \ell^+ \nu_\ell)] = 0.12 \pm 0.02 \pm 0.02$  which we multiply by our best value  $B(B^0 \rightarrow D^*(2010)^- \ell^+ \nu_\ell) = (4.97 \pm 0.12) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\bar{D}_1(2420)^0 \ell^+ \nu_\ell, \bar{D}_1^0 \rightarrow D^{*-} \pi^+) / \Gamma_{\text{total}}$   $\Gamma_{14} / \Gamma$

VALUE (units  $10^{-3}$ ) DOCUMENT ID TECN COMMENT

**3.03 ± 0.20 OUR AVERAGE**

2.97 ± 0.17 ± 0.17 <sup>1</sup> AUBERT 09Y BABR  $e^+e^- \rightarrow \Upsilon(4S)$

2.9 ± 0.3 ± 0.3 <sup>2</sup> AUBERT 08BL BABR  $e^+e^- \rightarrow \Upsilon(4S)$

4.2 ± 0.7 ± 0.7 <sup>2</sup> LIVENTSEV 08 BELL e<sup>+</sup>e<sup>-</sup> → γ(4S)  
 3.73 ± 0.85 ± 0.57 <sup>3</sup> ANASTASSOV 98 CLE2 e<sup>+</sup>e<sup>-</sup> → γ(4S)

<sup>1</sup> Uses a simultaneous measurement of all *B* semileptonic decays without full reconstruction of events.

<sup>2</sup> Uses a fully reconstructed *B* meson as a tag on the recoil side.

<sup>3</sup> Assumes equal production of *B*<sup>+</sup> and *B*<sup>0</sup> at the γ(4S).

**Γ( $\bar{D}_1'(2430)^0 \ell^+ \nu_\ell, \bar{D}_1^0 \rightarrow D^{*-} \pi^+$ )/Γ<sub>total</sub> Γ<sub>15</sub>/Γ**

VALUE (units 10 <sup>-3</sup> )	CL%	DOCUMENT ID	TECN	COMMENT
<b>2.7 ± 0.4 ± 0.5</b>		<sup>1</sup> AUBERT	08BL BABR	e <sup>+</sup> e <sup>-</sup> → γ(4S)

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 0.7                      90            <sup>1</sup> LIVENTSEV 08 BELL e<sup>+</sup>e<sup>-</sup> → γ(4S)

<sup>1</sup> Uses a fully reconstructed *B* meson as a tag on the recoil side.

**Γ( $\bar{D}_2^*(2460)^0 \ell^+ \nu_\ell, \bar{D}_2^0 \rightarrow D^{*-} \pi^+$ )/Γ<sub>total</sub> Γ<sub>16</sub>/Γ**

VALUE (units 10 <sup>-3</sup> )	CL%	DOCUMENT ID	TECN	COMMENT
<b>1.01 ± 0.24 OUR AVERAGE</b>		Error includes scale factor of 2.0.		

0.87 ± 0.11 ± 0.07            <sup>1</sup> AUBERT            09Y    BABR    e<sup>+</sup>e<sup>-</sup> → γ(4S)

1.5 ± 0.2 ± 0.2                <sup>2</sup> AUBERT            08BL    BABR    e<sup>+</sup>e<sup>-</sup> → γ(4S)

1.8 ± 0.6 ± 0.3                <sup>2</sup> LIVENTSEV    08    BELL    e<sup>+</sup>e<sup>-</sup> → γ(4S)

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 1.6                      90            <sup>3</sup> ANASTASSOV 98 CLE2 e<sup>+</sup>e<sup>-</sup> → γ(4S)

<sup>1</sup> Uses a simultaneous fit of all *B* semileptonic decays without full reconstruction of events.

AUBERT 09Y reports B(*B*<sup>+</sup> →  $\bar{D}_2^*(2460)^0 \ell^+ \nu_\ell$ ) · B( $\bar{D}_2^*(2460)^0 \rightarrow D^{(*)-} \pi^+$ ) =

(2.29 ± 0.23 ± 0.21) × 10<sup>-3</sup> and the authors have provided us the individual measurement.

<sup>2</sup> Uses a fully reconstructed *B* meson as a tag on the recoil side.

<sup>3</sup> Assumes equal production of *B*<sup>+</sup> and *B*<sup>0</sup> at the γ(4S).

**Γ( $\bar{D}^0 \pi^+ \pi^- \ell^+ \nu_\ell$ )/Γ( $\bar{D}^0 \ell^+ \nu_\ell$ ) Γ<sub>17</sub>/Γ<sub>5</sub>**

VALUE (units 10 <sup>-2</sup> )	DOCUMENT ID	TECN	COMMENT
<b>7.1 ± 1.3 ± 0.8</b>	<sup>1</sup> LEES            16	BABR	e <sup>+</sup> e <sup>-</sup> → γ(4S)

<sup>1</sup> Measurement used electrons and muons as leptons.

**Γ( $\bar{D}^{*0} \pi^+ \pi^- \ell^+ \nu_\ell$ )/Γ( $\bar{D}^{*0} \ell^+ \nu_\ell$ ) Γ<sub>18</sub>/Γ<sub>7</sub>**

VALUE (units 10 <sup>-2</sup> )	DOCUMENT ID	TECN	COMMENT
<b>1.4 ± 0.7 ± 0.4</b>	<sup>1</sup> LEES            16	BABR	e <sup>+</sup> e <sup>-</sup> → γ(4S)

<sup>1</sup> Measurement used electrons and muons as leptons.

**Γ( $D_s^{(*)-} K^+ \ell^+ \nu_\ell$ )/Γ<sub>total</sub> Γ<sub>19</sub>/Γ**

VALUE (units 10 <sup>-4</sup> )	DOCUMENT ID	TECN	COMMENT
<b>6.1 ± 1.0 OUR AVERAGE</b>			

5.9 ± 1.2 ± 1.5                <sup>1</sup> STYPULA            12    BELL    e<sup>+</sup>e<sup>-</sup> → γ(4S)

6.13<sup>+1.04</sup><sub>-1.03</sub> ± 0.67                <sup>1</sup> DEL-AMO-SA...11L    BABR    e<sup>+</sup>e<sup>-</sup> → γ(4S)

<sup>1</sup> Assumes equal production of *B*<sup>+</sup> and *B*<sup>0</sup> at the γ(4S).

$\Gamma(D_s^- K^+ \ell^+ \nu_\ell)/\Gamma_{\text{total}}$				$\Gamma_{20}/\Gamma$
VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT	
$3.0 \pm 0.9^{+1.1}_{-0.8}$	<sup>1</sup> STYPULA	12	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(D_s^{*-} K^+ \ell^+ \nu_\ell)/\Gamma_{\text{total}}$				$\Gamma_{21}/\Gamma$
VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT	
$2.9 \pm 1.6^{+1.1}_{-1.0}$	<sup>1,2</sup> STYPULA	12	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> STYPULA 12 provides also an upper limit of  $0.56 \times 10^{-3}$  at 90% CL for the same data. Also measures branching fraction of the combined modes of  $D_s^- K^+ \ell^+ \nu_\ell$  and  $D_s^{*-} K^+ \ell^+ \nu_\ell$  as  $B(B^+ \rightarrow D_s^{(*)-} K^+ \ell^+ \nu_\ell) = (5.9 \pm 1.2 \pm 1.5) \times 10^{-4}$ .

$\Gamma(\pi^0 \ell^+ \nu_\ell)/\Gamma_{\text{total}}$				$\Gamma_{22}/\Gamma$
"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFLAV) and are described at <a href="https://hflav.web.cern.ch/">https://hflav.web.cern.ch/</a> . The averaging/rescaling procedure takes into account correlations between the measurements.				

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>0.780 ± 0.027 OUR EVALUATION</b>			
<b>0.748 ± 0.029 OUR AVERAGE</b>			
0.80 ± 0.08 ± 0.04	<sup>1</sup> SIBIDANOV	13	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
0.77 ± 0.04 ± 0.03	<sup>2</sup> LEES	12AA	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
0.705 ± 0.025 ± 0.035	<sup>3</sup> DEL-AMO-SA..11C	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
0.82 ± 0.09 ± 0.05	<sup>3</sup> AUBERT	08AV	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
0.77 ± 0.14 ± 0.08	<sup>4</sup> HOKUUE	07	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.74 ± 0.05 ± 0.10	<sup>5</sup> AUBERT,B	05O	BABR Repl. by DEL-AMO-SANCHEZ 11C

<sup>1</sup> The signal events are tagged by a second  $B$  meson reconstructed in the fully hadronic decays.

<sup>2</sup> Uses loose neutrino reconstruction technique. Assumes  $B(Y(4S) \rightarrow B^+ B^-) = (51.6 \pm 0.6)\%$  and  $B(Y(4S) \rightarrow B^0 \bar{B}^0) = (48.4 \pm 0.6)\%$ .

<sup>3</sup> Using the isospin symmetry relation,  $B^+$  and  $B^0$  branching fractions are combined.

<sup>4</sup> The signal events are tagged by a second  $B$  meson reconstructed in the semileptonic mode  $B \rightarrow D^{(*)} \ell \nu_\ell$ .

<sup>5</sup>  $B^+$  and  $B^0$  decays combined assuming isospin symmetry. Systematic errors include both experimental and form-factor uncertainties.

$\Gamma(\pi^0 e^+ \nu_e)/\Gamma_{\text{total}}$				$\Gamma_{23}/\Gamma$
VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				

0.9 ± 0.2 ± 0.2		<sup>1</sup> ALEXANDER	96T	CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$
<22	90	ANTREASYAN	90B	CBAL $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Derived based in the reported  $B^0$  result by assuming isospin symmetry:  $\Gamma(B^0 \rightarrow \pi^- \ell^+ \nu) = 2\Gamma(B^+ \rightarrow \pi^0 \ell^+ \nu)$ .

$\Gamma(\eta\ell^+\nu_\ell)/\Gamma_{\text{total}}$   $\Gamma_{24}/\Gamma$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**0.39±0.05 OUR AVERAGE**

0.42±0.11±0.03		1 BELENO	17 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
0.38±0.05±0.05		2 LEES	12AA BABR	$e^+e^- \rightarrow \Upsilon(4S)$
0.31±0.06±0.08		2 AUBERT	09Q BABR	$e^+e^- \rightarrow \Upsilon(4S)$
0.64±0.20±0.03		3 AUBERT	08AV BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.36±0.05±0.04		2 DEL-AMO-SA..11F	BABR	Repl. by LEES 12AA
<1.01	90	4 ADAM	07 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.84±0.31±0.18		5 ATHAR	03 CLE2	Repl. by ADAM 07

<sup>1</sup> Uses missing-mass technique by fully reconstructing the hadronic decay chain of the accompanying  $B$ .

<sup>2</sup> Uses loose neutrino reconstruction technique. Assumes  $B(\Upsilon(4S) \rightarrow B^+B^-) = (51.6 \pm 0.6)\%$  and  $B(\Upsilon(4S) \rightarrow B^0\bar{B}^0) = (48.4 \pm 0.6)\%$ .

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>4</sup> The  $B^0$  and  $B^+$  results are combined assuming the isospin,  $B$  lifetimes, and relative charged/neutral  $B$  production at the  $\Upsilon(4S)$ .

<sup>5</sup> ATHAR 03 reports systematic errors  $0.16 \pm 0.09$ , which are experimental systematic and systematic due to model dependence. We combine these in quadrature.

$\Gamma(\eta'\ell^+\nu_\ell)/\Gamma_{\text{total}}$   $\Gamma_{25}/\Gamma$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**0.23±0.08 OUR AVERAGE**

0.24±0.08±0.03		1 LEES	12AA BABR	$e^+e^- \rightarrow \Upsilon(4S)$
0.04±0.22 <sup>+0.05</sup> <sub>-0.02</sub>		2 AUBERT	08AV BABR	$e^+e^- \rightarrow \Upsilon(4S)$
2.66±0.80±0.56		3 ADAM	07 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<0.72$	90	4 BELENO	17 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
0.24±0.08±0.03		1 DEL-AMO-SA..11F	BABR	Repl. by LEES 12AA

<sup>1</sup> Uses loose neutrino reconstruction technique. Assumes  $B(Y(4S) \rightarrow B^+B^-) = (51.6 \pm 0.6)\%$  and  $B(Y(4S) \rightarrow B^0\bar{B}^0) = (48.4 \pm 0.6)\%$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> The  $B^0$  and  $B^+$  results are combined assuming the isospin,  $B$  lifetimes, and relative charged/neutral  $B$  production at the  $\Upsilon(4S)$ . Corresponds to 90% CL interval  $(1.20-4.46) \times 10^{-4}$ .

<sup>4</sup> Uses missing-mass technique by fully reconstructing the hadronic decay chain of the accompanying  $B$ .

$\Gamma(\omega\ell^+\nu_\ell)/\Gamma_{\text{total}}$   $\Gamma_{26}/\Gamma$

$\ell = e$  or  $\mu$ , not sum over  $e$  and  $\mu$  modes.

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**1.19±0.09 OUR AVERAGE**

1.21±0.14±0.08		1,2 LEES	13A BABR	$e^+e^- \rightarrow \Upsilon(4S)$
1.35±0.21±0.11		3 LEES	13T BABR	$e^+e^- \rightarrow \Upsilon(4S)$
1.07±0.16±0.07		4 SIBIDANOV	13 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
1.19±0.16±0.09		2,5 LEES	12AA BABR	$e^+e^- \rightarrow \Upsilon(4S)$
1.3 ±0.4 ±0.4		6 SCHWANDA	04 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

- • • We do not use the following data for averages, fits, limits, etc. • • •

$1.14 \pm 0.16 \pm 0.08$	<sup>2</sup> AUBERT	09Q	BABR	Repl. by LEES 13A
<2.1	90	<sup>7</sup> BEAN	93B	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> LEES 13A reports $(1.21 \pm 0.14 \pm 0.08) \times 10^{-4}$ from a measurement of $[\Gamma(B^+ \rightarrow \omega \ell^+ \nu_\ell) / \Gamma_{\text{total}}] \times [B(\omega(782) \rightarrow \pi^+ \pi^- \pi^0)]$ assuming $B(\omega(782) \rightarrow \pi^+ \pi^- \pi^0) = (89.2 \pm 0.7) \times 10^{-2}$ .				
<sup>2</sup> Uses $B(\Upsilon(4S) \rightarrow B^+ B^-) = (51.6 \pm 0.6)\%$ and $B(\Upsilon(4S) \rightarrow B^0 \bar{B}^0) = (48.4 \pm 0.6)\%$ .				
<sup>3</sup> Uses semileptonic tagging. Assumes $B(\omega \rightarrow \pi^+ \pi^- \pi^0) = (89.2 \pm 0.7)\%$ and that the production ratio of $B^+ B^-$ to $B^0 \bar{B}^0$ from $\Upsilon(4S)$ is $1.056 \pm 0.028$ . The partial branching fractions in three bins of $q^2$ are also reported.				
<sup>4</sup> The signal events are tagged by a second $B$ meson reconstructed in the fully hadronic decays.				
<sup>5</sup> Uses loose neutrino reconstruction technique.				
<sup>6</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ .				
<sup>7</sup> BEAN 93B limit set using ISGW Model. Using isospin and the quark model to combine $\Gamma(\rho^0 \ell^+ \nu_\ell)$ and $\Gamma(\rho^- \ell^+ \nu_\ell)$ with this result, they obtain a limit $<(1.6-2.7) \times 10^{-4}$ at 90% CL for $B^+ \rightarrow \omega \ell^+ \nu_\ell$ . The range corresponds to the ISGW, WSB, and KS models. An upper limit on $ V_{ub}/V_{cb}  < 0.8-0.13$ at 90% CL is derived as well.				

**$\Gamma(\omega \mu^+ \nu_\mu) / \Gamma_{\text{total}}$**   **$\Gamma_{27} / \Gamma$**

VALUE DOCUMENT ID TECN

- • • We do not use the following data for averages, fits, limits, etc. • • •

seen <sup>1</sup> ALBRECHT 91C ARG

<sup>1</sup> In ALBRECHT 91C, one event is fully reconstructed providing evidence for the  $b \rightarrow u$  transition.

**$\Gamma(\rho^0 \ell^+ \nu_\ell) / \Gamma_{\text{total}}$**   **$\Gamma_{28} / \Gamma$**

$\ell = e$  or  $\mu$ , not sum over  $e$  and  $\mu$  modes.

“OUR EVALUATION” is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFLAV) and are described at <https://hflav.web.cern.ch/>. The averaging/rescaling procedure takes into account correlations between the measurements and asymmetric lifetime errors.

VALUE (units  $10^{-4}$ ) CL% DOCUMENT ID TECN COMMENT

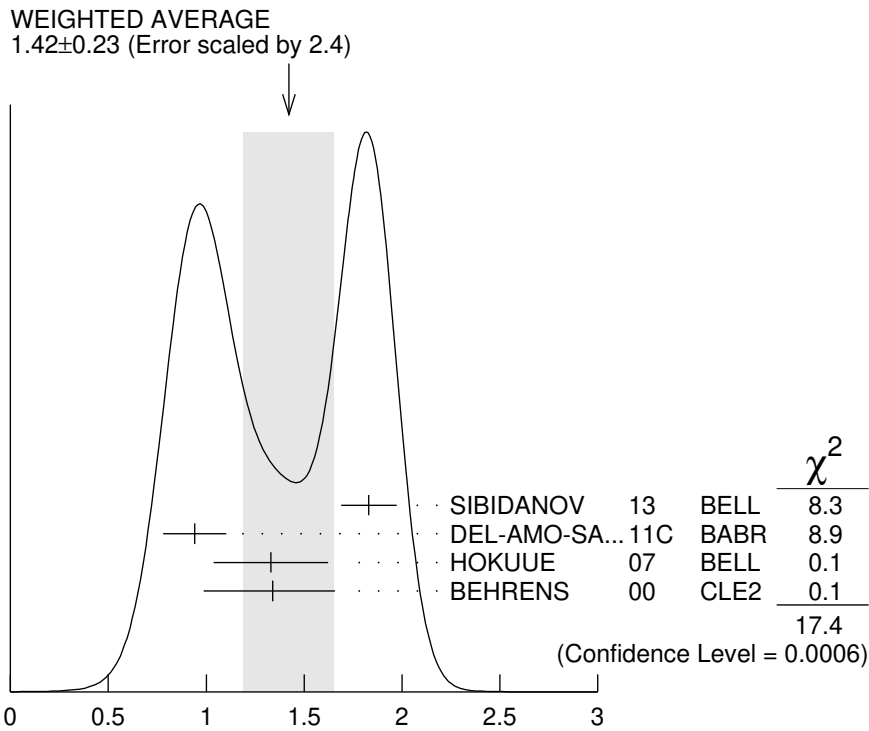
**1.58 ± 0.11 OUR EVALUATION**

**1.42 ± 0.23 OUR AVERAGE** Error includes scale factor of 2.4. See the ideogram below.

$1.83 \pm 0.10 \pm 0.10$	<sup>1</sup> SIBIDANOV	13	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$0.94 \pm 0.08 \pm 0.14$	<sup>2</sup> DEL-AMO-SA..11C	BABR	$e^+e^- \rightarrow \Upsilon(4S)$	
$1.33 \pm 0.23 \pm 0.18$	<sup>3</sup> HOKUUE	07	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$1.34 \pm 0.15^{+0.28}_{-0.32}$	<sup>4</sup> BEHRENS	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

- • • We do not use the following data for averages, fits, limits, etc. • • •

$1.16 \pm 0.11 \pm 0.30$	<sup>2</sup> AUBERT,B	05O	BABR	Repl. by DEL-AMO-SANCHEZ 11C
$1.40 \pm 0.21^{+0.32}_{-0.33}$	<sup>4</sup> BEHRENS	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
$1.2 \pm 0.2^{+0.3}_{-0.4}$	<sup>4</sup> ALEXANDER	96T	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
<2.1	90	<sup>5</sup> BEAN	93B	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$



<sup>1</sup> The signal events are tagged by a second  $B$  meson reconstructed in the fully hadronic decays.

<sup>2</sup>  $B^+$  and  $B^0$  decays combined assuming isospin symmetry. Systematic errors include both experimental and form-factor uncertainties.

<sup>3</sup> The signal events are tagged by a second  $B$  meson reconstructed in the semileptonic mode  $B \rightarrow D^{(*)} \ell \nu_\ell$ .

<sup>4</sup> Derived based in the reported  $B^0$  result by assuming isospin symmetry:  $\Gamma(B^0 \rightarrow \rho^- \ell^+ \nu_\ell) \approx 2\Gamma(B^+ \rightarrow \rho^0 \ell^+ \nu_\ell) \approx 2\Gamma(B^+ \rightarrow \omega \ell^+ \nu_\ell)$ .

<sup>5</sup> BEAN 93B limit set using ISGW Model. Using isospin and the quark model to combine  $\Gamma(\omega^0 \ell^+ \nu_\ell)$  and  $\Gamma(\rho^- \ell^+ \nu_\ell)$  with this result, they obtain a limit  $< (1.6-2.7) \times 10^{-4}$  at 90% CL for  $B^+ \rightarrow \rho^0 \ell^+ \nu_\ell$ . The range corresponds to the ISGW, WSB, and KS models. An upper limit on  $|V_{ub}/V_{cb}| < 0.8-0.13$  at 90% CL is derived as well.

$\Gamma(\rho^0 \ell^+ \nu_\ell) / \Gamma_{\text{total}}$  (units  $10^{-4}$ )

$\Gamma(\pi^+ \pi^- \ell^+ \nu_\ell) / \Gamma_{\text{total}}$   $\Gamma_{29} / \Gamma$

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
$22.7^{+1.9}_{-1.6} \pm 3.5$	BELENO	21	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

$\Gamma(\rho \bar{\rho} \ell^+ \nu_\ell) / \Gamma_{\text{total}}$   $\Gamma_{30} / \Gamma$

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
$5.8^{+2.4}_{-2.1} \pm 0.9$	<sup>1</sup> TIEN	14	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .



$\Gamma(p\bar{p}\mu^+\nu_\mu)/\Gamma_{\text{total}}$   $\Gamma_{31}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<8.5	90	<sup>1</sup> TIEN	14	BELL $e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(p\bar{p}\mu^+\nu_\mu)/\Gamma(J/\psi(1S)K^+)$   $\Gamma_{31}/\Gamma_{276}$ 

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
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<b>5.22±0.31±0.03</b>	<sup>1</sup> AAIJ	20K	LHCB $pp$ at 7, 8 and 13 TeV
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<sup>1</sup> AAIJ 20K reports  $[\Gamma(B^+ \rightarrow p\bar{p}\mu^+\nu_\mu)/\Gamma(B^+ \rightarrow J/\psi(1S)K^+)] / [B(J/\psi(1S) \rightarrow \mu^+\mu^-)] = (8.75 \pm 0.39 \pm 0.35) \times 10^{-2}$  which we multiply by our best value  $B(J/\psi(1S) \rightarrow \mu^+\mu^-) = (5.961 \pm 0.033) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(p\bar{p}e^+\nu_e)/\Gamma_{\text{total}}$   $\Gamma_{32}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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<b>8.2<sup>+3.7</sup><sub>-3.2</sub>±0.6</b>		<sup>1</sup> TIEN	14	BELL $e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<5200	90	<sup>2</sup> ADAM	03B	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Based on phase-space model; if  $V-A$  model is used, the 90% CL upper limit becomes  $< 1.2 \times 10^{-3}$ .

 $\Gamma(e^+\nu_e)/\Gamma_{\text{total}}$   $\Gamma_{33}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt; 0.98</b>	90	<sup>1</sup> SATOYAMA	07	BELL $e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 3.5	90	<sup>2</sup> YOOK	15	BELL $e^+e^- \rightarrow \Upsilon(4S)$
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< 8	90	<sup>1</sup> AUBERT	10E	BABR $e^+e^- \rightarrow \Upsilon(4S)$
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< 1.9	90	<sup>1</sup> AUBERT	09V	BABR $e^+e^- \rightarrow \Upsilon(4S)$
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< 5.2	90	<sup>1</sup> AUBERT	08AD	BABR $e^+e^- \rightarrow \Upsilon(4S)$
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<15	90	ARTUSO	95	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Assumes  $B(\Upsilon(4S) \rightarrow B^+B^-) = 0.513 \pm 0.006$ .

 $\Gamma(\mu^+\nu_\mu)/\Gamma_{\text{total}}$   $\Gamma_{34}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt; 0.86</b>	90	<sup>1</sup> PRIM	20	BELL $e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.29 to 1.07	90	<sup>2</sup> SIBIDANOV	18	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
< 2.7	90	<sup>3</sup> YOOK	15	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
<11	90	<sup>4</sup> AUBERT	10E	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
< 1.0	90	<sup>4</sup> AUBERT	09V	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
< 5.6	90	<sup>4</sup> AUBERT	08AD	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
< 1.7	90	<sup>4,5</sup> SATOYAMA	07	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
< 6.6	90	AUBERT	04O	BABR	Repl. by AUBERT 09V
<21	90	ARTUSO	95	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup>This is a 90% C.L. upper limit in the frequentist approach. The corresponding upper limit in the Bayesian approach is  $< 8.9 \times 10^{-7}$ . A 2.8 standard deviation signal above the background is found, with a measured branching fraction  $(5.3 \pm 2.0 \pm 0.9) \times 10^{-7}$ .

<sup>2</sup>This is a 90% confidence interval in the frequentist approach. A 2.4 standard deviation signal above the background is found, with a measured branching fraction  $(6.46 \pm 2.22 \pm 1.60) \times 10^{-7}$ .

<sup>3</sup>Assumes  $B(\Upsilon(4S) \rightarrow B^+ B^-) = 0.513 \pm 0.006$ .

<sup>4</sup>Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>5</sup>Superseded by SIBIDANOV 18.

### $\Gamma(\tau^+ \nu_\tau) / \Gamma_{\text{total}}$

### $\Gamma_{35} / \Gamma$

See the note on "Decay Constants of Charged Pseudoscalar Mesons" in the  $D_s^+$  Listings.

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>1.09 ± 0.24 OUR AVERAGE</b>		Error includes scale factor of 1.2.		
1.25 ± 0.28 ± 0.27		<sup>1,2</sup> KRONENBIT...15	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
0.72 <sup>+0.27</sup> <sub>-0.25</sub> ± 0.11		<sup>3</sup> HARA	13	BELL $e^+e^- \rightarrow \Upsilon(4S)$
1.83 <sup>+0.53</sup> <sub>-0.49</sub> ± 0.24		<sup>2,4</sup> LEES	13K	BABR $e^+e^- \rightarrow \Upsilon(4S)$
1.7 ± 0.8 ± 0.2		<sup>2,5</sup> AUBERT	10E	BABR $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.54 <sup>+0.38+0.29</sup> <sub>-0.37-0.31</sub>		<sup>2,6</sup> HARA	10	BELL	Repl. by KRONENBIT-TER 15
1.8 <sup>+0.9</sup> <sub>-0.8</sub> ± 0.45		<sup>2,7</sup> AUBERT	08D	BABR	Repl. by LEES 13K
0.9 ± 0.6 ± 0.1		<sup>2,5</sup> AUBERT	07AL	BABR	Repl. by AUBERT 10E
< 2.6	90	<sup>2</sup> AUBERT	06K	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
1.79 <sup>+0.56+0.46</sup> <sub>-0.49-0.51</sub>		<sup>2,7</sup> IKADO	06	BELL	Repl. by HARA 13
< 4.2	90	<sup>2</sup> AUBERT,B	05B	BABR	Repl. by AUBERT 06K
< 8.3	90	<sup>8</sup> BARATE	01E	ALEP	$e^+e^- \rightarrow Z$
< 8.4	90	<sup>2</sup> BROWDER	01	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
< 5.7	90	<sup>9</sup> ACCIARRI	97F	L3	$e^+e^- \rightarrow Z$
<104	90	<sup>10</sup> ALBRECHT	95D	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
< 22	90	ARTUSO	95	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
< 18	90	<sup>11</sup> BUSKULIC	95	ALEP	$e^+e^- \rightarrow Z$

<sup>1</sup>Requires one reconstructed semileptonic  $B$  decay  $B^- \rightarrow D^{(*)0} \ell^- \bar{\nu}_\ell$  in the recoil.

<sup>2</sup>Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup>The authors combine their result with that from HARA 10 obtaining  $B(B^- \rightarrow \tau^- \bar{\nu}_\tau) = (0.96 \pm 0.26) \times 10^{-4}$  and deriving  $f_B |V_{ub}| = (7.4 \pm 0.8 \pm 0.5) \times 10^{-4}$  GeV.

- <sup>4</sup> Requires a fully reconstructed hadronic  $B$ -decay in the recoil. Reports that this result combined with AUBERT 10E value gives  $B(B^- \rightarrow \tau^- \bar{\nu}_\tau) = (1.79 \pm 0.48) \times 10^{-4}$ .
- <sup>5</sup> Requires one reconstructed semileptonic  $B$  decay  $B^- \rightarrow D^0 \ell^- \bar{\nu}_\ell X$  in the recoil.
- <sup>6</sup> Requires one reconstructed semileptonic  $B$  decay  $B^- \rightarrow D^{(*)0} \ell^- \bar{\nu}_\ell X$  in the recoil.
- <sup>7</sup> The analysis is based on a sample of events with one fully reconstructed tag  $B$  in a hadronic decay mode  $B^- \rightarrow D^{(*)0} X^-$ .
- <sup>8</sup> The energy-flow and  $b$ -tagging algorithms were used.
- <sup>9</sup> ACCIARRI 97F uses missing-energy technique and  $f(b \rightarrow B^-) = (38.2 \pm 2.5)\%$ .
- <sup>10</sup> ALBRECHT 95D uses full reconstruction of one  $B$  decay as tag.
- <sup>11</sup> BUSKULIC 95 uses same missing-energy technique as in  $\bar{b} \rightarrow \tau^+ \nu_\tau X$ , but analysis is restricted to endpoint region of missing-energy distribution.

### $\Gamma(\ell^+ \nu_\ell \gamma)/\Gamma_{\text{total}}$ $\Gamma_{36}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 3.0 \times 10^{-6}$	90	1,2 GELB	18 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$< 3.5 \times 10^{-6}$	90	2,3 HELLER	15 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$< 15.6 \times 10^{-6}$	90	2 AUBERT	09AT BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Supersedes HELLER 15.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> Superseded by GELB 18.

### $\Gamma(e^+ \nu_e \gamma)/\Gamma_{\text{total}}$ $\Gamma_{37}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 4.3 \times 10^{-6}$	90	1,2 GELB	18 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$< 6.1 \times 10^{-6}$	90	2,3 HELLER	15 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$< 17 \times 10^{-6}$	90	2 AUBERT	09AT BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$< 200 \times 10^{-6}$	90	4 BROWDER	97 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Supersedes HELLER 15.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> Superseded by GELB 18.

<sup>4</sup> BROWDER 97 uses the hermiticity of the CLEO II detector to reconstruct the neutrino energy and momentum.

### $\Gamma(\mu^+ \nu_\mu \gamma)/\Gamma_{\text{total}}$ $\Gamma_{38}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 3.4 \times 10^{-6}$	90	1,2 GELB	18 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$< 3.4 \times 10^{-6}$	90	2,3 HELLER	15 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$< 24 \times 10^{-6}$	90	2,4 AUBERT	09AT BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$< 52 \times 10^{-6}$	90	5 BROWDER	97 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Supersedes HELLER 15.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> Superseded by GELB 18.

<sup>4</sup> Note that the value given by AUBERT 09AT is  $24 \times 10^{-6}$  in the paper abstract, and  $26 \times 10^{-6}$  in the paper itself (Table I).

<sup>5</sup> BROWDER 97 uses the hermiticity of the CLEO II detector to reconstruct the neutrino energy and momentum.

$\Gamma(\mu^+ \mu^- \mu^+ \nu_\mu)/\Gamma_{\text{total}}$			$\Gamma_{39}/\Gamma$		
<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
$<1.6 \times 10^{-8}$	95	<sup>1</sup> AAIJ	19P	LHCB	$p\bar{p}$ at 7, 8, 13 TeV

<sup>1</sup> AAIJ 19P limit established for the kinematic region where the lower of the two  $M(\mu^+ \mu^-)$  is less than  $980 \text{ MeV}/c^2$ .

$\Gamma(D^0 X)/\Gamma_{\text{total}}$			$\Gamma_{40}/\Gamma$		
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
$0.086 \pm 0.006 \pm 0.004$	<sup>1</sup> AUBERT	07N	BABR	$e^+ e^- \rightarrow \gamma(4S)$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.098 \pm 0.009 \pm 0.006$  <sup>1</sup> AUBERT, BE 04B BABR Repl. by AUBERT 07N

<sup>1</sup> Events are selected by completely reconstructing one  $B$  and searching for a reconstructed charmed particle in the rest of the event. The last error includes systematic and charm branching ratio uncertainties.

$\Gamma(\bar{D}^0 X)/\Gamma_{\text{total}}$			$\Gamma_{41}/\Gamma$		
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
$0.786 \pm 0.016^{+0.034}_{-0.033}$	<sup>1</sup> AUBERT	07N	BABR	$e^+ e^- \rightarrow \gamma(4S)$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.793 \pm 0.025^{+0.045}_{-0.044}$  <sup>1</sup> AUBERT, BE 04B BABR Repl. by AUBERT 07N

<sup>1</sup> Events are selected by completely reconstructing one  $B$  and searching for a reconstructed charmed particle in the rest of the event. The last error includes systematic and charm branching ratio uncertainties.

$\Gamma(D^0 X)/[\Gamma(D^0 X) + \Gamma(\bar{D}^0 X)]$			$\Gamma_{40}/(\Gamma_{40} + \Gamma_{41})$		
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
$0.098 \pm 0.007 \pm 0.001$	AUBERT	07N	BABR	$e^+ e^- \rightarrow \gamma(4S)$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.110 \pm 0.010 \pm 0.003$  AUBERT, BE 04B BABR Repl. by AUBERT 07N

$\Gamma(D^+ X)/\Gamma_{\text{total}}$			$\Gamma_{42}/\Gamma$		
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
$0.025 \pm 0.005 \pm 0.002$	<sup>1</sup> AUBERT	07N	BABR	$e^+ e^- \rightarrow \gamma(4S)$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.038 \pm 0.009 \pm 0.005$  <sup>1</sup> AUBERT, BE 04B BABR Repl. by AUBERT 07N

<sup>1</sup> Events are selected by completely reconstructing one  $B$  and searching for a reconstructed charmed particle in the rest of the event. The last error includes systematic and charm branching ratio uncertainties.

$\Gamma(D^- X)/\Gamma_{\text{total}}$			$\Gamma_{43}/\Gamma$		
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
$0.099 \pm 0.008 \pm 0.009$	<sup>1</sup> AUBERT	07N	BABR	$e^+ e^- \rightarrow \gamma(4S)$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.098 \pm 0.012 \pm 0.014$  <sup>1</sup> AUBERT, BE 04B BABR Repl. by AUBERT 07N

<sup>1</sup> Events are selected by completely reconstructing one  $B$  and searching for a reconstructed charmed particle in the rest of the event. The last error includes systematic and charm branching ratio uncertainties.

$$\Gamma(D^+ X)/[\Gamma(D^+ X) + \Gamma(D^- X)] \quad \Gamma_{42}/(\Gamma_{42} + \Gamma_{43})$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.204 ± 0.035 ± 0.001</b>	AUBERT	07N	BABR $e^+ e^- \rightarrow \gamma(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.278 ± 0.052 ± 0.009	AUBERT, BE	04B	BABR Repl. by AUBERT 07N

$$\Gamma(D_s^+ X)/\Gamma_{\text{total}} \quad \Gamma_{44}/\Gamma$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.079 ± 0.006<sup>+0.013</sup><sub>-0.011</sub></b>	<sup>1</sup> AUBERT	07N	BABR $e^+ e^- \rightarrow \gamma(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.143 ± 0.016 <sup>+0.051</sup> <sub>-0.034</sub>	<sup>1</sup> AUBERT, BE	04B	BABR Repl. by AUBERT 07N

<sup>1</sup> Events are selected by completely reconstructing one  $B$  and searching for a reconstructed charmed particle in the rest of the event. The last error includes systematic and charm branching ratio uncertainties.

$$\Gamma(D_s^- X)/\Gamma_{\text{total}} \quad \Gamma_{45}/\Gamma$$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.011<sup>+0.004+0.002</sup><sub>-0.003-0.001</sub></b>		<sup>1</sup> AUBERT	07N	BABR $e^+ e^- \rightarrow \gamma(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.022	90	<sup>1</sup> AUBERT, BE	04B	BABR Repl. by AUBERT 07N

<sup>1</sup> Events are selected by completely reconstructing one  $B$  and searching for a reconstructed charmed particle in the rest of the event. The last error includes systematic and charm branching ratio uncertainties.

$$\Gamma(D_s^+ X)/[\Gamma(D_s^+ X) + \Gamma(D_s^- X)] \quad \Gamma_{44}/(\Gamma_{44} + \Gamma_{45})$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.884 ± 0.038 ± 0.002</b>	AUBERT	07N	BABR $e^+ e^- \rightarrow \gamma(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.966 ± 0.039 ± 0.012	AUBERT, BE	04B	BABR Repl. by AUBERT 07N

$$\Gamma(D_s^- X)/[\Gamma(D_s^+ X) + \Gamma(D_s^- X)] \quad \Gamma_{45}/(\Gamma_{44} + \Gamma_{45})$$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;0.126</b>	90	AUBERT, BE	04B	BABR $e^+ e^- \rightarrow \gamma(4S)$

$$\Gamma(\Lambda_c^+ X)/\Gamma_{\text{total}} \quad \Gamma_{46}/\Gamma$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.021 ± 0.005<sup>+0.008</sup><sub>-0.004</sub></b>	<sup>1</sup> AUBERT	07N	BABR $e^+ e^- \rightarrow \gamma(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.029 ± 0.008 <sup>+0.011</sup> <sub>-0.007</sub>	<sup>1</sup> AUBERT, BE	04B	BABR Repl. by AUBERT 07N

<sup>1</sup> Events are selected by completely reconstructing one  $B$  and searching for a reconstructed charmed particle in the rest of the event. The last error includes systematic and charm branching ratio uncertainties.

$$\Gamma(\bar{\Lambda}_c^- X)/\Gamma_{\text{total}} \quad \Gamma_{47}/\Gamma$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.028 ± 0.005<sup>+0.010</sup><sub>-0.007</sub></b>	<sup>1</sup> AUBERT	07N	BABR $e^+ e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.035 \pm 0.008^{+0.013}_{-0.009}$  <sup>1</sup> AUBERT, BE 04B BABR Repl. by AUBERT 07N

<sup>1</sup> Events are selected by completely reconstructing one  $B$  and searching for a reconstructed charmed particle in the rest of the event. The last error includes systematic and charm branching ratio uncertainties.

$\Gamma(\Lambda_c^+ X) / [\Gamma(\Lambda_c^+ X) + \Gamma(\bar{\Lambda}_c^- X)]$   $\Gamma_{46} / (\Gamma_{46} + \Gamma_{47})$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.427 \pm 0.071 \pm 0.001</math></b>	AUBERT	07N	BABR $e^+ e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.452 \pm 0.090 \pm 0.003$  AUBERT, BE 04B BABR Repl. by AUBERT 07N

$\Gamma(\bar{c} X) / \Gamma_{\text{total}}$   $\Gamma_{48} / \Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.968 \pm 0.019^{+0.041}_{-0.039}</math></b>	<sup>1</sup> AUBERT	07N	BABR $e^+ e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.983 \pm 0.030^{+0.054}_{-0.051}$  <sup>1</sup> AUBERT, BE 04B BABR Repl. by AUBERT 07N

<sup>1</sup> Events are selected by completely reconstructing one  $B$  and searching for a reconstructed charmed particle in the rest of the event. The last error includes systematic and charm branching ratio uncertainties.

$\Gamma(c X) / \Gamma_{\text{total}}$   $\Gamma_{49} / \Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.234 \pm 0.012^{+0.018}_{-0.014}</math></b>	<sup>1</sup> AUBERT	07N	BABR $e^+ e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.330 \pm 0.022^{+0.055}_{-0.037}$  <sup>1</sup> AUBERT, BE 04B BABR Repl. by AUBERT 07N

<sup>1</sup> Events are selected by completely reconstructing one  $B$  and searching for a reconstructed charmed particle in the rest of the event. The last error includes systematic and charm branching ratio uncertainties.

$\Gamma(c / \bar{c} X) / \Gamma_{\text{total}}$   $\Gamma_{50} / \Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>1.202 \pm 0.023^{+0.053}_{-0.049}</math></b>	<sup>1</sup> AUBERT	07N	BABR $e^+ e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.313 \pm 0.037^{+0.088}_{-0.075}$  <sup>1</sup> AUBERT, BE 04B BABR Repl. by AUBERT 07N

<sup>1</sup> Events are selected by completely reconstructing one  $B$  and searching for a reconstructed charmed particle in the rest of the event. The last error includes systematic and charm branching ratio uncertainties.

$\Gamma(\bar{D}^0 \pi^+) / \Gamma_{\text{total}}$   $\Gamma_{51} / \Gamma$

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>4.68 \pm 0.13</math> OUR FIT</b>				
<b><math>4.70 \pm 0.13</math> OUR AVERAGE</b>				
$4.34 \pm 0.10 \pm 0.23$		<sup>1</sup> KATO	18	BELL $e^+ e^- \rightarrow \gamma(4S)$
$4.90 \pm 0.07 \pm 0.22$		<sup>2</sup> AUBERT	07H	BABR $e^+ e^- \rightarrow \gamma(4S)$
$4.9 \pm 0.6 \pm 0.2$		<sup>3</sup> ABULENCIA	06J	CDF $p\bar{p}$ at 1.96 TeV

4.49±0.21±0.23		<sup>4</sup> AUBERT,BE	06J	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
4.97±0.12±0.29		<sup>2,5</sup> AHMED	02B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
5.0 ±0.7 ±0.6	54	<sup>6</sup> BORTOLETTO92		CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
5.4 $\begin{smallmatrix} +1.8 & +1.2 \\ -1.5 & -0.9 \end{smallmatrix}$	14	<sup>7</sup> BEBEK	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

4.68±0.26±0.04		<sup>8</sup> AUBERT,B	04P	BABR	Repl. by AUBERT 07H
5.5 ±0.4 ±0.5	304	<sup>9</sup> ALAM	94	CLE2	Repl. by AHMED 02B
2.0 ±0.8 ±0.6	12	<sup>6</sup> ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
1.9 ±1.0 ±0.6	7	<sup>10</sup> ALBRECHT	88K	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Measures absolute branching fractions using a missing-mass technique.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> ABULENCIA 06J reports  $[\Gamma(B^+ \rightarrow \bar{D}^0 \pi^+)/\Gamma_{\text{total}}] / [B(B^0 \rightarrow D^- \pi^+)] = 1.97 \pm 0.10 \pm 0.21$  which we multiply by our best value  $B(B^0 \rightarrow D^- \pi^+) = (2.51 \pm 0.08) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>4</sup> Uses a missing-mass method. Does not depend on  $D$  branching fractions or  $B^+/B^0$  production rates.

<sup>5</sup> AHMED 02B reports an additional uncertainty on the branching ratios to account for 4.5% uncertainty on relative production of  $B^0$  and  $B^+$ , which is not included here.

<sup>6</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and uses the Mark III branching fractions for the  $D$ .

<sup>7</sup> BEBEK 87 value has been updated in BERKELMAN 91 to use same assumptions as noted for BORTOLETTO 92.

<sup>8</sup> AUBERT,B 04P reports  $[\Gamma(B^+ \rightarrow \bar{D}^0 \pi^+)/\Gamma_{\text{total}}] \times [B(D^0 \rightarrow K^- \pi^+)] = (1.846 \pm 0.032 \pm 0.097) \times 10^{-4}$  which we divide by our best value  $B(D^0 \rightarrow K^- \pi^+) = (3.947 \pm 0.030) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>9</sup> ALAM 94 assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the CLEO II absolute  $B(D^0 \rightarrow K^- \pi^+)$  and the PDG 1992  $B(D^0 \rightarrow K^- \pi^+ \pi^0)/B(D^0 \rightarrow K^- \pi^+)$  and  $B(D^0 \rightarrow K^- 2\pi^+ \pi^-)/B(D^0 \rightarrow K^- \pi^+)$ .

<sup>10</sup> ALBRECHT 88K assumes  $B^0 \bar{B}^0 : B^+ B^-$  ratio is 45:55. Superseded by ALBRECHT 90J.

$\Gamma(\bar{D}^0 \rho^+)/\Gamma_{\text{total}}$					$\Gamma_{54}/\Gamma$
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b>0.0134±0.0018 OUR AVERAGE</b>					

0.0135±0.0012±0.0015	212	<sup>1</sup> ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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0.013 ±0.004 ±0.004	19	<sup>2</sup> ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.021 ±0.008 ±0.009	10	<sup>3</sup> ALBRECHT	88K	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> ALAM 94 assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the CLEO II absolute  $B(D^0 \rightarrow K^- \pi^+)$  and the PDG 1992  $B(D^0 \rightarrow K^- \pi^+ \pi^0)/B(D^0 \rightarrow K^- \pi^+)$  and  $B(D^0 \rightarrow K^- 2\pi^+ \pi^-)/B(D^0 \rightarrow K^- \pi^+)$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and uses the Mark III branching fractions for the  $D$ .

<sup>3</sup>ALBRECHT 88K assumes  $B^0 \bar{B}^0 : B^+ B^-$  ratio is 45:55.

$\Gamma(\bar{D}^0 K^+)/\Gamma(\bar{D}^0 \pi^+)$

$\Gamma_{55}/\Gamma_{51}$

VALUE (units  $10^{-2}$ ) DOCUMENT ID TECN COMMENT

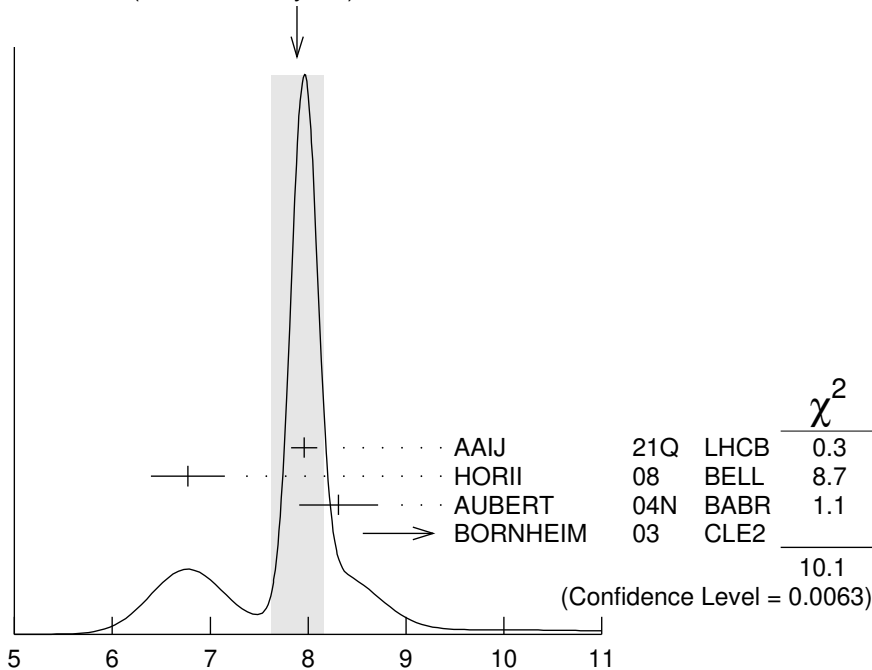
**7.89 ± 0.27 OUR AVERAGE** Error includes scale factor of 2.3. See the ideogram below.

7.96 ± 0.03 ± 0.13	AAIJ	21Q	LHCB	$pp$ at 7, 8, 13 TeV
6.77 ± 0.23 ± 0.30	HORII	08	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
8.31 ± 0.35 ± 0.20	AUBERT	04N	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
9.9 <sup>+1.4</sup> <sub>-1.2</sub> <sup>+0.7</sup> <sub>-0.6</sub>	BORNHEIM	03	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

7.768 ± 0.038 ± 0.066	<sup>1,2</sup> AAIJ	18A	LHCB	$pp$ at 7, 8, 13 TeV
7.79 ± 0.06 ± 0.19	AAIJ	16L	LHCB	$pp$ at 7, 8 TeV
7.93 ± 0.10 ± 0.18	<sup>3</sup> AAIJ	16L	LHCB	$pp$ at 7, 8 TeV
7.71 ± 0.17 ± 0.26	<sup>3</sup> AAIJ	13AE	LHCB	Repl. by AAIJ 16L
7.74 ± 0.12 ± 0.19	AAIJ	12M	LHCB	Repl. by AAIJ 16L
9.4 ± 0.9 ± 0.7	ABE	03D	BELL	Repl. by SWAIN 03
7.7 ± 0.5 ± 0.6	SWAIN	03	BELL	Repl. by HORII 08
7.9 ± 0.9 ± 0.6	ABE	01I	BELL	Repl. by ABE 03D
5.5 ± 1.4 ± 0.5	ATHANAS	98	CLE2	Repl. by BORNHEIM 03

WEIGHTED AVERAGE  
7.89 ± 0.27 (Error scaled by 2.3)



<sup>1</sup> Supersedes AAIJ 16L.

<sup>2</sup> Superseded by AAIJ 21Q.

<sup>3</sup> Uses  $B^\pm \rightarrow [K^\pm \pi^\mp \pi^+ \pi^-]_D h^\pm$  mode.

$\Gamma(\bar{D}^0 K^+)/\Gamma(\bar{D}^0 \pi^+)$  (units  $10^{-2}$ )



$\Gamma(D_{CP(+1)}K^+)/\Gamma(D_{CP(+1)}\pi^+)$   $\Gamma_{56}/\Gamma_{52}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.089±0.008 OUR AVERAGE</b>			
0.089±0.008±0.003	<sup>1,2</sup> ABE	06	BELL $e^+e^- \rightarrow \gamma(4S)$
0.088±0.016±0.005	<sup>3</sup> AUBERT	04N	BABR $e^+e^- \rightarrow \gamma(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.125±0.036±0.010	<sup>3</sup> ABE	03D	BELL Repl. by SWAIN 03
0.093±0.018±0.008	<sup>3</sup> SWAIN	03	BELL Repl. by ABE 06

<sup>1</sup> Reports a double ratio of  $B(B^+ \rightarrow D_{CP(+1)}K^+)/B(B^+ \rightarrow D_{CP(+1)}\pi^+)$  and  $B(B^+ \rightarrow \bar{D}^0K^+)/B(B^+ \rightarrow \bar{D}^0\pi^+)$ ,  $1.13 \pm 0.16 \pm 0.08$ . We multiply by our best value of  $B(B^+ \rightarrow \bar{D}^0K^+)/B(B^+ \rightarrow \bar{D}^0\pi^+) = 0.083 \pm 0.006$ . Our first error is their experiment's error and the second error is systematic error from using our best value.

<sup>2</sup> ABE 06 reports  $[\Gamma(B^+ \rightarrow D_{CP(+1)}K^+)/\Gamma(B^+ \rightarrow D_{CP(+1)}\pi^+)] / [\Gamma(B^+ \rightarrow \bar{D}^0K^+)/\Gamma(B^+ \rightarrow \bar{D}^0\pi^+)] = 1.13 \pm 0.06 \pm 0.08$  which we multiply by our best value  $\Gamma(B^+ \rightarrow \bar{D}^0K^+)/\Gamma(B^+ \rightarrow \bar{D}^0\pi^+) = 0.0789 \pm 0.0027$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup>  $CP=+1$  eigenstate of  $D^0\bar{D}^0$  system is reconstructed via  $K^+K^-$  and  $\pi^+\pi^-$ .

 $\Gamma(D_{CP(+1)}K^+)/\Gamma(\bar{D}^0K^+)$   $\Gamma_{56}/\Gamma_{55}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.495±0.007 OUR AVERAGE</b>			
0.494±0.008±0.006	<sup>1</sup> AAIJ	18A	LHCB $pp$ at 7, 8, 13 TeV
0.496±0.014±0.008	<sup>2</sup> AAIJ	18A	LHCB $pp$ at 7, 8, 13 TeV
0.489±0.010±0.009	<sup>3</sup> AAIJ	16L	LHCB $pp$ at 7, 8 TeV
0.65 ±0.12 ±0.06	<sup>4</sup> AALTONEN	10A	CDF $p\bar{p}$ at 1.96 TeV
0.590±0.045±0.025	<sup>5</sup> DEL-AMO-SA..10G	BABR	$e^+e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.504±0.019±0.006	<sup>6</sup> AAIJ	12M	LHCB Repl. by AAIJ 16L
0.53 ±0.05 ±0.025	AUBERT	08AA	BABR Repl. by DEL-AMO-SANCHEZ 10G
0.45 ±0.06 ±0.02	AUBERT	06J	BABR Repl. by AUBERT 08AA

<sup>1</sup> Uses  $D \rightarrow K^+K^-$  decay mode and reports  $R_{CP+} = 0.988 \pm 0.015 \pm 0.011$  which we have divided by 2.

<sup>2</sup> Uses  $D \rightarrow \pi^+\pi^-$  decay mode and reports  $R_{CP+} = 0.992 \pm 0.027 \pm 0.015$  which we have divided by 2.

<sup>3</sup> AAIJ 16L reports  $R_{CP+} = 0.978 \pm 0.019 \pm 0.018$  which we have divided by 2.

<sup>4</sup> Reports  $R_{CP+} = 2 (B(B^- \rightarrow D_{CP(+1)}K^-) + B(B^+ \rightarrow D_{CP(+1)}K^+)) / (B(B^- \rightarrow D^0K^-) + B(B^+ \rightarrow \bar{D}^0K^+)) = 1.30 \pm 0.24 \pm 0.12$  that we have divided by 2.

<sup>5</sup> Reports  $R_{CP+} = 1.18 \pm 0.09 \pm 0.05$  that we have divided by 2.

<sup>6</sup> AAIJ 12M reports  $R_{CP+} = 1.007 \pm 0.038 \pm 0.012$  which we have divided by 2.

 $\Gamma(D_{CP(-1)}K^+)/\Gamma(D_{CP(-1)}\pi^+)$   $\Gamma_{57}/\Gamma_{53}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.097±0.016±0.007</b>	<sup>1</sup> ABE	06	BELL $e^+e^- \rightarrow \gamma(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.119±0.028±0.006	<sup>2</sup> ABE	03D	BELL Repl. by SWAIN 03
0.108±0.019±0.007	<sup>2</sup> SWAIN	03	BELL Repl. by ABE 06

<sup>1</sup> Reports a double ratio of  $B(B^+ \rightarrow D_{CP(-1)} K^+)/B(B^+ \rightarrow D_{CP(-1)} \pi^+)$  and  $B(B^+ \rightarrow \bar{D}^0 K^+)/B(B^+ \rightarrow \bar{D}^0 \pi^+)$ ,  $1.17 \pm 0.14 \pm 0.14$ . We multiply by our best value of  $B(B^+ \rightarrow \bar{D}^0 K^+)/B(B^+ \rightarrow \bar{D}^0 \pi^+) = 0.083 \pm 0.006$ . Our first error is their experiment's error and the second error is systematic error from using our best value.

<sup>2</sup>  $CP=-1$  eigenstate of  $D^0 \bar{D}^0$  system is reconstructed via  $K_S^0 \pi^0$ ,  $K_S^0 \omega$ ,  $K_S^0 \phi$ ,  $K_S^0 \eta$ , and  $K_S^0 \eta'$ .

### $\Gamma(D_{CP(-1)} K^+)/\Gamma(\bar{D}^0 K^+)$ $\Gamma_{57}/\Gamma_{55}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.54 ± 0.04 ± 0.02</b>	<sup>1</sup> DEL-AMO-SA..10G	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
0.515 ± 0.05 ± 0.025	AUBERT	08AA	Repl. by DEL-AMO-SANCHEZ 10G
0.43 ± 0.05 ± 0.02	AUBERT	06J	Repl. by AUBERT 08AA

<sup>1</sup> Reports  $R_{CP+} = 1.07 \pm 0.08 \pm 0.04$  that we have divided by 2.

### $\Gamma(D^0 K^+)/\Gamma(\bar{D}^0 K^+)$ $\Gamma_{58}/\Gamma_{55}$

"OUR EVALUATION" is derived from  $r_B(B^+ \rightarrow D^0 K^+)$  data block listed in "CP violation parameters" section.

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>
<b>9.88 ± 0.52 OUR EVALUATION</b>	

### $\Gamma([K^- \pi^+]_D K^+)/\Gamma_{total}$ $\Gamma_{59}/\Gamma$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt; 2.8 × 10<sup>-7</sup></b>	90	HORII	08	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
< 6.3 × 10 <sup>-7</sup>	90	SAIGO	05	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

### $\Gamma([K^- \pi^+]_D K^+)/\Gamma([K^+ \pi^-]_D K^+)$ $\Gamma_{59}/\Gamma_{60}$

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>14 ± 7 OUR AVERAGE</b>				Error includes scale factor of 14.7.
9.5 ± 0.5 ± 0.3		<sup>1</sup> AAIJ	21Q	LHCB $pp$ at 7, 8, 13 TeV
25.2 ± 0.8 ± 0.4		<sup>2</sup> AAIJ	21Q	LHCB $pp$ at 7, 8, 13 TeV
22.0 ± 8.6 ± 2.6		<sup>3</sup> AALTONEN	11AJ	CDF $p\bar{p}$ at 1.96 TeV
16.3 <sup>+4.4+0.7</sup> <sub>-4.1-1.3</sub>		HORII	11	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
11 ± 6 ± 2		DEL-AMO-SA..10H	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
18.8 ± 1.1 ± 1.0		<sup>4</sup> AAIJ	16L	LHCB $pp$ at 7, 8 TeV
15.2 ± 2.0 ± 0.4		AAIJ	12M	LHCB Repl. by AAIJ 16L
7.8 <sup>+6.2+2.0</sup> <sub>-5.7-2.8</sub>		HORII	08	BELL Repl. by HORII 11
< 29	90	<sup>5</sup> AUBERT	05G	BABR Repl. by DEL-AMO-SANCHEZ 10H
< 44	90	<sup>6</sup> SAIGO	05	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
< 26	90	<sup>7</sup> AUBERT,B	04L	BABR Repl. by AUBERT 05G

<sup>1</sup> Uses the ratio of  $B^- \rightarrow [K^+ \pi^-]_D K^-$  and  $B^- \rightarrow [K^- \pi^+]_D K^-$ . AAIJ 21Q gives the charge-averaged rate as  $0.0173 \pm 0.0006$ , where the statistical and systematic uncertainties have been combined according to the correlations between the observables.

<sup>2</sup> Uses the ratio of  $B^+ \rightarrow [K^- \pi^+]_D K^+$  and  $B^+ \rightarrow [K^+ \pi^-]_D K^+$ . AAIJ 21Q gives the charge-averaged rate as  $0.0173 \pm 0.0006$ , where the statistical and systematic uncertainties have been combined according to the correlations between the observables.

<sup>3</sup> AALTONEN 11AJ also measures the ratio separately for  $B^+$  ( $R^+(K)$ ) and  $B^-$  ( $R^-(K)$ ) and obtains:  $R^+(K) = (42.6 \pm 13.7 \pm 2.8) \times 10^{-3}$ ,  $R^-(K) = (3.8 \pm 10.3 \pm 2.7) \times 10^{-3}$ .

<sup>4</sup> Superseded by AAIJ 21Q.

<sup>5</sup> AUBERT 05G extract a constraint on the magnitude of the ratio of amplitudes  $|A(B^+ \rightarrow D^0 K^+) / A(B^+ \rightarrow \bar{D}^0 K^+)| < 0.23$  at 90% CL (Bayesian). Similar measurements from  $B^+ \rightarrow D^{*0} K^+$  are also reported.

<sup>6</sup> SAIGO 05 extract a constraint on the magnitude of the ratio of amplitudes  $|A(B^+ \rightarrow D^0 K^+) / A(B^+ \rightarrow \bar{D}^0 K^+)| < 0.27$  at 90% CL.

<sup>7</sup> AUBERT,B 04L extract a constraint on the magnitude of the ratio of amplitudes  $|A(B^+ \rightarrow D^0 K^+) / A(B^+ \rightarrow \bar{D}^0 K^+)| < 0.22$  at 90% CL.

$\Gamma([K^- \pi^+ \pi^0]_D K^+) / \Gamma([K^+ \pi^- \pi^0]_D K^+) \quad \Gamma_{61} / \Gamma_{62}$

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>16 ± 4 OUR AVERAGE</b>				
14.0 ± 4.7 ± 2.1		<sup>1</sup> AAIJ	15W LHCB	$pp$ at 7, 8 TeV
19.8 ± 6.2 ± 2.4		NAYAK	13 BELL	$e^+ e^- \rightarrow \gamma(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<21	90	<sup>2</sup> LEES	11D BABR	$e^+ e^- \rightarrow \gamma(4S)$
<39	95	<sup>3</sup> AUBERT	07BN BABR	Repl. by LEES 11D

<sup>1</sup> Uses  $D^0 \rightarrow K^- \pi^+ \pi^0$  for the favored mode, and  $D^0 \rightarrow K^+ \pi^- \pi^0$  for the suppressed mode.

<sup>2</sup> Extracts a constraint on the magnitude of the ratio of amplitudes  $|A(B^+ \rightarrow D^0 K^+) / A(B^+ \rightarrow \bar{D}^0 K^+)| < 0.13$  at 95% CL.

<sup>3</sup> Extracts a constraint on the magnitude of the ratio of amplitudes  $|A(B^+ \rightarrow D^0 K^+) / A(B^+ \rightarrow \bar{D}^0 K^+)| < 0.19$  at 95% CL.

$\Gamma([K^- \pi^+ \pi^+ \pi^-]_D K^+) / \Gamma([K^+ \pi^- \pi^+ \pi^-]_D K^+) \quad \Gamma_{63} / \Gamma_{64}$

<u>VALUE (units <math>10^{-2}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.40 ± 0.15 ± 0.06</b>	AAIJ	16L LHCB	$pp$ at 7, 8 TeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
1.24 ± 0.27	AAIJ	13AE LHCB	Repl. by AAIJ 16L

$\Gamma([\pi^+ \pi^+ \pi^- \pi^-] K^+) / \Gamma([K^+ \pi^- \pi^+ \pi^-]_D K^+) \quad \Gamma_{65} / \Gamma_{64}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.975 ± 0.037 ± 0.019</b>	AAIJ	16L LHCB	$pp$ at 7, 8 TeV

$\Gamma([K^- \pi^+]_D K^*(892)^+) / \Gamma([K^+ \pi^-]_D K^*(892)^+) \quad \Gamma_{67} / \Gamma_{68}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.012 ± 0.004 OUR AVERAGE</b>			
0.011 ± 0.004 ± 0.001	AAIJ	17B0 LHCB	$pp$ at 7, 8, 13 TeV
0.066 ± 0.031 ± 0.010	AUBERT	09AJ BABR	$e^+ e^- \rightarrow \gamma(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.046 ± 0.031 ± 0.008	AUBERT,B	05V BABR	Repl. by AUBERT 09AJ

$\Gamma([K^- \pi^+ \pi^- \pi^+]_D K^*(892)^+)/\Gamma([K^+ \pi^- \pi^+ \pi^-]_D K^*(892)^+)$	$\Gamma_{69}/\Gamma_{70}$		
VALUE	DOCUMENT ID	TECN	COMMENT
$0.011 \pm 0.005 \pm 0.003$	AAIJ	17B0	LHCB $pp$ at 7, 8, 13 TeV

$\Gamma([\pi^+ \pi^- \pi^+ \pi^-]_D K^*(892)^+)/\Gamma([K^+ \pi^- \pi^+ \pi^-]_D K^*(892)^+)$	$\Gamma_{66}/\Gamma_{70}$		
VALUE	DOCUMENT ID	TECN	COMMENT
$1.08 \pm 0.13 \pm 0.03$	AAIJ	17B0	LHCB $pp$ at 7, 8, 13 TeV

$\Gamma([K^- \pi^+]_D \pi^+)/\Gamma_{\text{total}}$	$\Gamma_{71}/\Gamma$		
VALUE (units $10^{-7}$ )	DOCUMENT ID	TECN	COMMENT
$6.29^{+1.02+0.37}_{-0.98-0.48}$	HORII	08	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$6.6^{+1.9}_{-1.7} \pm 0.5$	SAIGO	05	BELL Repl. by HORII 08
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$\Gamma([K^- \pi^+]_D \pi^+)/\Gamma([K^+ \pi^-]_D \pi^+)$	$\Gamma_{71}/\Gamma_{72}$		
VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>3.6 \pm 0.5</math> OUR AVERAGE</b>	Error includes scale factor of 7.9.		

$4.15 \pm 0.08 \pm 0.04$	<sup>1</sup> AAIJ	21Q	LHCB $pp$ at 7, 8, 13 TeV
$3.20 \pm 0.07 \pm 0.04$	<sup>2</sup> AAIJ	21Q	LHCB $pp$ at 7, 8, 13 TeV
$2.8 \pm 0.7 \pm 0.4$	<sup>3</sup> AALTONEN	11AJ	CDF $p\bar{p}$ at 1.96 TeV
$3.28^{+0.38+0.12}_{-0.36-0.18}$	HORII	11	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$3.3 \pm 0.6 \pm 0.4$	DEL-AMO-SA..10H	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$3.60 \pm 0.12 \pm 0.09$	<sup>4</sup> AAIJ	16L	LHCB $pp$ at 7, 8 TeV
$4.10 \pm 0.25 \pm 0.05$	AAIJ	12M	LHCB Repl. by AAIJ 16L
$3.40^{+0.55+0.15}_{-0.53-0.22}$	HORII	08	BELL Repl. by HORII 11
$3.5^{+1.0}_{-0.9} \pm 0.2$	SAIGO	05	BELL Repl. by HORII 08

<sup>1</sup> Uses the ratio of  $B^- \rightarrow [K^+ \pi^-]_D K^-$  and  $B^- \rightarrow [K^- \pi^+]_D K^-$ . AAIJ 21Q gives the charge-averaged rate as  $0.00368 \pm 0.00007$ , where the statistical and systematic uncertainties have been combined according to the correlations between the observables.

<sup>2</sup> Uses the ratio of  $B^+ \rightarrow [K^- \pi^+]_D \pi^+$  and  $B^+ \rightarrow [K^+ \pi^-]_D \pi^+$ . AAIJ 21Q gives the charge-averaged rate as  $0.00368 \pm 0.00007$ , where the statistical and systematic uncertainties have been combined according to the correlations between the observables.

<sup>3</sup> AALTONEN 11AJ also measures the ratio separately for  $B^+$  ( $R^+(\pi)$ ) and  $B^-$  ( $R^-(\pi)$ ) and obtains:  $R^+(\pi) = (2.4 \pm 1.0 \pm 0.4) \times 10^{-3}$ ,  $R^-(\pi) = (3.1 \pm 1.1 \pm 0.4) \times 10^{-3}$ .

<sup>4</sup> Superseded by AAIJ 21Q.

$\Gamma([K^- \pi^+ \pi^0]_D \pi^+)/\Gamma([K^+ \pi^- \pi^0]_D \pi^+)$	$\Gamma_{73}/\Gamma_{74}$		
VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>2.2 \pm 0.4</math> OUR AVERAGE</b>			

$2.35 \pm 0.49 \pm 0.06$	<sup>1</sup> AAIJ	15W	LHCB $pp$ at 7, 8 TeV
$1.89 \pm 0.54^{+0.22}_{-0.25}$	NAYAK	13	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses  $D^0 \rightarrow K^- \pi^+ \pi^0$  for the favored mode, and  $D^0 \rightarrow K^+ \pi^- \pi^0$  for the suppressed mode.

$\Gamma([K^- \pi^+ \pi^+ \pi^-]_D \pi^+)/\Gamma([K^+ \pi^- \pi^+ \pi^-]_D \pi^+)$   $\Gamma_{75}/\Gamma_{76}$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>3.77 ± 0.18 ± 0.06</b>	AAIJ	16L LHCb	$pp$ at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
3.7 ± 0.4	AAIJ	13AE LHCb	Repl. by AAIJ 16L

$\Gamma([K^- \pi^+]_{(D\pi)} \pi^+)/\Gamma([K^+ \pi^-]_{(D\pi)} \pi^+)$   $\Gamma_{77}/\Gamma_{78}$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>4.4 ± 0.6 OUR AVERAGE</b>	Error includes scale factor of 1.1.		
4.05 ± 0.56 ± 0.59	<sup>1</sup> AAIJ	21Q LHCb	$pp$ at 7, 8, 13 TeV
5.36 ± 0.56 ± 0.58	<sup>2</sup> AAIJ	21Q LHCb	$pp$ at 7, 8, 13 TeV
3.2 ± 0.9 ± 0.8	DEL-AMO-SA..10H	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses the ratio of  $B^- \rightarrow ([K^+ \pi^-]_D \pi^0)_{D^*} \pi^-$  and  $B^- \rightarrow ([K^- \pi^+]_D \pi^0)_{D^*} \pi^-$ , without inclusion of the neutral pion in the reconstruction. AAIJ 21Q gives the charge-averaged rate as  $0.00471 \pm 0.00077$ , where the statistical and systematic uncertainties have been combined according to the correlations between the observables.

<sup>2</sup> Uses the ratio of  $B^+ \rightarrow ([K^+ \pi^-]_D \pi^0)_{D^*} \pi^+$  and  $B^+ \rightarrow ([K^- \pi^+]_D \pi^0)_{D^*} \pi^+$ , without inclusion of the neutral pion in the reconstruction. AAIJ 21Q gives the charge-averaged rate as  $0.00471 \pm 0.00077$ , where the statistical and systematic uncertainties have been combined according to the correlations between the observables.

$\Gamma([K^- \pi^+]_{(D\gamma)} \pi^+)/\Gamma([K^+ \pi^-]_{(D\gamma)} \pi^+)$   $\Gamma_{79}/\Gamma_{80}$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>4.1 ± 1.0 OUR AVERAGE</b>			
4.72 ± 0.92 ± 1.18	<sup>1</sup> AAIJ	21Q LHCb	$pp$ at 7, 8, 13 TeV
4.03 ± 0.91 ± 1.14	<sup>2</sup> AAIJ	21Q LHCb	$pp$ at 7, 8, 13 TeV
2.7 ± 1.4 ± 2.2	DEL-AMO-SA..10H	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses the ratio of  $B^- \rightarrow ([K^+ \pi^-]_{D\gamma})_{D^*} \pi^-$  and  $B^- \rightarrow ([K^- \pi^+]_{D\gamma})_{D^*} \pi^-$ , without inclusion of the photon in the reconstruction. AAIJ 21Q gives the charge-averaged rate as  $0.00420 \pm 0.00138$ , where the statistical and systematic uncertainties have been combined according to the correlations between the observables.

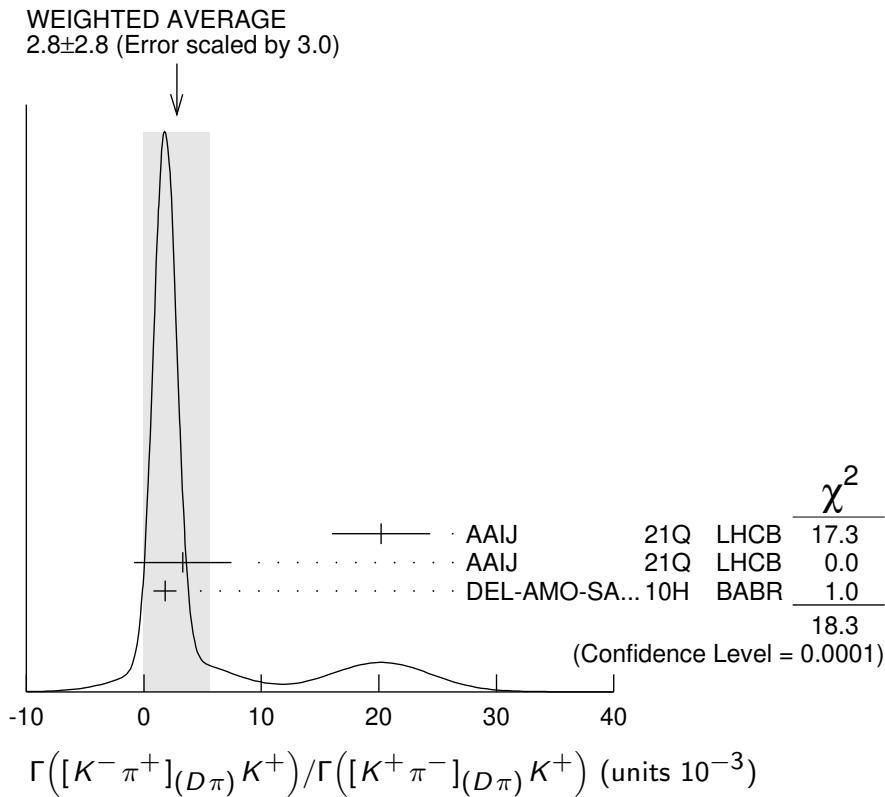
<sup>2</sup> Uses the ratio of  $B^+ \rightarrow ([K^- \pi^+]_{D\gamma})_{D^*} \pi^+$  and  $B^- \rightarrow ([K^+ \pi^-]_{D\gamma})_{D^*} \pi^+$ , without inclusion of the photon in the reconstruction. AAIJ 21Q gives the charge-averaged rate as  $0.00420 \pm 0.00138$ , where the statistical and systematic uncertainties have been combined according to the correlations between the observables.

$\Gamma([K^- \pi^+]_{(D\pi)} K^+)/\Gamma([K^+ \pi^-]_{(D\pi)} K^+)$   $\Gamma_{81}/\Gamma_{82}$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>2.8 ± 2.8 OUR AVERAGE</b>	Error includes scale factor of 3.0. See the ideogram below.		
20.2 ± 3.5 ± 2.3	<sup>1</sup> AAIJ	21Q LHCb	$pp$ at 7, 8, 13 TeV
3.3 ± 3.5 ± 2.2	<sup>2</sup> AAIJ	21Q LHCb	$pp$ at 7, 8, 13 TeV
1.8 ± 0.9 ± 0.4	DEL-AMO-SA..10H	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses the ratio of  $B^- \rightarrow ([K^+ \pi^-]_D \pi^0)_{D^*} K^-$  and  $B^- \rightarrow ([K^- \pi^+]_D \pi^0)_{D^*} K^-$ , without inclusion of the neutral pion in the reconstruction. AAIJ 21Q gives the charge-averaged rate as  $0.0118 \pm 0.0034$ , where the statistical and systematic uncertainties have been combined according to the correlations between the observables.

<sup>2</sup> Uses the ratio of  $B^+ \rightarrow ([K^+ \pi^-]_D \pi^0)_{D^*} \pi^+$  and  $B^+ \rightarrow ([K^- \pi^+]_D \pi^0)_{D^*} \pi^+$ , without inclusion of the neutral pion in the reconstruction. AAIJ 21Q gives the charge-averaged rate as  $0.0118 \pm 0.0034$ , where the statistical and systematic uncertainties have been combined according to the correlations between the observables.



**$\Gamma([K^- \pi^+]_{(D\gamma)} K^+) / \Gamma([K^+ \pi^-]_{(D\gamma)} K^+)$   $\Gamma_{83} / \Gamma_{84}$**

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>1.4 \pm 1.6</math> OUR AVERAGE</b>			
$11.7 \pm 21.5 \pm 31.3$	<sup>1</sup> AAIJ	21Q LHCB	$pp$ at 7, 8, 13 TeV
$29.2 \pm 21.4 \pm 31.2$	<sup>2</sup> AAIJ	21Q LHCB	$pp$ at 7, 8, 13 TeV
$1.3 \pm 1.4 \pm 0.8$	DEL-AMO-SA...10H	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses the ratio of  $B^- \rightarrow ([K^+ \pi^-]_{D\gamma})_{D^*} K^-$  and  $B^- \rightarrow ([K^- \pi^+]_{D\gamma})_{D^*} K^-$ , without inclusion of the photon in the reconstruction. AAIJ 21Q gives the charge-averaged rate as  $0.0163 \pm 0.0373$ , where the statistical and systematic uncertainties have been combined according to the correlations between the observables.

<sup>2</sup> Uses the ratio of  $B^+ \rightarrow ([K^- \pi^+]_{D\gamma})_{D^*} K^+$  and  $B^+ \rightarrow ([K^+ \pi^-]_{D\gamma})_{D^*} K^+$ , without inclusion of the photon in the reconstruction. AAIJ 21Q gives the charge-averaged rate as  $0.0163 \pm 0.0373$ , where the statistical and systematic uncertainties have been combined according to the correlations between the observables.

**$\Gamma([\pi^+ \pi^- \pi^0]_{D} K^-) / \Gamma_{\text{total}}$   $\Gamma_{85} / \Gamma$**

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>4.6 \pm 0.8 \pm 0.4</math></b>	<sup>1</sup> AUBERT	07BJ BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$5.5 \pm 1.0 \pm 0.7$	<sup>1</sup> AUBERT,B	05T BABR	Repl. by AUBERT 07BJ

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma([K_S^0 K^+ \pi^-]_D K^+)/\Gamma([K_S^0 K^+ \pi^-]_D \pi^+)$   $\Gamma_{86}/\Gamma_{92}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.092 \pm 0.009 \pm 0.004</math></b>	<sup>1</sup> AAIJ	14V	LHCB $pp$ at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.081 \pm 0.008 \pm 0.004$	<sup>2</sup> AAIJ	20N	LHCB $pp$ at 7, 8, 13 TeV
<sup>1</sup> The analysis uses all of $D \rightarrow K_S^0 K \pi$ Dalitz decays.			
<sup>2</sup> The analysis uses $D \rightarrow K_S^0 K \pi$ Dalitz decays with $K^{*-} K^+$ region excluded.			

 $\Gamma([K_S^0 K^- \pi^+]_D K^+)/\Gamma([K_S^0 K^- \pi^+]_D \pi^+)$   $\Gamma_{88}/\Gamma_{90}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.066 \pm 0.009 \pm 0.002</math></b>	<sup>1</sup> AAIJ	14V	LHCB $pp$ at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.073 \pm 0.006 \pm 0.002$	<sup>2</sup> AAIJ	20N	LHCB $pp$ at 7, 8, 13 TeV
<sup>1</sup> The analysis uses all of $D \rightarrow K_S^0 K \pi$ Dalitz decays.			
<sup>2</sup> The analysis uses $D \rightarrow K_S^0 K \pi$ Dalitz decays with $K^{*-} K^+$ region excluded.			

 $\Gamma([K^*(892)^- K^+]_D K^+)/\Gamma([K^*(892)^- K^+]_D \pi^+)$   $\Gamma_{87}/\Gamma_{93}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.079 \pm 0.004 \pm 0.002</math></b>	<sup>1</sup> AAIJ	20N	LHCB $pp$ at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.084 \pm 0.011 \pm 0.003$	<sup>1</sup> AAIJ	14V	LHCB Repl. by AAIJ 20N
<sup>1</sup> The Analysis uses $D \rightarrow K^*(892) K \rightarrow K_S^0 K \pi$ decays.			

 $\Gamma([K^*(892)^+ K^-]_D K^+)/\Gamma([K^*(892)^+ K^-]_D \pi^+)$   $\Gamma_{89}/\Gamma_{91}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.062 \pm 0.006 \pm 0.003</math></b>	<sup>1</sup> AAIJ	20N	LHCB $pp$ at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.056 \pm 0.013 \pm 0.002$	<sup>1</sup> AAIJ	14V	LHCB Repl. by AAIJ 20N
<sup>1</sup> The Analysis uses $D \rightarrow K^*(892) K \rightarrow K_S^0 K \pi$ decays.			

 $\Gamma([K^+ K^- \pi^0]_D K^+)/\Gamma([K^+ K^- \pi^0]_D \pi^+)$   $\Gamma_{94}/\Gamma_{95}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.95 \pm 0.22 \pm 0.05</math></b>	<sup>1</sup> AAIJ	15W	LHCB $pp$ at 7, 8 TeV
<sup>1</sup> Uses $D \rightarrow K^+ K^- \pi^0$ mode.			

 $\Gamma([\pi^+ \pi^- \pi^0]_D K^+)/\Gamma([\pi^+ \pi^- \pi^0]_D \pi^+)$   $\Gamma_{96}/\Gamma_{97}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.98 \pm 0.11 \pm 0.05</math></b>	<sup>1</sup> AAIJ	15W	LHCB $pp$ at 7, 8 TeV
<sup>1</sup> Uses $D \rightarrow \pi^+ \pi^- \pi^0$ mode.			

 $\Gamma([K_S^0 K^+ \pi^-]_D \pi^+)/\Gamma([K_S^0 K^- \pi^+]_D \pi^+)$   $\Gamma_{92}/\Gamma_{90}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>1.528 \pm 0.058 \pm 0.025</math></b>	<sup>1</sup> AAIJ	14V	LHCB $pp$ at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.706 \pm 0.019 \pm 0.009$	<sup>2</sup> AAIJ	20N	LHCB $pp$ at 7, 8, 13 TeV
<sup>1</sup> The analysis uses all of $D \rightarrow K_S^0 K \pi$ Dalitz decays.			
<sup>2</sup> The analysis uses $D \rightarrow K_S^0 K \pi$ Dalitz decays with $K^{*-} K^+$ region excluded.			

$\Gamma([K^*(892)^- K^+]_D \pi^+)/\Gamma([K^*(892)^+ K^-]_D \pi^+)$   $\Gamma_{93}/\Gamma_{91}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>2.585 ± 0.057 ± 0.019</b>	<sup>1</sup> AAIJ	20N	LHCB $pp$ at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
2.57 ± 0.13 ± 0.06	<sup>1</sup> AAIJ	14V	LHCB Repl. by AAIJ 20N

<sup>1</sup>The Analysis uses  $D \rightarrow K^*(892)K \rightarrow K_S^0 K \pi$  decays.

$\Gamma(\overline{D}^0 K^*(892)^+)/\Gamma_{\text{total}}$   $\Gamma_{98}/\Gamma$

<u>VALUE (units 10<sup>-4</sup>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>5.3 ± 0.4 OUR AVERAGE</b>			
5.29 ± 0.30 ± 0.34	<sup>1</sup> AUBERT	06Z	BABR $e^+e^- \rightarrow \Upsilon(4S)$
6.1 ± 1.6 ± 1.7	<sup>1</sup> MAHAPATRA	02	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
6.3 ± 0.7 ± 0.5	<sup>1</sup> AUBERT	04Q	BABR Repl. by AUBERT 06Z

<sup>1</sup>Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(D_{CP(-)} K^*(892)^+)/\Gamma(\overline{D}^0 K^*(892)^+)$   $\Gamma_{99}/\Gamma_{98}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.515 ± 0.135 ± 0.065</b>	<sup>1</sup> AUBERT	09AJ	BABR $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.325 ± 0.13 ± 0.04	<sup>2</sup> AUBERT,B	05U	BABR Repl. by AUBERT 09AJ

<sup>1</sup>The authors report  $R_{CP-} = 1.03 \pm 0.27 \pm 0.13$  which is, assuming  $CP$  conservation, twice the value of the quoted above branching ratio,

<sup>2</sup>The authors report  $R_{CP-} = 0.65 \pm 0.26 \pm 0.08$  which is, assuming  $CP$  conservation, twice the value of the quoted above branching ratio.

$\Gamma(D_{CP(+)} K^*(892)^+)/\Gamma(\overline{D}^0 K^*(892)^+)$   $\Gamma_{100}/\Gamma_{98}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.16 ± 0.08 OUR AVERAGE</b>			
1.18 ± 0.08 ± 0.02	<sup>1</sup> AAIJ	18X	LHCB $pp$ at 7, 8, 13 TeV
1.085 ± 0.175 ± 0.045	<sup>2</sup> AUBERT	09AJ	BABR $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1.18 ± 0.08 ± 0.01	<sup>3</sup> AAIJ	17BO	LHCB Repl. by AAIJ 18X
0.98 ± 0.20 ± 0.055	<sup>4</sup> AUBERT,B	05U	BABR Repl. by AUBERT 09AJ

<sup>1</sup>Measures the ratio separately for  $K^+K^-$  and  $\pi^+\pi^-$  final states,  $R_{KK} = 1.22 \pm 0.09 \pm 0.02$  and  $R_{\pi\pi} = 1.08 \pm 0.14 \pm 0.03$ , and combines the two results.

<sup>2</sup>The authors report  $R_{CP+} = 2.17 \pm 0.35 \pm 0.09$  which is, assuming  $CP$  conservation, twice the value of the quoted above branching ratio,

<sup>3</sup>Measures the ratio separately for  $K^+K^-$  and  $\pi^+\pi^-$  final states,  $R_{KK} = 1.22 \pm 0.09 \pm 0.01$  and  $R_{\pi\pi} = 1.08 \pm 0.14 \pm 0.03$ , and combines the two results.

<sup>4</sup>The authors report  $R_{CP+} = 1.96 \pm 0.40 \pm 0.11$  which is, assuming  $CP$  conservation, twice the value of the quoted above branching ratio.

$\Gamma(D^0 K^*(892)^+)/\Gamma(\overline{D}^0 K^*(892)^+)$   $\Gamma_{101}/\Gamma_{98}$

"OUR EVALUATION" is derived from  $r_B(B^+ \rightarrow D^0 K^{*+})$  data block listed in "CP violation parameters" section.

<u>VALUE (units 10<sup>-3</sup>)</u>	<u>DOCUMENT ID</u>
<b>10.2<sup>+3.2</sup><sub>-6.9</sub> OUR EVALUATION</b>	



$\Gamma(\overline{D}^0 K^+ \pi^+ \pi^-) / \Gamma(\overline{D}^0 \pi^+ \pi^+ \pi^-)$				$\Gamma_{102} / \Gamma_{108}$
<u>VALUE (units <math>10^{-2}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b><math>9.4 \pm 1.3 \pm 0.9</math></b>	AAIJ	12T	LHCB	$pp$ at 7 TeV
$\Gamma(D_{CP(+1)} K^+ \pi^- \pi^+) / \Gamma([K^+ \pi^-]_D K^+ \pi^- \pi^+)$				$\Gamma_{105} / \Gamma_{103}$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b><math>1.040 \pm 0.064</math></b>	AAIJ	15BC	LHCB	$pp$ at 7, 8 TeV
$\Gamma([K^- \pi^+]_D K^+ \pi^- \pi^+) / \Gamma([K^+ \pi^-]_D K^+ \pi^- \pi^+)$				$\Gamma_{104} / \Gamma_{103}$
<u>VALUE (units <math>10^{-4}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b><math>85^{+36}_{-33}</math></b>	AAIJ	15BC	LHCB	$pp$ at 7, 8 TeV
$\Gamma(\overline{D}^0 K^+ \overline{K}^0) / \Gamma_{\text{total}}$				$\Gamma_{106} / \Gamma$
<u>VALUE (units <math>10^{-4}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b><math>5.5 \pm 1.4 \pm 0.8</math></b>	<sup>1</sup> DRUTSKOY	02	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ .				
$\Gamma(\overline{D}^0 K^+ \overline{K}^*(892)^0) / \Gamma_{\text{total}}$				$\Gamma_{107} / \Gamma$
<u>VALUE (units <math>10^{-4}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b><math>7.5 \pm 1.3 \pm 1.1</math></b>	<sup>1</sup> DRUTSKOY	02	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ .				
$\Gamma(\overline{D}^0 \pi^+ \pi^+ \pi^-) / \Gamma_{\text{total}}$				$\Gamma_{108} / \Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b><math>0.0056 \pm 0.0021</math> OUR FIT</b>	Error includes scale factor of 3.6.			
<b><math>0.0115 \pm 0.0029 \pm 0.0021</math></b>	<sup>1</sup> BORTOLETTO92	CLEO		$e^+ e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> BORTOLETTO 92 assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ and uses Mark III branching fractions for the $D$ .				
$\Gamma(\overline{D}^0 \pi^+ \pi^+ \pi^-) / \Gamma(\overline{D}^0 \pi^+)$				$\Gamma_{108} / \Gamma_{51}$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b><math>1.2 \pm 0.4</math> OUR FIT</b>	Error includes scale factor of 3.7.			
<b><math>1.27 \pm 0.06 \pm 0.11</math></b>	AAIJ	11E	LHCB	$pp$ at 7 TeV
$\Gamma([K^- \pi^+]_D \pi^+ \pi^- \pi^+) / \Gamma([K^+ \pi^-]_D K^+ \pi^- \pi^+)$				$\Gamma_{109} / \Gamma_{103}$
<u>VALUE (units <math>10^{-4}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b><math>42.7 \pm 5.6</math></b>	AAIJ	15BC	LHCB	$pp$ at 7, 8 TeV
$\Gamma(\overline{D}^0 \pi^+ \pi^+ \pi^- \text{ nonresonant}) / \Gamma_{\text{total}}$				$\Gamma_{110} / \Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b><math>0.0051 \pm 0.0034 \pm 0.0023</math></b>	<sup>1</sup> BORTOLETTO92	CLEO		$e^+ e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> BORTOLETTO 92 assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ and uses Mark III branching fractions for the $D$ .				

$$\Gamma(\overline{D}^0 \pi^+ \rho^0) / \Gamma_{\text{total}} \qquad \Gamma_{111} / \Gamma$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.0042 ± 0.0023 ± 0.0020</b>	<sup>1</sup> BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> BORTOLETTO 92 assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ and uses Mark III branching fractions for the $D$ .			

$$\Gamma(\overline{D}^0 a_1(1260)^+) / \Gamma_{\text{total}} \qquad \Gamma_{112} / \Gamma$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.0045 ± 0.0019 ± 0.0031</b>	<sup>1</sup> BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> BORTOLETTO 92 assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ and uses Mark III branching fractions for the $D$ .			

$$\Gamma(\overline{D}^0 \omega \pi^+) / \Gamma_{\text{total}} \qquad \Gamma_{113} / \Gamma$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.0041 ± 0.0007 ± 0.0006</b>	<sup>1</sup> ALEXANDER 01B	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ . The signal is consistent with all observed $\omega \pi^+$ having proceeded through the $\rho'^+$ resonance at mass $1349 \pm 25^{+10}_-5$ MeV and width $547 \pm 86^{+46}_{-45}$ MeV.			

$$\Gamma(D^*(2010)^- \pi^+ \pi^+) / \Gamma_{\text{total}} \qquad \Gamma_{114} / \Gamma$$

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.35 ± 0.22 OUR AVERAGE</b>					
1.25 ± 0.08 ± 0.22			<sup>1</sup> ABE	04D	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
1.9 ± 0.7 ± 0.3	14		<sup>2</sup> ALAM	94	CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$
2.6 ± 1.4 ± 0.7	11		<sup>3</sup> ALBRECHT	90J	ARG $e^+ e^- \rightarrow \Upsilon(4S)$
2.4 $\begin{smallmatrix} +1.7 & +1.0 \\ -1.6 & -0.6 \end{smallmatrix}$		3	<sup>4</sup> BEBEK	87	CLEO $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<4.	90		<sup>5</sup> BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
5. ± 2. ± 3.		7	<sup>6</sup> ALBRECHT	87C	ARG $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> ALAM 94 assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the CLEO II  $B(D^*(2010)^+ \rightarrow D^0 \pi^+)$  and absolute  $B(D^0 \rightarrow K^- \pi^+)$  and the PDG 1992  $B(D^0 \rightarrow K^- \pi^+ \pi^0) / B(D^0 \rightarrow K^- \pi^+)$  and  $B(D^0 \rightarrow K^- 2\pi^+ \pi^-) / B(D^0 \rightarrow K^- \pi^+)$ .

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and uses the Mark III branching fractions for the  $D$ .

<sup>4</sup> BEBEK 87 value has been updated in BERKELMAN 91 to use same assumptions as noted for BORTOLETTO 92.

<sup>5</sup> BORTOLETTO 92 assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and uses Mark III branching fractions for the  $D$  and  $D^*(2010)$ . The authors also find the product branching fraction into  $D^{**} \pi$  followed by  $D^{**} \rightarrow D^*(2010) \pi$  to be  $0.0014^{+0.0008}_{-0.0006} \pm 0.0003$  where  $D^{**}$  represents all orbitally excited  $D$  mesons.

<sup>6</sup> ALBRECHT 87C use PDG 86 branching ratios for  $D$  and  $D^*(2010)$  and assume  $B(\Upsilon(4S) \rightarrow B^+ B^-) = 55\%$  and  $B(\Upsilon(4S) \rightarrow B^0 \overline{B}^0) = 45\%$ . Superseded by ALBRECHT 90J.

$\Gamma(D^*(2010)^- K^+ \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{115}/\Gamma$

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
<b>8.2±0.3±1.4</b>	<sup>1</sup> AAIJ	17AR	LHCB $pp$ at 7, 8 TeV

<sup>1</sup> The branching fraction of the normalization mode  $B^+ \rightarrow D^{*-} \pi^+ \pi^+$  is rescaled to the updated ratio of  $\Upsilon(4S) \rightarrow B^+ B^-$  to  $\Upsilon(4S) \rightarrow B^0 \bar{B}^0$  decay rates of  $1.058 \pm 0.024$ .

$\Gamma(D^*(2010)^- K^+ \pi^+)/\Gamma(D^*(2010)^- \pi^+ \pi^+)$   $\Gamma_{115}/\Gamma_{114}$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b>6.39±0.27±0.48</b>	<sup>1</sup> AAIJ	17AR	LHCB $pp$ at 7, 8 TeV

<sup>1</sup> Uses  $D^{*-} \rightarrow \bar{D}^0 \pi^-$  and  $\bar{D}^0 \rightarrow K^+ \pi^-$  decays.

$\Gamma(\bar{D}_1(2420)^0 \pi^+, \bar{D}_1^0 \rightarrow D^*(2010)^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{116}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>8.42±0.08±1.46</b>	<sup>1</sup> AAIJ	20D	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> AAIJ 20D used a 4-body amplitude analysis of  $B^- \rightarrow D^{*+} \pi^- \pi^-$  decays.

$\Gamma(\bar{D}_1(2420)^0 \pi^+, \bar{D}_1^0 \rightarrow D^*(2010)^- \pi^+)/\Gamma(\bar{D}^0 \pi^+ \pi^+ \pi^-)$   $\Gamma_{116}/\Gamma_{108}$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b>9.3±1.6±0.9</b>	<sup>1</sup> AAIJ	11E	LHCB $pp$ at 7 TeV

<sup>1</sup> AAIJ 11E reports  $(9.3 \pm 1.6 \pm 0.9) \times 10^{-2}$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{D}_1(2420)^0 \pi^+, \bar{D}_1^0 \rightarrow D^*(2010)^- \pi^+)/\Gamma(B^+ \rightarrow \bar{D}^0 \pi^+ \pi^+ \pi^-)] \times [B(D^*(2010)^+ \rightarrow D^0 \pi^+)]$  assuming  $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = (67.7 \pm 0.5) \times 10^{-2}$ .

$\Gamma(D^- \pi^+ \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{117}/\Gamma$

VALUE (units $10^{-3}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.07±0.05 OUR AVERAGE</b>					
1.08±0.03±0.05			<sup>1</sup> AUBERT	09AB	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
1.02±0.04±0.15			<sup>1</sup> ABE	04D	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<1.4	90		<sup>2</sup> ALAM	94	CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$
<7	90		<sup>3</sup> BORTOLETTO92	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$
2.5 <sup>+4.1</sup> / <sub>-2.3</sub> <sup>+2.4</sup> / <sub>-0.8</sub>		1	<sup>4</sup> BEBEK	87	CLEO $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> ALAM 94 assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the Mark III  $B(D^+ \rightarrow K^- 2\pi^+)$ .

<sup>3</sup> BORTOLETTO 92 assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and uses Mark III branching fractions for the  $D$ . The product branching fraction into  $D_0^*(2340)\pi$  followed by  $D_0^*(2340) \rightarrow D\pi$  is  $< 0.005$  at 90%CL and into  $D_2^*(2460)$  followed by  $D_2^*(2460) \rightarrow D\pi$  is  $< 0.004$  at 90%CL.

<sup>4</sup> BEBEK 87 assume the  $\Upsilon(4S)$  decays 43% to  $B^0 \bar{B}^0$ .  $B(D^- \rightarrow K^+ \pi^- \pi^-) = (9.1 \pm 1.3 \pm 0.4)\%$  is assumed.

$\Gamma(D^- K^+ \pi^+)/\Gamma(D^- \pi^+ \pi^+)$   $\Gamma_{118}/\Gamma_{117}$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b>7.20±0.19±0.21</b>	AAIJ	15V	LHCB $pp$ at 7, 8 TeV

$\Gamma(D_0^*(2300)^0 K^+, D_0^{*0} \rightarrow D^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{119}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>6.1 \pm 1.9 \pm 1.5</math></b>		<sup>1</sup> AAIJ	15V LHCb	$pp$ at 7, 8 TeV

<sup>1</sup> Performs the amplitude analysis by fitting the square-Dalitz-plot distribution.

 $\Gamma(D_2^*(2460)^0 K^+, D_2^{*0} \rightarrow D^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{120}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>23.2 \pm 1.1 \pm 2.0</math></b>		<sup>1</sup> AAIJ	15V LHCb	$pp$ at 7, 8 TeV

<sup>1</sup> Performs the amplitude analysis by fitting the square-Dalitz-plot distribution.

 $\Gamma(D_1^*(2760)^0 K^+, D_1^{*0} \rightarrow D^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{121}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>3.6 \pm 0.9 \pm 0.8</math></b>		<sup>1</sup> AAIJ	15V LHCb	$pp$ at 7, 8 TeV

<sup>1</sup> Performs the amplitude analysis by fitting the square-Dalitz-plot distribution.

 $\Gamma(D^+ K^0)/\Gamma_{\text{total}}$   $\Gamma_{122}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 2.9</math></b>	90	<sup>1</sup> DEL-AMO-SA...10K	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • •		We do not use the following data for averages, fits, limits, etc. • • •		
$< 5.0$	90	<sup>1</sup> AUBERT,B	05E BABR	Repl. by DEL-AMO-SANCHEZ 10K

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(D^+ K^+ \pi^-)/\Gamma(D^- K^+ \pi^+)$   $\Gamma_{123}/\Gamma_{118}$ 

VALUE (units $10^{-2}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>7.3 \pm 1.2 \pm 0.7</math></b>		AAIJ	16M LHCb	$pp$ at 7, 8 TeV

 $\Gamma(D_2^*(2460)^0 K^+, D_2^{*0} \rightarrow D^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{124}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 6.3 \times 10^{-7}</math></b>	90	AAIJ	16R LHCb	$pp$ at 7, 8 TeV

 $\Gamma(D^+ K^{*0})/\Gamma_{\text{total}}$   $\Gamma_{125}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 4.9 \times 10^{-7}</math></b>	90	AAIJ	16M LHCb	$pp$ at 7, 8 TeV
• • •		We do not use the following data for averages, fits, limits, etc. • • •		
$< 1.8 \times 10^{-6}$	90	AAIJ	13R LHCb	Repl. by AAIJ 16M
$< 3.0 \times 10^{-6}$	90	<sup>1</sup> DEL-AMO-SA...10K	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(D^+ \bar{K}^{*0})/\Gamma_{\text{total}}$   $\Gamma_{126}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 1.4</math></b>	90	AAIJ	13R LHCb	$pp$ at 7 TeV

$$\Gamma(\bar{D}^*(2007)^0 \pi^+) / \Gamma_{\text{total}} \qquad \Gamma_{127} / \Gamma$$

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>5.18 ± 0.15 OUR AVERAGE</b>				
5.35 ± 0.04 ± 0.22		AAIJ	21Q	LHCB $pp$ at 7, 8, 13 TeV
4.82 ± 0.12 ± 0.35		<sup>1</sup> KATO	18	BELL $e^+e^- \rightarrow \Upsilon(4S)$
5.52 ± 0.17 ± 0.42		<sup>2</sup> AUBERT	07H	BABR $e^+e^- \rightarrow \Upsilon(4S)$
5.3 ± 0.4 ± 0.1		<sup>3,4</sup> AUBERT,BE	06J	BABR $e^+e^- \rightarrow \Upsilon(4S)$
4.34 ± 0.47 ± 0.18		<sup>5</sup> BRANDENB...	98	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
5.2 ± 0.7 ± 0.7	71	<sup>6</sup> ALAM	94	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
7.2 ± 1.8 ± 1.6		<sup>7</sup> BORTOLETTO	092	CLEO $e^+e^- \rightarrow \Upsilon(4S)$
4.0 ± 1.4 ± 1.2	9	<sup>7</sup> ALBRECHT	90J	ARG $e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
4.664 ± 0.029 ± 0.268		<sup>8</sup> AAIJ	18A	LHCB $pp$ at 7, 8, 13 TeV
2.7 ± 4.4		<sup>9</sup> BEBEK	87	CLEO $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Measures absolute branching fractions using a missing-mass technique.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> AUBERT,BE 06J reports  $[\Gamma(B^+ \rightarrow \bar{D}^*(2007)^0 \pi^+) / \Gamma_{\text{total}}] / [B(B^+ \rightarrow \bar{D}^0 \pi^+)] = 1.14 \pm 0.07 \pm 0.04$  which we multiply by our best value  $B(B^+ \rightarrow \bar{D}^0 \pi^+) = (4.68 \pm 0.13) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>4</sup> Uses a missing-mass method. Does not depend on  $D$  branching fractions or  $B^+/B^0$  production rates.

<sup>5</sup> BRANDENBURG 98 assume equal production of  $B^+$  and  $B^0$  at  $\Upsilon(4S)$  and use the  $D^*$  reconstruction technique. The first error is their experiment's error and the second error is the systematic error from the PDG 96 value of  $B(D^* \rightarrow D\pi)$ .

<sup>6</sup> ALAM 94 assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the CLEO II  $B(D^*(2007)^0 \rightarrow D^0 \pi^0)$  and absolute  $B(D^0 \rightarrow K^- \pi^+)$  and the PDG 1992  $B(D^0 \rightarrow K^- \pi^+ \pi^0) / B(D^0 \rightarrow K^- \pi^+)$  and  $B(D^0 \rightarrow K^- 2\pi^+ \pi^-) / B(D^0 \rightarrow K^- \pi^+)$ .

<sup>7</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and uses Mark III branching fractions for the  $D$  and  $D^*(2010)$ .

<sup>8</sup> Superseded by AAIJ 21Q.

<sup>9</sup> This is a derived branching ratio, using the inclusive pion spectrum and other two-body  $B$  decays. BEBEK 87 assume the  $\Upsilon(4S)$  decays 43% to  $B^0 \bar{B}^0$ .

$$\Gamma(\bar{D}^*(2007)^0 \omega \pi^+) / \Gamma_{\text{total}} \qquad \Gamma_{130} / \Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.0045 ± 0.0010 ± 0.0007</b>	<sup>1</sup> ALEXANDER	01B	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . The signal is consistent with all observed  $\omega \pi^+$  having proceeded through the  $\rho'^+$  resonance at mass  $1349 \pm 25^{+10}_{-5}$  MeV and width  $547 \pm 86^{+46}_{-45}$  MeV.

$$\Gamma(\bar{D}^*(2007)^0 \rho^+) / \Gamma_{\text{total}} \qquad \Gamma_{131} / \Gamma$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.0098 ± 0.0017 OUR AVERAGE</b>				
0.0098 ± 0.0006 ± 0.0017		<sup>1</sup> CSORNA	03	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
0.010 ± 0.006 ± 0.004	7	<sup>2</sup> ALBRECHT	90J	ARG $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.0168 ± 0.0021 ± 0.0028      86      <sup>3</sup>ALAM      94      CLE2      e<sup>+</sup>e<sup>-</sup> → γ(4S)

<sup>1</sup> Assumes equal production of B<sup>0</sup> and B<sup>+</sup> at the γ(4S) resonance. The second error combines the systematic and theoretical uncertainties in quadrature. CSORNA 03 includes data used in ALAM 94. A full angular fit to three complex helicity amplitudes is performed.

<sup>2</sup> Assumes equal production of B<sup>+</sup> and B<sup>0</sup> at the γ(4S) and uses Mark III branching fractions for the D and D\*(2010).

<sup>3</sup> ALAM 94 assume equal production of B<sup>+</sup> and B<sup>0</sup> at the γ(4S) and use the CLEO II B(D\*(2007)<sup>0</sup> → D<sup>0</sup>π<sup>0</sup>) and absolute B(D<sup>0</sup> → K<sup>-</sup>π<sup>+</sup>) and the PDG 1992 B(D<sup>0</sup> → K<sup>-</sup>π<sup>+</sup>π<sup>0</sup>)/B(D<sup>0</sup> → K<sup>-</sup>π<sup>+</sup>) and B(D<sup>0</sup> → K<sup>-</sup>2π<sup>+</sup>π<sup>-</sup>)/B(D<sup>0</sup> → K<sup>-</sup>π<sup>+</sup>). The nonresonant π<sup>+</sup>π<sup>0</sup> contribution under the ρ<sup>+</sup> is negligible.

**Γ(D\*(2007)<sup>0</sup>K<sup>+</sup>)/Γ<sub>total</sub>      Γ<sub>132</sub>/Γ**

VALUE (units 10 <sup>-4</sup> )	DOCUMENT ID	TECN	COMMENT
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**4.20<sup>+0.31</sup><sub>-0.28</sub> OUR AVERAGE**

4.21<sup>+0.30</sup><sub>-0.26</sub> ± 0.12      <sup>1</sup> AUBERT      05N      BABR      e<sup>+</sup>e<sup>-</sup> → γ(4S)

4.0 ± 1.1 ± 0.1      <sup>2</sup> ABE      01I      BELL      e<sup>+</sup>e<sup>-</sup> → γ(4S)

<sup>1</sup> AUBERT 05N reports [Γ(B<sup>+</sup> → D\*(2007)<sup>0</sup>K<sup>+</sup>)/Γ<sub>total</sub>] / [B(B<sup>+</sup> → D\*(2007)<sup>0</sup>π<sup>+</sup>)] = 0.0813 ± 0.0040<sup>+0.0042</sup><sub>-0.0031</sub> which we multiply by our best value B(B<sup>+</sup> → D\*(2007)<sup>0</sup>π<sup>+</sup>) = (5.18 ± 0.15) × 10<sup>-3</sup>. Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> ABE 01I reports [Γ(B<sup>+</sup> → D\*(2007)<sup>0</sup>K<sup>+</sup>)/Γ<sub>total</sub>] / [B(B<sup>+</sup> → D\*(2007)<sup>0</sup>π<sup>+</sup>)] = 0.078 ± 0.019 ± 0.009 which we multiply by our best value B(B<sup>+</sup> → D\*(2007)<sup>0</sup>π<sup>+</sup>) = (5.18 ± 0.15) × 10<sup>-3</sup>. Our first error is their experiment's error and our second error is the systematic error from using our best value.

**Γ(D\*<sup>0</sup><sub>CP(+1)</sub>K<sup>+</sup>)/Γ<sub>total</sub>      Γ<sub>133</sub>/Γ**

VALUE (units 10 <sup>-4</sup> )	DOCUMENT ID	TECN	COMMENT
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**2.75 ± 0.29<sup>+0.21</sup><sub>-0.19</sub>**      <sup>1</sup> AUBERT      08BF      BABR      e<sup>+</sup>e<sup>-</sup> → γ(4S)

<sup>1</sup> AUBERT 08BF reports [Γ(B<sup>+</sup> → D\*<sup>0</sup><sub>CP(+1)</sub>K<sup>+</sup>)/Γ<sub>total</sub>] / [B(B<sup>+</sup> → D\*(2007)<sup>0</sup>K<sup>+</sup>)] = 0.655 ± 0.065 ± 0.020 which we multiply by our best value B(B<sup>+</sup> → D\*(2007)<sup>0</sup>K<sup>+</sup>) = (4.20<sup>+0.31</sup><sub>-0.28</sub>) × 10<sup>-4</sup>. Our first error is their experiment's error and our second error is the systematic error from using our best value.

**Γ(D\*(2007)<sup>0</sup>K<sup>+</sup>)/Γ(D\*(2007)<sup>0</sup>π<sup>+</sup>)      Γ<sub>132</sub>/Γ<sub>127</sub>**

VALUE (units 10 <sup>-2</sup> )	DOCUMENT ID	TECN	COMMENT
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**8.51 ± 0.12 ± 0.48**      <sup>1</sup> AAIJ      21Q      LHCB      pp at 7, 8, 13 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

7.930 ± 0.110 ± 0.560      <sup>2</sup> AAIJ      18A      LHCB      pp at 7, 8, 13 TeV

<sup>1</sup> Uses semi-inclusive reconstruction of B<sup>+</sup> → ([K<sup>+</sup>π<sup>-</sup>]<sub>D</sub>γ/π<sup>0</sup>)<sub>D\*</sub>K<sup>+</sup>/π<sup>+</sup>. Decays of D\* → Dγ/π<sup>0</sup> are reconstructed without inclusion of π<sup>0</sup> or γ.

<sup>2</sup> Superseded by AAIJ 21Q.

$\Gamma(\bar{D}_{CP(+1)}^{*0} K^+)/\Gamma(\bar{D}_{CP(+1)}^{*0} \pi^+)$   $\Gamma_{133}/\Gamma_{128}$

VALUE	DOCUMENT ID	TECN	COMMENT
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**0.095±0.017 OUR AVERAGE**

0.11 ±0.02 ±0.02	<sup>1</sup> ABE	06	BELL $e^+e^- \rightarrow \Upsilon(4S)$
0.086±0.021±0.007	<sup>2</sup> AUBERT	05N	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Reports a double ratio of  $B(B^+ \rightarrow D_{CP(+1)}^{*0} K^+)/B(B^+ \rightarrow D_{CP(+1)}^{*0} \pi^+)$  and  $B(B^+ \rightarrow \bar{D}^{*0} K^+)/B(B^+ \rightarrow \bar{D}^{*0} \pi^+)$ ,  $1.41 \pm 0.25 \pm 0.06$ . We multiply by our best value of  $B(B^+ \rightarrow \bar{D}^{*0} K^+)/B(B^+ \rightarrow \bar{D}^{*0} \pi^+) = 0.080 \pm 0.011$ . Our first error is their experiment's error and the second error is systematic error from using our best value.

<sup>2</sup> Uses  $D^{*0} \rightarrow D^0 \pi^0$  with  $D^0$  reconstructed in the  $CP$ -even eigenstates  $K^+ K^-$  and  $\pi^+ \pi^-$ .

$\Gamma(\bar{D}_{CP(-1)}^{*0} K^+)/\Gamma_{\text{total}}$   $\Gamma_{134}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
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<b>2.31±0.27<sup>+0.17</sup><sub>-0.16</sub></b>	<sup>1</sup> AUBERT	08BF	BABR $e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> AUBERT 08BF reports  $[\Gamma(B^+ \rightarrow \bar{D}_{CP(-1)}^{*0} K^+)/\Gamma_{\text{total}}] / [B(B^+ \rightarrow \bar{D}^*(2007)^0 K^+)] = 0.55 \pm 0.06 \pm 0.02$  which we multiply by our best value  $B(B^+ \rightarrow \bar{D}^*(2007)^0 K^+) = (4.20^{+0.31}_{-0.28}) \times 10^{-4}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\bar{D}_{CP(-1)}^{*0} K^+)/\Gamma(D_{CP(-1)}^{*0} \pi^+)$   $\Gamma_{134}/\Gamma_{129}$

VALUE	DOCUMENT ID	TECN	COMMENT
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<b>0.09±0.03±0.01</b>	<sup>1</sup> ABE	06	BELL $e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Reports a double ratio of  $B(B^+ \rightarrow (D_{CP(-1)}^{*0})^0 K^+)/B(B^+ \rightarrow (D_{CP(-1)}^{*0})^0 \pi^+)$  and  $B(B^+ \rightarrow \bar{D}^{*0} K^+)/B(B^+ \rightarrow \bar{D}^{*0} \pi^+)$ ,  $1.15 \pm 0.31 \pm 0.12$ . We multiply by our best value of  $B(B^+ \rightarrow \bar{D}^{*0} K^+)/B(B^+ \rightarrow \bar{D}^{*0} \pi^+) = 0.080 \pm 0.011$ . Our first error is their experiment's error and the second error is systematic error from using our best value.

$\Gamma(D^*(2007)^0 K^+)/\Gamma(\bar{D}^*(2007)^0 K^+)$   $\Gamma_{135}/\Gamma_{132}$

"OUR EVALUATION" is derived from  $r_B(B^+ \rightarrow D^{*0} K^+)$  data block listed in "CP violation parameters" section.

VALUE (units $10^{-2}$ )	DOCUMENT ID
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<b>1.08<sup>+0.27</sup><sub>-0.29</sub> OUR EVALUATION</b>	
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$\Gamma(\bar{D}^*(2007)^0 K^*(892)^+)/\Gamma_{\text{total}}$   $\Gamma_{136}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
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**8.1±1.4 OUR AVERAGE**

8.3±1.1±1.0	<sup>1</sup> AUBERT	04K	BABR $e^+e^- \rightarrow \Upsilon(4S)$
7.2±2.2±2.6	<sup>2</sup> MAHAPATRA	02	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and an unpolarized final state.

$\Gamma(\bar{D}^*(2007)^0 K^+ \bar{K}^0)/\Gamma_{\text{total}}$   $\Gamma_{137}/\Gamma$ 

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;10.6</b>	90	<sup>1</sup> DRUTSKOY 02	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\bar{D}^*(2007)^0 K^+ \bar{K}^*(892)^0)/\Gamma_{\text{total}}$   $\Gamma_{138}/\Gamma$ 

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>15.3 ± 3.1 ± 2.9</b>	<sup>1</sup> DRUTSKOY 02	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\bar{D}^*(2007)^0 \pi^+ \pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{139}/\Gamma$ 

VALUE (units $10^{-2}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.03 ± 0.12 OUR AVERAGE</b>				
1.055 ± 0.047 ± 0.129		<sup>1</sup> MAJUMDER 04	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
0.94 ± 0.20 ± 0.17	48	<sup>2,3</sup> ALAM 94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> ALAM 94 assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the CLEO II  $B(D^*(2007)^0 \rightarrow D^0 \pi^0)$  and absolute  $B(D^0 \rightarrow K^- \pi^+)$  and the PDG 1992  $B(D^0 \rightarrow K^- \pi^+ \pi^0)/B(D^0 \rightarrow K^- \pi^+)$  and  $B(D^0 \rightarrow K^- 2\pi^+ \pi^-)/B(D^0 \rightarrow K^- \pi^+)$ .

<sup>3</sup> The three pion mass is required to be between 1.0 and 1.6 GeV consistent with an  $a_1$  meson. (If this channel is dominated by  $a_1^+$ , the branching ratio for  $\bar{D}^{*0} a_1^+$  is twice that for  $\bar{D}^{*0} \pi^+ \pi^+ \pi^-$ .)

 $\Gamma(\bar{D}^*(2007)^0 a_1(1260)^+)/\Gamma_{\text{total}}$   $\Gamma_{140}/\Gamma$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.0188 ± 0.0040 ± 0.0034</b>	<sup>1,2</sup> ALAM 94	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> ALAM 94 value is twice their  $\Gamma(\bar{D}^*(2007)^0 \pi^+ \pi^+ \pi^-)/\Gamma_{\text{total}}$  value based on their observation that the three pions are dominantly in the  $a_1(1260)$  mass range 1.0 to 1.6 GeV.

<sup>2</sup> ALAM 94 assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the CLEO II  $B(D^*(2007)^0 \rightarrow D^0 \pi^0)$  and absolute  $B(D^0 \rightarrow K^- \pi^+)$  and the PDG 1992  $B(D^0 \rightarrow K^- \pi^+ \pi^0)/B(D^0 \rightarrow K^- \pi^+)$  and  $B(D^0 \rightarrow K^- 2\pi^+ \pi^-)/B(D^0 \rightarrow K^- \pi^+)$ .

 $\Gamma(\bar{D}^*(2007)^0 \pi^- \pi^+ \pi^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{141}/\Gamma$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.0180 ± 0.0024 ± 0.0027</b>	<sup>1</sup> ALEXANDER 01B	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . The signal is consistent with all observed  $\omega \pi^+$  having proceeded through the  $\rho'^+$  resonance at mass  $1349 \pm 25_{-5}^{+10}$  MeV and width  $547 \pm 86_{-45}^{+46}$  MeV.

 $\Gamma(\bar{D}^{*0} 3\pi^+ 2\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{142}/\Gamma$ 

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>5.67 ± 0.91 ± 0.85</b>	<sup>1</sup> MAJUMDER 04	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .



$\Gamma(D^*(2010)^+\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{143}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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$<3.6 \times 10^{-6}$		<sup>1</sup> IWABUCHI 08	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$<1.7 \times 10^{-4}$	90	<sup>2</sup> BRANDENB... 98	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> BRANDENBURG 98 assume equal production of  $B^+$  and  $B^0$  at  $\Upsilon(4S)$  and use the  $D^*$  partial reconstruction technique. The first error is their experiment's error and the second error is the systematic error from the PDG 96 value of  $B(D^* \rightarrow D\pi)$ .

 $\Gamma(D^*(2010)^+K^0)/\Gamma_{\text{total}}$   $\Gamma_{144}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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$<9.0 \times 10^{-6}$	90	<sup>1</sup> AUBERT,B 05E	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$<9.5 \times 10^{-5}$	90	<sup>1</sup> GRITSAN 01	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(D^*(2010)^-\pi^+\pi^+\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{145}/\Gamma$ 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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$0.0152 \pm 0.0071 \pm 0.0001$	26	<sup>1</sup> ALBRECHT 90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.043 \pm 0.013 \pm 0.026$	24	<sup>2</sup> ALBRECHT 87C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> ALBRECHT 90J reports  $0.018 \pm 0.007 \pm 0.005$  from a measurement of  $[\Gamma(B^+ \rightarrow D^*(2010)^-\pi^+\pi^+\pi^0)/\Gamma_{\text{total}}] \times [B(D^*(2010)^+ \rightarrow D^0\pi^+)]$  assuming  $B(D^*(2010)^+ \rightarrow D^0\pi^+) = 0.57 \pm 0.06$ , which we rescale to our best value  $B(D^*(2010)^+ \rightarrow D^0\pi^+) = (67.7 \pm 0.5) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and uses Mark III branching fractions for the  $D$ .

<sup>2</sup> ALBRECHT 87C use PDG 86 branching ratios for  $D$  and  $D^*(2010)$  and assume  $B(\Upsilon(4S) \rightarrow B^+B^-) = 55\%$  and  $B(\Upsilon(4S) \rightarrow B^0\bar{B}^0) = 45\%$ . Superseded by ALBRECHT 90J.

 $\Gamma(D^*(2010)^-\pi^+\pi^+\pi^-\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{146}/\Gamma$ 

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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$2.56 \pm 0.26 \pm 0.33$		<sup>1</sup> MAJUMDER 04	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$<10$	90	<sup>2</sup> ALBRECHT 90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and uses Mark III branching fractions for the  $D$  and  $D^*(2010)$ .

$\Gamma(\overline{D}^{*0}\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{147}/\Gamma$

$D^{*0}$  represents an excited state with mass  $2.2 < M < 2.8 \text{ GeV}/c^2$ .

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>5.7 \pm 1.2 \pm 0.2</math></b>	<sup>1,2</sup> AUBERT,BE 06J	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> AUBERT,BE 06J reports  $[\Gamma(B^+ \rightarrow \overline{D}^{*0}\pi^+)/\Gamma_{\text{total}}] / [B(B^+ \rightarrow \overline{D}^0\pi^+)] = 1.22 \pm 0.13 \pm 0.23$  which we multiply by our best value  $B(B^+ \rightarrow \overline{D}^0\pi^+) = (4.68 \pm 0.13) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> Uses a missing-mass method. Does not depend on  $D$  branching fractions or  $B^+/B^0$  production rates.

$\Gamma(\overline{D}_1^*(2420)^0\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{148}/\Gamma$

VALUE	EVT5	DOCUMENT ID	TECN	COMMENT
<b><math>0.0015 \pm 0.0006</math> OUR AVERAGE</b>		Error includes scale factor of 1.3.		
$0.0011 \pm 0.0005 \pm 0.0002$	8	<sup>1</sup> ALAM 94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
$0.0025 \pm 0.0007 \pm 0.0006$		<sup>2</sup> ALBRECHT 94D	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> ALAM 94 assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the CLEO II  $B(D^*(2010)^+ \rightarrow D^0\pi^+)$  and absolute  $B(D^0 \rightarrow K^-\pi^+)$  and the PDG 1992  $B(D^0 \rightarrow K^-\pi^+\pi^0)/B(D^0 \rightarrow K^-\pi^+)$  and assuming  $B(D_1(2420)^0 \rightarrow D^*(2010)^+\pi^-) = 67\%$ .

<sup>2</sup> ALBRECHT 94D assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the CLEO II  $B(D^*(2010)^+ \rightarrow D^0\pi^+)$  assuming  $B(D_1(2420)^0 \rightarrow D^*(2010)^+\pi^-) = 67\%$ .

$\Gamma(\overline{D}_1(2420)^0\pi^+ \times B(\overline{D}_1^0 \rightarrow \overline{D}^0\pi^+\pi^-))/\Gamma_{\text{total}}$   $\Gamma_{149}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>2.5^{+1.6}_{-1.4}</math> OUR FIT</b>	Error includes scale factor of 3.9.		

<b><math>1.85 \pm 0.29^{+0.35}_{-0.55}</math></b>	<sup>1</sup> ABE 05A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\overline{D}_1(2420)^0\pi^+ \times B(\overline{D}_1^0 \rightarrow \overline{D}^0\pi^+\pi^-))/\Gamma(\overline{D}^0\pi^+\pi^+\pi^-)$   $\Gamma_{149}/\Gamma_{108}$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>4.6^{+3.3}_{-2.7}</math> OUR FIT</b>	Error includes scale factor of 3.9.		
<b><math>10.3 \pm 1.5 \pm 0.9</math></b>	AAIJ 11E	LHCB	$pp$ at 7 TeV

$\Gamma(\overline{D}_1(2420)^0\pi^+ \times B(\overline{D}_1^0 \rightarrow \overline{D}^0\pi^+\pi^- (\text{nonresonant}))) / \Gamma(\overline{D}^0\pi^+\pi^+\pi^-)$   $\Gamma_{150}/\Gamma_{108}$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>4.0 \pm 0.7 \pm 0.5</math></b>	<sup>1</sup> AAIJ 11E	LHCB	$pp$ at 7 TeV

<sup>1</sup> Excludes decays where  $\overline{D}_1(2420)^0 \rightarrow D^*(2010)^-\pi^+$ .

$\Gamma(\overline{D}_1(2430)^0\pi^+, \overline{D}_1^0 \rightarrow D^*(2010)^-\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{151}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>3.51 \pm 0.06 \pm 0.61</math></b>	<sup>1</sup> AAIJ 20D	LHCB	$pp$ at 7, 8, 13 TeV

<sup>1</sup> AAIJ 20D used a 4-body amplitude analysis of  $B^- \rightarrow D^{*+}\pi^-\pi^-$  decays.

$\Gamma(\overline{D}_2^*(2462)^0 \pi^+, \overline{D}_2^{*0} \rightarrow D^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{154}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
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**3.56 ± 0.24 OUR AVERAGE**

3.62 ± 0.06 ± 0.30	1 AAIJ	16AH LHCB	pp at 7, 8 TeV
3.5 ± 0.2 ± 0.4	2 AUBERT	09AB BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
3.4 ± 0.3 ± 0.72	2 ABE	04D BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Measured using a Dalitz plot analysis of  $B^- \rightarrow D^+ \pi^- \pi^-$  decays.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\overline{D}_2^*(2462)^0 \pi^+, \overline{D}_2^{*0} \rightarrow \overline{D}^0 \pi^- \pi^+)/\Gamma(\overline{D}^0 \pi^+ \pi^+ \pi^-)$   $\Gamma_{155}/\Gamma_{108}$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
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<b>4.0 ± 1.0 ± 0.4</b>	AAIJ	11E LHCB	pp at 7 TeV
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$\Gamma(\overline{D}_2^*(2462)^0 \pi^+, \overline{D}_2^{*0} \rightarrow \overline{D}^0 \pi^- \pi^+ (\text{nonresonant}))/\Gamma(\overline{D}^0 \pi^+ \pi^+ \pi^-)$   $\Gamma_{156}/\Gamma_{108}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt; 3.0 × 10<sup>-2</sup></b>	90	1 AAIJ	11E LHCB	pp at 7 TeV
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<sup>1</sup> Excludes decays where  $\overline{D}_2^*(2462)^0 \rightarrow D^*(2010)^- \pi^+$ .

$\Gamma(\overline{D}_2^*(2462)^0 \pi^+, \overline{D}_2^{*0} \rightarrow D^*(2010)^- \pi^+)/\Gamma(\overline{D}^0 \pi^+ \pi^+ \pi^-)$   $\Gamma_{157}/\Gamma_{108}$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
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<b>3.9 ± 1.2 ± 0.4</b>	1 AAIJ	11E LHCB	pp at 7 TeV
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<sup>1</sup> Uses  $B(D^*(2010)^+ \rightarrow D^0 \pi^+) = (67.7 \pm 0.5)\%$ .

$\Gamma(\overline{D}_0^*(2400)^0 \pi^+ \times B(\overline{D}_0^*(2400)^0 \rightarrow D^- \pi^+))/\Gamma_{\text{total}}$   $\Gamma_{158}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
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**6.4 ± 1.4 OUR AVERAGE**

6.8 ± 0.3 ± 2.0	1 AUBERT	09AB BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
6.1 ± 0.6 ± 1.8	1 ABE	04D BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\overline{D}_1(2421)^0 \pi^+, \overline{D}_1^0 \rightarrow D^{*-} \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{159}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
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**7.4 ± 1.0 OUR AVERAGE**

7.95 ± 0.09 ± 1.34	1 AAIJ	20D LHCB	pp at 7, 8, 13 TeV
6.8 ± 0.7 ± 1.3	2 ABE	04D BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> AAIJ 20D used a 4-body amplitude analysis of  $B^- \rightarrow D^{*+} \pi^- \pi^-$  decays.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\overline{D}_2^*(2462)^0 \pi^+, \overline{D}_2^{*0} \rightarrow D^{*-} \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{160}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
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**1.98 ± 0.30 OUR AVERAGE**

2.08 ± 0.03 ± 0.37	1 AAIJ	20D LHCB	pp at 7, 8, 13 TeV
1.8 ± 0.3 ± 0.4	2 ABE	04D BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> AAIJ 20D used a 4-body amplitude analysis of  $B^- \rightarrow D^{*+} \pi^- \pi^-$  decays.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\overline{D}_1'(2427)^0 \pi^+, \overline{D}_1^0 \rightarrow D^{*-} \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{161}/\Gamma$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>3.5 \pm 0.9</math></b> <b>OUR AVERAGE</b>				Error includes scale factor of 1.5.
$2.96 \pm 0.30 \pm 0.63$		<sup>1</sup> AAIJ	20D	LHCB $pp$ at 7, 8, 13 TeV
$5.0 \pm 0.4 \pm 1.1$		<sup>2</sup> ABE	04D	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> AAIJ 20D used a 4-body amplitude analysis of  $B^- \rightarrow D^{*+} \pi^- \pi^-$  decays.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\overline{D}_1(2420)^0 \pi^+ \times B(\overline{D}_1^0 \rightarrow \overline{D}^{*0} \pi^+ \pi^-))/\Gamma_{\text{total}}$   $\Gamma_{162}/\Gamma$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.06</b>	90	<sup>1</sup> ABE	05A	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\overline{D}_1^*(2420)^0 \rho^+)/\Gamma_{\text{total}}$   $\Gamma_{163}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.0014</b>	90	<sup>1</sup> ALAM	94	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> ALAM 94 assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the CLEO II  $B(D^*(2010)^+ \rightarrow D^0 \pi^+)$  assuming  $B(D_1(2420)^0 \rightarrow D^*(2010)^+ \pi^-) = 67\%$ .

$\Gamma(\overline{D}_2^*(2460)^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{164}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.0013</b>	90	<sup>1</sup> ALAM	94	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.0028	90	<sup>2</sup> ALAM	94	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
<0.0023	90	<sup>3</sup> ALBRECHT	94D	ARG $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> ALAM 94 assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the Mark III  $B(D^+ \rightarrow K^- 2\pi^+)$  and  $B(D_2^*(2460)^0 \rightarrow D^+ \pi^-) = 30\%$ .

<sup>2</sup> ALAM 94 assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the Mark III  $B(D^+ \rightarrow K^- 2\pi^+)$ , the CLEO II  $B(D^*(2010)^+ \rightarrow D^0 \pi^+)$  and  $B(D_2^*(2460)^0 \rightarrow D^*(2010)^+ \pi^-) = 20\%$ .

<sup>3</sup> ALBRECHT 94D assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the CLEO II  $B(D^*(2010)^+ \rightarrow D^0 \pi^+)$  and  $B(D_2^*(2460)^0 \rightarrow D^*(2010)^+ \pi^-) = 30\%$ .

$\Gamma(\overline{D}_2^*(2460)^0 \pi^+ \times B(\overline{D}_2^{*0} \rightarrow \overline{D}^{*0} \pi^+ \pi^-))/\Gamma_{\text{total}}$   $\Gamma_{165}/\Gamma$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.22</b>	90	<sup>1</sup> ABE	05A	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\overline{D}_2^*(2460)^0 \rho^+)/\Gamma_{\text{total}}$   $\Gamma_{171}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.0047</b>	90	<sup>1</sup> ALAM	94	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
<0.005	90	<sup>2</sup> ALAM	94	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> ALAM 94 assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the Mark III  $B(D^+ \rightarrow K^- 2\pi^+)$  and  $B(D_2^*(2460)^0 \rightarrow D^+ \pi^-) = 30\%$ .

<sup>2</sup> ALAM 94 assume equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and use the Mark III  $B(D^+ \rightarrow K^- 2\pi^+)$ , the CLEO II  $B(D^*(2010)^+ \rightarrow D^0 \pi^+)$  and  $B(D_2^*(2460)^0 \rightarrow D^*(2010)^+ \pi^-) = 20\%$ .

$\Gamma(\overline{D}(2550)^0 \pi^+, \overline{D}^0 \rightarrow D^*(2010)^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{152}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>0.72±0.01±0.14</b>	<sup>1</sup> AAIJ	20D	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> AAIJ 20D used a 4-body amplitude analysis of  $B^- \rightarrow D^{*+} \pi^- \pi^-$  decays.

$\Gamma(\overline{D}_j^*(2600)^0 \pi^+, \overline{D}_j^{*0} \rightarrow D^*(2010)^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{153}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>0.68±0.01±0.13</b>	<sup>1</sup> AAIJ	20D	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> AAIJ 20D used a 4-body amplitude analysis of  $B^- \rightarrow D^{*+} \pi^- \pi^-$  decays.

$\Gamma(\overline{D}_1^*(2680)^0 \pi^+, \overline{D}_1^*(2680)^0 \rightarrow D^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{166}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>0.84±0.06±0.20</b>	<sup>1</sup> AAIJ	16AH	LHCB $pp$ at 7, 8 TeV

<sup>1</sup> Measured using a Dalitz plot analysis of  $B^+ \rightarrow D^- \pi^+ \pi^+$  decays.

$\Gamma(\overline{D}(2740)^0 \pi^+, \overline{D}^0 \rightarrow D^*(2010)^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{167}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>0.33±0.02±0.15</b>	<sup>1</sup> AAIJ	20D	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> AAIJ 20D used a 4-body amplitude analysis of  $B^- \rightarrow D^{*+} \pi^- \pi^-$  decays.

$\Gamma(\overline{D}_3^*(2750)^0 \pi^+, \overline{D}_3^{*0} \rightarrow D^*(2010)^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{168}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>0.11±0.01±0.03</b>	<sup>1</sup> AAIJ	20D	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> AAIJ 20D used a 4-body amplitude analysis of  $B^- \rightarrow D^{*+} \pi^- \pi^-$  decays.

$\Gamma(\overline{D}_3^*(2760)^0 \pi^+, \overline{D}_3^*(2760)^0 \pi^+ \rightarrow D^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{169}/\Gamma$

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.0±0.1±0.2</b>	<sup>1</sup> AAIJ	16AH	LHCB $pp$ at 7, 8 TeV

<sup>1</sup> Measured using a Dalitz plot analysis of  $B^+ \rightarrow D^- \pi^+ \pi^+$  decays.

$\Gamma(\overline{D}_2^*(3000)^0 \pi^+, \overline{D}_2^*(3000)^0 \pi^+ \rightarrow D^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{170}/\Gamma$

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b>2±1±1</b>	<sup>1</sup> AAIJ	16AH	LHCB $pp$ at 7, 8 TeV

<sup>1</sup> Measured using a Dalitz plot analysis of  $B^+ \rightarrow D^- \pi^+ \pi^+$  decays.

$\Gamma(\overline{D}^0 D_s^+)/\Gamma_{\text{total}}$   $\Gamma_{172}/\Gamma$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>9.0±0.9 OUR AVERAGE</b>			
8.6±0.2±1.1	<sup>1</sup> AAIJ	13AP	LHCB $pp$ at 7 TeV
9.5±2.0±0.8	<sup>2</sup> AUBERT	06N	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
9.8±2.6±0.9	<sup>3</sup> GIBAUT	96	CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$
14 ±8 ±1	<sup>4</sup> ALBRECHT	92G	ARG $e^+ e^- \rightarrow \Upsilon(4S)$
13 ±6 ±1	<sup>5</sup> BORTOLETTO90		CLEO $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses  $B(B^0 \rightarrow D^- D_s^+) = (7.2 \pm 0.8) \times 10^{-3}$ .

- <sup>2</sup> AUBERT 06N reports  $(0.92 \pm 0.14 \pm 0.18) \times 10^{-2}$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{D}^0 D_s^+)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.0462 \pm 0.0062$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.
- <sup>3</sup> GIBAUT 96 reports  $0.0126 \pm 0.0022 \pm 0.0025$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{D}^0 D_s^+)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.
- <sup>4</sup> ALBRECHT 92G reports  $0.024 \pm 0.012 \pm 0.004$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{D}^0 D_s^+)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990  $D^0$  branching ratios, e.g.,  $B(D^0 \rightarrow K^- \pi^+) = 3.71 \pm 0.25\%$ .
- <sup>5</sup> BORTOLETTO 90 reports  $0.029 \pm 0.013$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{D}^0 D_s^+)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.02$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D_{s0}^*(2317)^+ \bar{D}^0, D_{s0}^{*+} \rightarrow D_s^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{173}/\Gamma$

VALUE (units  $10^{-3}$ )                      DOCUMENT ID    TECN    COMMENT

**$0.80^{+0.16}_{-0.13}$  OUR AVERAGE**

$0.80^{+0.17}_{-0.16} \pm 0.02$                       1,2 CHOI                      15A BELL     $e^+ e^- \rightarrow \Upsilon(4S)$

$0.80^{+0.35}_{-0.21} \pm 0.07$                       2,3 AUBERT,B                      04s BABR     $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.65^{+0.26}_{-0.24} \pm 0.06$                       2,4 KROKOVNY    03B BELL    Repl. by CHOI 15A

<sup>1</sup> CHOI 15A reports  $(8.0^{+1.3}_{-1.2} \pm 1.1 \pm 0.4) \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_{s0}^*(2317)^+ \bar{D}^0, D_{s0}^{*+} \rightarrow D_s^+ \pi^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow K^+ K^- \pi^+)]$  assuming  $B(D_s^+ \rightarrow K^+ K^- \pi^+) = (5.39 \pm 0.21) \times 10^{-2}$ , which we rescale to our best value  $B(D_s^+ \rightarrow K^+ K^- \pi^+) = (5.38 \pm 0.10) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> AUBERT,B 04s reports  $(1.0 \pm 0.3^{+0.4}_{-0.2}) \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_{s0}^*(2317)^+ \bar{D}^0, D_{s0}^{*+} \rightarrow D_s^+ \pi^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.036 \pm 0.009$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>4</sup> KROKOVNY 03B reports  $(0.81^{+0.30}_{-0.27} \pm 0.24) \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_{s0}^*(2317)^+ \bar{D}^0, D_{s0}^{*+} \rightarrow D_s^+ \pi^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.036 \pm 0.009$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D_{s0}(2317)^+\bar{D}^0 \times B(D_{s0}(2317)^+ \rightarrow D_s^{*+}\gamma))/\Gamma_{\text{total}}$   $\Gamma_{174}/\Gamma$

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.76</b>	90	<sup>1</sup> KROKOVNY	03B	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(D_{s0}(2317)^+\bar{D}^*(2007)^0 \times B(D_{s0}(2317)^+ \rightarrow D_s^+\pi^0))/\Gamma_{\text{total}}$   $\Gamma_{175}/\Gamma$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>0.9 \pm 0.6^{+0.4}_{-0.3}</math></b>	<sup>1</sup> AUBERT,B	04s	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(D_{sJ}(2457)^+\bar{D}^0)/\Gamma_{\text{total}}$   $\Gamma_{176}/\Gamma$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>3.1^{+1.0}_{-0.9}</math> OUR AVERAGE</b>			

$4.3 \pm 1.6 \pm 1.3$  <sup>1</sup> AUBERT 06N BABR  $e^+e^- \rightarrow \Upsilon(4S)$

$4.6^{+1.8}_{-1.6} \pm 1.0$  <sup>2,3</sup> AUBERT,B 04s BABR  $e^+e^- \rightarrow \Upsilon(4S)$

$2.1^{+1.1}_{-0.9} \pm 0.5$  <sup>2,4</sup> KROKOVNY 03B BELL  $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses a missing-mass method in the events that one of the  $B$  mesons is fully reconstructed.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> AUBERT,B 04s reports  $[\Gamma(B^+ \rightarrow D_{sJ}(2457)^+\bar{D}^0)/\Gamma_{\text{total}}] \times [B(D_{s1}(2460)^+ \rightarrow D_s^{*+}\pi^0)] = (2.2^{+0.8}_{-0.7} \pm 0.3) \times 10^{-3}$  which we divide by our best value  $B(D_{s1}(2460)^+ \rightarrow D_s^{*+}\pi^0) = (48 \pm 11) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>4</sup> KROKOVNY 03B reports  $[\Gamma(B^+ \rightarrow D_{sJ}(2457)^+\bar{D}^0)/\Gamma_{\text{total}}] \times [B(D_{s1}(2460)^+ \rightarrow D_s^{*+}\pi^0)] = (1.0^{+0.5}_{-0.4} \pm 0.1) \times 10^{-3}$  which we divide by our best value  $B(D_{s1}(2460)^+ \rightarrow D_s^{*+}\pi^0) = (48 \pm 11) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D_{sJ}(2457)^+\bar{D}^0 \times B(D_{sJ}(2457)^+ \rightarrow D_s^+\gamma))/\Gamma_{\text{total}}$   $\Gamma_{177}/\Gamma$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>0.46^{+0.13}_{-0.11}</math> OUR AVERAGE</b>			

$0.48^{+0.19}_{-0.13} \pm 0.04$  <sup>1,2</sup> AUBERT,B 04s BABR  $e^+e^- \rightarrow \Upsilon(4S)$

$0.45^{+0.15}_{-0.14} \pm 0.04$  <sup>1,3</sup> KROKOVNY 03B BELL  $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> AUBERT,B 04s reports  $(0.6 \pm 0.2^{+0.2}_{-0.1}) \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_{sJ}(2457)^+\bar{D}^0 \times B(D_{sJ}(2457)^+ \rightarrow D_s^+\gamma))/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.036 \pm 0.009$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup> KROKOVNY 03B reports  $(0.56^{+0.16}_{-0.15} \pm 0.17) \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_{sJ}(2457)^+\bar{D}^0 \times B(D_{sJ}(2457)^+ \rightarrow D_s^+\gamma))/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming

$B(D_s^+ \rightarrow \phi\pi^+) = 0.036 \pm 0.009$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D_{sJ}(2457)^+ \bar{D}^0 \times B(D_{sJ}(2457)^+ \rightarrow D_s^+ \pi^+ \pi^-))/\Gamma_{\text{total}}$   $\Gamma_{178}/\Gamma$

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.22</b>	90	<sup>1</sup> KROKOVNY	03B	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(D_{sJ}(2457)^+ \bar{D}^0 \times B(D_{sJ}(2457)^+ \rightarrow D_s^+ \pi^0))/\Gamma_{\text{total}}$   $\Gamma_{179}/\Gamma$

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.27</b>	90	<sup>1</sup> KROKOVNY	03B	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(D_{sJ}(2457)^+ \bar{D}^0 \times B(D_{sJ}(2457)^+ \rightarrow D_s^{*+} \gamma))/\Gamma_{\text{total}}$   $\Gamma_{180}/\Gamma$

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.98</b>	90	<sup>1</sup> KROKOVNY	03B	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(D_{sJ}(2457)^+ \bar{D}^*(2007)^0)/\Gamma_{\text{total}}$   $\Gamma_{181}/\Gamma$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>12.0 ± 3.0 OUR AVERAGE</b>			
11.2 ± 2.6 ± 2.0	<sup>1</sup> AUBERT	06N	BABR $e^+e^- \rightarrow \Upsilon(4S)$
16 <sup>+8</sup> / <sub>-6</sub> ± 4	<sup>2,3</sup> AUBERT,B	04s	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses a missing-mass method in the events that one of the  $B$  mesons is fully reconstructed.

<sup>2</sup> AUBERT,B 04s reports  $[\Gamma(B^+ \rightarrow D_{sJ}(2457)^+ \bar{D}^*(2007)^0)/\Gamma_{\text{total}}] \times [B(D_{s1}(2460)^+ \rightarrow D_s^{*+} \pi^0)] = (7.6 \pm 1.7^{+3.2}_{-2.4}) \times 10^{-3}$  which we divide by our best value  $B(D_{s1}(2460)^+ \rightarrow D_s^{*+} \pi^0) = (48 \pm 11) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(D_{sJ}(2457)^+ \bar{D}^*(2007)^0 \times B(D_{sJ}(2457)^+ \rightarrow D_s^+ \gamma))/\Gamma_{\text{total}}$   $\Gamma_{182}/\Gamma$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.4 ± 0.4 <sup>+0.6</sup>/<sub>-0.4</sub></b>	<sup>1</sup> AUBERT,B	04s	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\bar{D}^0 D_{s1}(2536)^+ \times B(D_{s1}(2536)^+ \rightarrow D^*(2007)^0 K^+))/\Gamma_{\text{total}}$   $\Gamma_{184}/\Gamma$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>2.16 ± 0.52 ± 0.45</b>		<sup>1</sup> AUBERT	08B	BABR $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<2	90	AUBERT	03X	BABR Repl. by AUBERT 08B
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .



$$\frac{\Gamma(\bar{D}^0 D_{s1}(2536)^+ \times B(D_{s1}(2536)^+ \rightarrow D^*(2007)^0 K^+ + D^*(2010)^+ K^0))}{\Gamma_{\text{total}}} \quad \Gamma_{183}/\Gamma$$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>3.97 ± 0.85 ± 0.56</b>	1,2 AUSHEV	11	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses  $\Gamma(D^*(2007)^0 \rightarrow D^0 \pi^0) / \Gamma(D^*(2007)^0 \rightarrow D^0 \gamma) = 1.74 \pm 0.13$  and  $\Gamma(D_{s1}(2536)^+ \rightarrow D^*(2007)^0 K^+) / \Gamma(D_{s1}(2536)^+ \rightarrow D^*(2010)^+ K^0) = 1.36 \pm 0.2$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$$\frac{\Gamma(\bar{D}^*(2007)^0 D_{s1}(2536)^+ \times B(D_{s1}(2536)^+ \rightarrow D^*(2007)^0 K^+))}{\Gamma_{\text{total}}} \quad \Gamma_{185}/\Gamma$$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>5.46 ± 1.17 ± 1.04</b>		<sup>1</sup> AUBERT	08B	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<7                      90                      AUBERT                      03X                      BABR                      Repl. by AUBERT 08B

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$$\frac{\Gamma(\bar{D}^0 D_{s1}(2536)^+ \times B(D_{s1}(2536)^+ \rightarrow D^{*+} K^0))}{\Gamma_{\text{total}}} \quad \Gamma_{186}/\Gamma$$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>2.30 ± 0.98 ± 0.43</b>	<sup>1</sup> AUBERT	08B	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$$\frac{\Gamma(\bar{D}^0 D_{sJ}(2700)^+ \times B(D_{sJ}(2700)^+ \rightarrow D^0 K^+))}{\Gamma_{\text{total}}} \quad \Gamma_{187}/\Gamma$$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>5.6 ± 1.8 OUR AVERAGE</b>	Error includes scale factor of 1.7.		
5.02 ± 0.71 ± 0.93	<sup>1</sup> LEES	15c	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
11.3 ± 2.2 <sup>+1.4</sup> <sub>-2.8</sub>	<sup>1</sup> BRODZICKA	08	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$$\frac{\Gamma(\bar{D}^{*0} D_{s1}(2536)^+, D_{s1}^+ \rightarrow D^{*+} K^0)}{\Gamma_{\text{total}}} \quad \Gamma_{188}/\Gamma$$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>3.92 ± 2.46 ± 0.83</b>	<sup>1</sup> AUBERT	08B	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$$\frac{\Gamma(\bar{D}^0 D_{sJ}(2573)^+, D_{sJ}^+ \rightarrow D^0 K^+)}{\Gamma_{\text{total}}} \quad \Gamma_{189}/\Gamma$$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>0.08 ± 0.14 ± 0.05</b>	<sup>1</sup> LEES	15c	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$$\frac{\Gamma(\bar{D}^{*0} D_{sJ}(2573), D_{sJ}^+ \rightarrow D^0 K^+)}{\Gamma_{\text{total}}} \quad \Gamma_{190}/\Gamma$$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<2	90	AUBERT	03X	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

$$\frac{\Gamma(\bar{D}^*(2007)^0 D_{sJ}(2573), D_{sJ}^+ \rightarrow D^0 K^+)}{\Gamma_{\text{total}}} \quad \Gamma_{191}/\Gamma$$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<5	90	AUBERT	03X	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

$\Gamma(\bar{D}^0 D_s^{*+})/\Gamma_{\text{total}}$				$\Gamma_{192}/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b>0.0076 ± 0.0016 OUR AVERAGE</b>				
0.0079 ± 0.0017 ± 0.0007	<sup>1</sup> AUBERT	06N	BABR	$e^+e^- \rightarrow \gamma(4S)$
0.0068 ± 0.0025 ± 0.0006	<sup>2</sup> GIBAUT	96	CLE2	$e^+e^- \rightarrow \gamma(4S)$
0.010 ± 0.007 ± 0.001	<sup>3</sup> ALBRECHT	92G	ARG	$e^+e^- \rightarrow \gamma(4S)$
<sup>1</sup> AUBERT 06N reports $(0.77 \pm 0.15 \pm 0.13) \times 10^{-2}$ from a measurement of $[\Gamma(B^+ \rightarrow \bar{D}^0 D_s^{*+})/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.0462 \pm 0.0062$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.				
<sup>2</sup> GIBAUT 96 reports $0.0087 \pm 0.0027 \pm 0.0017$ from a measurement of $[\Gamma(B^+ \rightarrow \bar{D}^0 D_s^{*+})/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.				
<sup>3</sup> ALBRECHT 92G reports $0.016 \pm 0.012 \pm 0.003$ from a measurement of $[\Gamma(B^+ \rightarrow \bar{D}^0 D_s^{*+})/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 $D^0$ branching ratios, e.g., $B(D^0 \rightarrow K^- \pi^+) = 3.71 \pm 0.25\%$ .				

$\Gamma(\bar{D}^*(2007)^0 D_s^+)/\Gamma_{\text{total}}$				$\Gamma_{193}/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b>0.0082 ± 0.0017 OUR AVERAGE</b>				
0.0078 ± 0.0018 ± 0.0007	<sup>1</sup> AUBERT	06N	BABR	$e^+e^- \rightarrow \gamma(4S)$
0.011 ± 0.004 ± 0.001	<sup>2</sup> GIBAUT	96	CLE2	$e^+e^- \rightarrow \gamma(4S)$
0.008 ± 0.006 ± 0.001	<sup>3</sup> ALBRECHT	92G	ARG	$e^+e^- \rightarrow \gamma(4S)$
<sup>1</sup> AUBERT 06N reports $(0.76 \pm 0.15 \pm 0.13) \times 10^{-2}$ from a measurement of $[\Gamma(B^+ \rightarrow \bar{D}^*(2007)^0 D_s^+)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.0462 \pm 0.0062$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.				
<sup>2</sup> GIBAUT 96 reports $0.0140 \pm 0.0043 \pm 0.0035$ from a measurement of $[\Gamma(B^+ \rightarrow \bar{D}^*(2007)^0 D_s^+)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.				
<sup>3</sup> ALBRECHT 92G reports $0.013 \pm 0.009 \pm 0.002$ from a measurement of $[\Gamma(B^+ \rightarrow \bar{D}^*(2007)^0 D_s^+)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990 $D^0$ and $D^*(2007)^0$ branching ratios, e.g., $B(D^0 \rightarrow K^- \pi^+) = 3.71 \pm 0.25\%$ and $B(D^*(2007)^0 \rightarrow D^0 \pi^0) = 55 \pm 6\%$ .				

$$\Gamma(\bar{D}^*(2007)^0 D_s^{*+})/\Gamma_{\text{total}} \quad \Gamma_{194}/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.0171±0.0024 OUR AVERAGE</b>			
0.0167±0.0019±0.0015	<sup>1</sup> AUBERT 06N	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
0.024 ±0.009 ±0.002	<sup>2</sup> GIBAUT 96	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
0.019 ±0.010 ±0.002	<sup>3</sup> ALBRECHT 92G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> AUBERT 06N reports  $(1.62 \pm 0.22 \pm 0.18) \times 10^{-2}$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{D}^*(2007)^0 D_s^{*+})/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.0462 \pm 0.0062$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> GIBAUT 96 reports  $0.0310 \pm 0.0088 \pm 0.0065$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{D}^*(2007)^0 D_s^{*+})/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.035$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup> ALBRECHT 92G reports  $0.031 \pm 0.016 \pm 0.005$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{D}^*(2007)^0 D_s^{*+})/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes PDG 1990  $D^0$  and  $D^*(2007)^0$  branching ratios, e.g.,  $B(D^0 \rightarrow K^- \pi^+) = 3.71 \pm 0.25\%$  and  $B(D^*(2007)^0 \rightarrow D^0 \pi^0) = 55 \pm 6\%$ .

$$\Gamma(D_s^{(*)+} \bar{D}^{*0})/\Gamma_{\text{total}} \quad \Gamma_{195}/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>(2.73 \pm 0.93 \pm 0.68) \times 10^{-2}</math></b>	<sup>1</sup> AHMED 00B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> AHMED 00B reports their experiment's uncertainties  $(\pm 0.78 \pm 0.48 \pm 0.68)\%$ , where the first error is statistical, the second is systematic, and the third is the uncertainty in the  $D_s \rightarrow \phi\pi$  branching fraction. We combine the first two in quadrature.

$$\Gamma(\bar{D}^*(2007)^0 D^*(2010)^+)/\Gamma_{\text{total}} \quad \Gamma_{196}/\Gamma$$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>8.1±1.2±1.2</b>		<sup>1</sup> AUBERT,B	06A	BABR $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<110                      90                      BARATE 98Q                      ALEP  $e^+e^- \rightarrow Z$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$$[\Gamma(\bar{D}^0 D^*(2010)^+) + \Gamma(\bar{D}^*(2007)^0 D^+)]/\Gamma_{\text{total}} \quad \Gamma_{197}/\Gamma$$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;130</b>	90	BARATE 98Q	ALEP	$e^+e^- \rightarrow Z$

$$\Gamma(\bar{D}^0 D^*(2010)^+)/\Gamma_{\text{total}} \quad \Gamma_{198}/\Gamma$$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>3.9 ±0.5 OUR AVERAGE</b>			
3.6 ±0.5 ±0.4	<sup>1</sup> AUBERT,B	06A	BABR $e^+e^- \rightarrow \Upsilon(4S)$
4.57±0.71±0.56	<sup>1</sup> MAJUMDER	05	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\bar{D}^0 D^+)/\Gamma_{\text{total}}$   $\Gamma_{199}/\Gamma$ 

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>3.8 \pm 0.4</math></b>				<b>OUR AVERAGE</b>
$3.85 \pm 0.31 \pm 0.38$		<sup>1</sup> ADACHI	08	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
$3.8 \pm 0.6 \pm 0.5$		<sup>1</sup> AUBERT,B	06A	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$4.83 \pm 0.78 \pm 0.58$		<sup>1</sup> MAJUMDER	05	BELL Repl. by ADACHI 08
<67	90	BARATE	98Q	ALEP $e^+ e^- \rightarrow Z$
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ .				

 $\Gamma(\bar{D}^0 D^+ K^0)/\Gamma_{\text{total}}$   $\Gamma_{200}/\Gamma$ 

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>1.55 \pm 0.17 \pm 0.13</math></b>				
		<sup>1</sup> DEL-AMO-SA..11B	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<2.8	90	<sup>1</sup> AUBERT	03X	BABR Repl. by DEL-AMO-SANCHEZ 11B
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ .				

 $\Gamma(D^+ \bar{D}^*(2007)^0)/\Gamma_{\text{total}}$   $\Gamma_{201}/\Gamma$ 

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>6.3 \pm 1.4 \pm 1.0</math></b>				
		<sup>1</sup> AUBERT,B	06A	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ .				

 $\Gamma(\bar{D}^*(2007)^0 D^+ K^0)/\Gamma_{\text{total}}$   $\Gamma_{202}/\Gamma$ 

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>2.06 \pm 0.38 \pm 0.30</math></b>				
		<sup>1</sup> DEL-AMO-SA..11B	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<6.1	90	<sup>1</sup> AUBERT	03X	BABR Repl. by DEL-AMO-SANCHEZ 11B
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ .				

 $\Gamma(\bar{D}^0 D^*(2010)^+ K^0)/\Gamma_{\text{total}}$   $\Gamma_{203}/\Gamma$ 

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>3.81 \pm 0.31 \pm 0.23</math></b>				
		<sup>1</sup> DEL-AMO-SA..11B	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$5.2 \begin{smallmatrix} +1.0 \\ -0.9 \end{smallmatrix} \pm 0.7$		<sup>1</sup> AUBERT	03X	BABR Repl. by DEL-AMO-SANCHEZ 11B
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ .				

 $\Gamma(\bar{D}^*(2007)^0 D^*(2010)^+ K^0)/\Gamma_{\text{total}}$   $\Gamma_{204}/\Gamma$ 

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>9.17 \pm 0.83 \pm 0.90</math></b>				
		<sup>1</sup> DEL-AMO-SA..11B	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$7.8 \begin{smallmatrix} +2.3 \\ -2.1 \end{smallmatrix} \pm 1.4$		<sup>1</sup> AUBERT	03X	BABR Repl. by DEL-AMO-SANCHEZ 11B
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ .				

$\Gamma(\bar{D}^0 D^0 K^+)/\Gamma_{\text{total}}$   $\Gamma_{205}/\Gamma$ 

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.45±0.33 OUR AVERAGE</b>	Error includes scale factor of 2.6.		
1.31±0.07±0.12	<sup>1</sup> DEL-AMO-SA..11B	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
2.22±0.22 <sup>+0.26</sup> <sub>-0.24</sub>	<sup>1</sup> BRODZICKA 08	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
1.17±0.21±0.15	<sup>1</sup> CHISTOV 04	BELL	Repl. by BRODZICKA 08
1.9 ±0.3 ±0.3	<sup>1</sup> AUBERT 03X	BABR	Repl. by DEL-AMO-SANCHEZ 11B

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\bar{D}^*(2007)^0 D^0 K^+)/\Gamma_{\text{total}}$   $\Gamma_{206}/\Gamma$ 

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>2.26±0.16±0.17</b>		<sup>1</sup> DEL-AMO-SA..11B	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<3.8	90	<sup>1</sup> AUBERT 03X	BABR	Repl. by DEL-AMO-SANCHEZ 11B

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\bar{D}^0 D^*(2007)^0 K^+)/\Gamma_{\text{total}}$   $\Gamma_{207}/\Gamma$ 

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>6.32±0.19±0.45</b>	<sup>1</sup> DEL-AMO-SA..11B	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
4.7 ±0.7 ±0.7	<sup>1</sup> AUBERT 03X	BABR	Repl. by DEL-AMO-SANCHEZ 11B

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\bar{D}^*(2007)^0 D^*(2007)^0 K^+)/\Gamma_{\text{total}}$   $\Gamma_{208}/\Gamma$ 

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>11.23±0.36±1.26</b>	<sup>1</sup> DEL-AMO-SA..11B	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
5.3 <sup>+1.1</sup> <sub>-1.0</sub> ±1.2	<sup>1</sup> AUBERT 03X	BABR	Repl. by DEL-AMO-SANCHEZ 11B

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(D^- D^+ K^+)/\Gamma_{\text{total}}$   $\Gamma_{209}/\Gamma$ 

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>0.22±0.05±0.05</b>		<sup>1</sup> DEL-AMO-SA..11B	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<0.90	90	<sup>1</sup> CHISTOV 04	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
<0.4	90	<sup>1</sup> AUBERT 03X	BABR	Repl. by DEL-AMO-SANCHEZ 11B

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(X_0(2900) D^+, X_0 \rightarrow D^- K^+)/\Gamma(D^- D^+ K^+)$   $\Gamma_{210}/\Gamma_{209}$ 

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b>5.6±1.4±0.5</b>	<sup>1</sup> AAIJ 20AI	LHCB	$pp$ at 7, 8, 13 TeV

<sup>1</sup> Measured in Dalitz plot analysis of  $B^+ \rightarrow D^- D^+ K^+$  decays.

$\Gamma(X_1(2900)D^+, X_1 \rightarrow D^- K^+)/\Gamma(D^- D^+ K^+)$   $\Gamma_{211}/\Gamma_{209}$ 

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>30.6 \pm 2.4 \pm 2.1</math></b>	<sup>1</sup> AAIJ	20AI LHCB	$pp$ at 7, 8, 13 TeV

<sup>1</sup> Measured in Dalitz plot analysis of  $B^+ \rightarrow D^- D^+ K^+$  decays.

 $\Gamma(D^- D^+ K^+ \text{ nonresonant})/\Gamma(D^- D^+ K^+)$   $\Gamma_{212}/\Gamma_{209}$ 

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>24.2 \pm 2.2 \pm 0.5</math></b>	<sup>1</sup> AAIJ	20AI LHCB	$pp$ at 7, 8, 13 TeV

<sup>1</sup> Measured in Dalitz plot analysis of  $B^+ \rightarrow D^- D^+ K^+$  decays.

 $\Gamma(D^- D^*(2010)^+ K^+)/\Gamma_{\text{total}}$   $\Gamma_{213}/\Gamma$ 

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>0.63 \pm 0.09 \pm 0.06</math></b>		<sup>1</sup> DEL-AMO-SA..11B	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • •				We do not use the following data for averages, fits, limits, etc. • • •
<0.7	90	<sup>1</sup> AUBERT	03X BABR	Repl. by DEL-AMO-SANCHEZ 11B

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(D^- D^*(2010)^+ K^+)/\Gamma(\bar{D}^0 D^0 K^+)$   $\Gamma_{213}/\Gamma_{205}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.517 \pm 0.015 \pm 0.017</math></b>	<sup>1</sup> AAIJ	20AN LHCB	$pp$ at 7, 8, 13 TeV

<sup>1</sup> Uses  $D^+ \rightarrow K^- \pi^+ \pi^+$ ,  $D^0 \rightarrow K^- \pi^+$  and  $D^0 \rightarrow K^- \pi^+ \pi^+ \pi^-$  decays.

 $\Gamma(D^*(2010)^- D^+ K^+)/\Gamma_{\text{total}}$   $\Gamma_{214}/\Gamma$ 

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>0.60 \pm 0.10 \pm 0.08</math></b>	<sup>1</sup> DEL-AMO-SA..11B	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • •			We do not use the following data for averages, fits, limits, etc. • • •
$1.5 \pm 0.3 \pm 0.2$	<sup>1</sup> AUBERT	03X BABR	Repl. by DEL-AMO-SANCHEZ 11B

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(D^*(2010)^- D^+ K^+)/\Gamma(\bar{D}^0 D^0 K^+)$   $\Gamma_{214}/\Gamma_{205}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.577 \pm 0.016 \pm 0.018</math></b>	<sup>1</sup> AAIJ	20AN LHCB	$pp$ at 7, 8, 13 TeV

<sup>1</sup> Uses  $D^+ \rightarrow K^- \pi^+ \pi^+$ ,  $D^0 \rightarrow K^- \pi^+$  and  $D^0 \rightarrow K^- \pi^+ \pi^+ \pi^-$  decays.

 $\Gamma(D^- D^*(2010)^+ K^+)/\Gamma(D^*(2010)^- D^+ K^+)$   $\Gamma_{213}/\Gamma_{214}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.907 \pm 0.033 \pm 0.014</math></b>	<sup>1</sup> AAIJ	20AN LHCB	$pp$ at 7, 8, 13 TeV

<sup>1</sup> Uses  $D^+ \rightarrow K^- \pi^+ \pi^+$ ,  $D^0 \rightarrow K^- \pi^+$  and  $D^0 \rightarrow K^- \pi^+ \pi^+ \pi^-$  decays.

 $\Gamma(D^*(2010)^- D^*(2010)^+ K^+)/\Gamma_{\text{total}}$   $\Gamma_{215}/\Gamma$ 

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>1.32 \pm 0.13 \pm 0.12</math></b>		<sup>1</sup> DEL-AMO-SA..11B	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • •				We do not use the following data for averages, fits, limits, etc. • • •
<1.8	90	<sup>1</sup> AUBERT	03X BABR	Repl. by DEL-AMO-SANCHEZ 11B

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma((\bar{D}+\bar{D}^*)(D+D^*)K)/\Gamma_{\text{total}}$   $\Gamma_{216}/\Gamma$ 

VALUE (units $10^{-2}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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<b><math>4.05 \pm 0.11 \pm 0.28</math></b>		<sup>1</sup> DEL-AMO-SA...11B	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$3.5 \pm 0.3 \pm 0.5$		<sup>1</sup> AUBERT	03X	BABR Repl. by DEL-AMO-SANCHEZ 11B
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(D_s^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{217}/\Gamma$ 

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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<b><math>1.6^{+0.6}_{-0.5} \pm 0.1</math></b>		<sup>1</sup> AUBERT	07M	BABR $e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<16	90	<sup>2</sup> ALEXANDER	93B	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> AUBERT 07M reports  $[\Gamma(B^+ \rightarrow D_s^+ \pi^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi \pi^+)] = (7.0^{+2.4+0.6}_{-2.1-0.8}) \times 10^{-7}$  which we divide by our best value  $B(D_s^+ \rightarrow \phi \pi^+) = (4.5 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> ALEXANDER 93B reports  $< 2.0 \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^+ \pi^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi \pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi \pi^+) = 0.037$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi \pi^+) = 4.5 \times 10^{-2}$ .

 $[\Gamma(D_s^+ \pi^0) + \Gamma(D_s^{*+} \pi^0)]/\Gamma_{\text{total}}$   $(\Gamma_{217} + \Gamma_{218})/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b><math>&lt; 5 \times 10^{-4}</math></b>	90	<sup>1</sup> ALBRECHT	93E	ARG $e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> ALBRECHT 93E reports  $< 0.9 \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^+ \pi^0) + \Gamma(B^+ \rightarrow D_s^{*+} \pi^0)]/\Gamma_{\text{total}} \times [B(D_s^+ \rightarrow \phi \pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi \pi^+) = 0.027$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi \pi^+) = 4.5 \times 10^{-2}$ .

 $\Gamma(D_s^{*+} \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{218}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b><math>&lt; 2.6 \times 10^{-4}</math></b>	90	<sup>1</sup> ALEXANDER	93B	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> ALEXANDER 93B reports  $< 3.2 \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^{*+} \pi^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi \pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi \pi^+) = 0.037$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi \pi^+) = 4.5 \times 10^{-2}$ .

 $\Gamma(D_s^+ \eta)/\Gamma_{\text{total}}$   $\Gamma_{219}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b><math>&lt; 4 \times 10^{-4}</math></b>	90	<sup>1</sup> ALEXANDER	93B	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> ALEXANDER 93B reports  $< 4.6 \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^+ \eta)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi \pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi \pi^+) = 0.037$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi \pi^+) = 4.5 \times 10^{-2}$ .

$\Gamma(D_s^{*+} \eta)/\Gamma_{\text{total}}$					$\Gamma_{220}/\Gamma$
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<6 \times 10^{-4}$	90	<sup>1</sup> ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \gamma(4S)$	
<sup>1</sup> ALEXANDER 93B reports $< 7.5 \times 10^{-4}$ from a measurement of $[\Gamma(B^+ \rightarrow D_s^{*+} \eta)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .					

$\Gamma(D_s^+ \rho^0)/\Gamma_{\text{total}}$					$\Gamma_{221}/\Gamma$
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<3.0 \times 10^{-4}$	90	<sup>1</sup> ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \gamma(4S)$	
<sup>1</sup> ALEXANDER 93B reports $< 3.7 \times 10^{-4}$ from a measurement of $[\Gamma(B^+ \rightarrow D_s^+ \rho^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .					

$[\Gamma(D_s^+ \rho^0) + \Gamma(D_s^+ \bar{K}^*(892)^0)]/\Gamma_{\text{total}}$					$(\Gamma_{221} + \Gamma_{232})/\Gamma$
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<2.0 \times 10^{-3}$	90	<sup>1</sup> ALBRECHT 93E	ARG	$e^+e^- \rightarrow \gamma(4S)$	
<sup>1</sup> ALBRECHT 93E reports $< 3.4 \times 10^{-3}$ from a measurement of $[[\Gamma(B^+ \rightarrow D_s^+ \rho^0) + \Gamma(B^+ \rightarrow D_s^+ \bar{K}^*(892)^0)]/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .					

$\Gamma(D_s^{*+} \rho^0)/\Gamma_{\text{total}}$					$\Gamma_{222}/\Gamma$
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<4 \times 10^{-4}$	90	<sup>1</sup> ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \gamma(4S)$	
<sup>1</sup> ALEXANDER 93B reports $< 4.8 \times 10^{-4}$ from a measurement of $[\Gamma(B^+ \rightarrow D_s^{*+} \rho^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .					

$[\Gamma(D_s^{*+} \rho^0) + \Gamma(D_s^{*+} \bar{K}^*(892)^0)]/\Gamma_{\text{total}}$					$(\Gamma_{222} + \Gamma_{234})/\Gamma$
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<1.2 \times 10^{-3}$	90	<sup>1</sup> ALBRECHT 93E	ARG	$e^+e^- \rightarrow \gamma(4S)$	
<sup>1</sup> ALBRECHT 93E reports $< 2.0 \times 10^{-3}$ from a measurement of $[[\Gamma(B^+ \rightarrow D_s^{*+} \rho^0) + \Gamma(B^+ \rightarrow D_s^{*+} \bar{K}^*(892)^0)]/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .					

$\Gamma(D_s^+ \omega)/\Gamma_{\text{total}}$					$\Gamma_{223}/\Gamma$
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<4 \times 10^{-4}$	90	<sup>1</sup> ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \gamma(4S)$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.0 \times 10^{-3}$	90	<sup>2</sup> ALBRECHT 93E	ARG	$e^+e^- \rightarrow \gamma(4S)$	



<sup>1</sup> ALEXANDER 93B reports  $< 4.8 \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^+ \omega)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .

<sup>2</sup> ALBRECHT 93E reports  $< 3.4 \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^+ \omega)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .

### $\Gamma(D_s^{*+} \omega)/\Gamma_{\text{total}}$ $\Gamma_{224}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b><math>&lt; 6 \times 10^{-4}</math></b>	90	<sup>1</sup> ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \gamma(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 1.1 \times 10^{-3}$	90	<sup>2</sup> ALBRECHT 93E	ARG	$e^+e^- \rightarrow \gamma(4S)$
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<sup>1</sup> ALEXANDER 93B reports  $< 6.8 \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^{*+} \omega)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .

<sup>2</sup> ALBRECHT 93E reports  $< 1.9 \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^{*+} \omega)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .

### $\Gamma(D_s^+ a_1(1260)^0)/\Gamma_{\text{total}}$ $\Gamma_{225}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b><math>&lt; 1.8 \times 10^{-3}</math></b>	90	<sup>1</sup> ALBRECHT 93E	ARG	$e^+e^- \rightarrow \gamma(4S)$
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<sup>1</sup> ALBRECHT 93E reports  $< 3.0 \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^+ a_1(1260)^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .

### $\Gamma(D_s^{*+} a_1(1260)^0)/\Gamma_{\text{total}}$ $\Gamma_{226}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b><math>&lt; 1.3 \times 10^{-3}</math></b>	90	<sup>1</sup> ALBRECHT 93E	ARG	$e^+e^- \rightarrow \gamma(4S)$
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<sup>1</sup> ALBRECHT 93E reports  $< 2.2 \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^{*+} a_1(1260)^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .

### $\Gamma(D_s^+ K^+ K^-)/\Gamma(\bar{D}^0 D_s^+)$ $\Gamma_{227}/\Gamma_{172}$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
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<b><math>8.0 \pm 0.9 \pm 0.1</math></b>	<sup>1</sup> AAIJ	18B	LHCB $pp$ at 7, 8, 13 TeV
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<sup>1</sup> AAIJ 18B reports  $[\Gamma(B^+ \rightarrow D_s^+ K^+ K^-)/\Gamma(B^+ \rightarrow \bar{D}^0 D_s^+)] / [B(D^0 \rightarrow K^+ K^-)] = 0.197 \pm 0.015 \pm 0.017$  which we multiply by our best value  $B(D^0 \rightarrow K^+ K^-) = (4.08 \pm 0.06) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D_s^+ \phi)/\Gamma_{\text{total}}$   $\Gamma_{228}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 0.42</b>	90	<sup>1</sup> AAIJ 18B	LHCB	$pp$ at 7, 8, 13 TeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$1.7^{+1.1}_{-0.7} \pm 0.2$		<sup>2</sup> AAIJ 13R	LHCB	Repl. by AAIJ 18B
< 1.9	90	<sup>3</sup> AUBERT 06F	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
< 1000	90	<sup>4</sup> ALBRECHT 93E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
< 260	90	<sup>5</sup> ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> AAIJ 18B uses  $B^+ \rightarrow D_s^+ \bar{D}^0$  decays for normalization.

<sup>2</sup> AAIJ 13R reports  $(1.87^{+1.25}_{-0.73} \pm 0.19 \pm 0.32) \times 10^{-6}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^+ \phi)/\Gamma_{\text{total}}] / [B(B^+ \rightarrow \bar{D}^0 D_s^+)]$  assuming  $B(B^+ \rightarrow \bar{D}^0 D_s^+) = (10.0 \pm 1.7) \times 10^{-3}$ , which we rescale to our best value  $B(B^+ \rightarrow \bar{D}^0 D_s^+) = (9.0 \pm 0.9) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>4</sup> ALBRECHT 93E reports  $< 1.7 \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^+ \phi)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi \pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi \pi^+) = 0.027$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi \pi^+) = 4.5 \times 10^{-2}$ .

<sup>5</sup> ALEXANDER 93B reports  $< 3.1 \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^+ \phi)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi \pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi \pi^+) = 0.037$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi \pi^+) = 4.5 \times 10^{-2}$ .

$\Gamma(D_s^{*+} \phi)/\Gamma_{\text{total}}$   $\Gamma_{229}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; <math>1.2 \times 10^{-5}</math></b>	90	<sup>1</sup> AUBERT 06F	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
< $1.3 \times 10^{-3}$	90	<sup>2</sup> ALBRECHT 93E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
< $3.5 \times 10^{-4}$	90	<sup>3</sup> ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> ALBRECHT 93E reports  $< 2.1 \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^{*+} \phi)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi \pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi \pi^+) = 0.027$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi \pi^+) = 4.5 \times 10^{-2}$ .

<sup>3</sup> ALEXANDER 93B reports  $< 4.2 \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^{*+} \phi)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi \pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi \pi^+) = 0.037$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi \pi^+) = 4.5 \times 10^{-2}$ .

$\Gamma(D_s^+ \bar{K}^0)/\Gamma_{\text{total}}$   $\Gamma_{230}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; <math>8 \times 10^{-4}</math></b>	90	<sup>1</sup> ALEXANDER 93B	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
< $1.5 \times 10^{-3}$	90	<sup>2</sup> ALBRECHT 93E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> ALEXANDER 93B reports  $< 10.3 \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^+ \bar{K}^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .

<sup>2</sup> ALBRECHT 93E reports  $< 2.5 \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^+ \bar{K}^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .

**$\Gamma(D_s^{*+} \bar{K}^0)/\Gamma_{\text{total}}$   $\Gamma_{231}/\Gamma$**

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b><math>&lt; 9 \times 10^{-4}</math></b>	90	<sup>1</sup> ALEXANDER 93B	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 1.9 \times 10^{-3}$	90	<sup>2</sup> ALBRECHT 93E	ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> ALEXANDER 93B reports  $< 10.9 \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^{*+} \bar{K}^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .

<sup>2</sup> ALBRECHT 93E reports  $< 3.1 \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^{*+} \bar{K}^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .

**$\Gamma(D_s^+ \bar{K}^*(892)^0)/\Gamma_{\text{total}}$   $\Gamma_{232}/\Gamma$**

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b><math>&lt; 4.4 \times 10^{-6}</math></b>	90	AAIJ	13R	LHCB $pp$ at 7 TeV
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 4 \times 10^{-4}$	90	<sup>1</sup> ALEXANDER 93B	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> ALEXANDER 93B reports  $< 4.4 \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^+ \bar{K}^*(892)^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .

**$\Gamma(D_s^+ K^{*0})/\Gamma_{\text{total}}$   $\Gamma_{233}/\Gamma$**

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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<b><math>&lt; 3.5</math></b>	90	AAIJ	13R	LHCB $pp$ at 7 TeV
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**$\Gamma(D_s^{*+} \bar{K}^*(892)^0)/\Gamma_{\text{total}}$   $\Gamma_{234}/\Gamma$**

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b><math>&lt; 3.5 \times 10^{-4}</math></b>	90	<sup>1</sup> ALEXANDER 93B	CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> ALEXANDER 93B reports  $< 4.3 \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow D_s^{*+} \bar{K}^*(892)^0)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$  assuming  $B(D_s^+ \rightarrow \phi\pi^+) = 0.037$ , which we rescale to our best value  $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .

$\Gamma(D_s^- \pi^+ K^+)/\Gamma_{\text{total}}$   $\Gamma_{235}/\Gamma$ 

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>1.80 ± 0.22 OUR AVERAGE</b>				
$1.71^{+0.08}_{-0.07} \pm 0.25$		<sup>1</sup> WIEHCZYN...09	BELL	$e^+e^- \rightarrow \gamma(4S)$
$2.02 \pm 0.13 \pm 0.38$		<sup>1</sup> AUBERT 08G	BABR	$e^+e^- \rightarrow \gamma(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<7	90	<sup>2</sup> ALBRECHT 93E	ARG	$e^+e^- \rightarrow \gamma(4S)$
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\gamma(4S)$ .				
<sup>2</sup> ALBRECHT 93E reports $< 1.1 \times 10^{-3}$ from a measurement of $[\Gamma(B^+ \rightarrow D_s^- \pi^+ K^+)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .				

 $\Gamma(D_s^{*-} \pi^+ K^+)/\Gamma_{\text{total}}$   $\Gamma_{236}/\Gamma$ 

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>1.45 ± 0.24 OUR AVERAGE</b>				
$1.31^{+0.13}_{-0.12} \pm 0.28$		<sup>1</sup> WIEHCZYN...09	BELL	$e^+e^- \rightarrow \gamma(4S)$
$1.67 \pm 0.16 \pm 0.35$		<sup>1</sup> AUBERT 08G	BABR	$e^+e^- \rightarrow \gamma(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<10	90	<sup>2</sup> ALBRECHT 93E	ARG	$e^+e^- \rightarrow \gamma(4S)$
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\gamma(4S)$ .				
<sup>2</sup> ALBRECHT 93E reports $< 1.6 \times 10^{-3}$ from a measurement of $[\Gamma(B^+ \rightarrow D_s^{*-} \pi^+ K^+)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .				

 $\Gamma(D_s^- \pi^+ K^*(892)^+)/\Gamma_{\text{total}}$   $\Gamma_{237}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; <math>5 \times 10^{-3}</math></b>				
	90	<sup>1</sup> ALBRECHT 93E	ARG	$e^+e^- \rightarrow \gamma(4S)$
<sup>1</sup> ALBRECHT 93E reports $< 8.6 \times 10^{-3}$ from a measurement of $[\Gamma(B^+ \rightarrow D_s^- \pi^+ K^*(892)^+)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .				

 $\Gamma(D_s^{*-} \pi^+ K^*(892)^+)/\Gamma_{\text{total}}$   $\Gamma_{238}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; <math>7 \times 10^{-3}</math></b>				
	90	<sup>1</sup> ALBRECHT 93E	ARG	$e^+e^- \rightarrow \gamma(4S)$
<sup>1</sup> ALBRECHT 93E reports $< 1.1 \times 10^{-2}$ from a measurement of $[\Gamma(B^+ \rightarrow D_s^{*-} \pi^+ K^*(892)^+)/\Gamma_{\text{total}}] \times [B(D_s^+ \rightarrow \phi\pi^+)]$ assuming $B(D_s^+ \rightarrow \phi\pi^+) = 0.027$ , which we rescale to our best value $B(D_s^+ \rightarrow \phi\pi^+) = 4.5 \times 10^{-2}$ .				

 $\Gamma(D_s^- K^+ K^+)/\Gamma_{\text{total}}$   $\Gamma_{239}/\Gamma$ 

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>0.97 ± 0.21 OUR AVERAGE</b>				
$0.93 \pm 0.22 \pm 0.10$		<sup>1</sup> WIEHCZYN...15	BELL	$e^+e^- \rightarrow \gamma(4S)$
$1.1 \pm 0.4 \pm 0.2$		<sup>1</sup> AUBERT 08G	BABR	$e^+e^- \rightarrow \gamma(4S)$
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\gamma(4S)$ .				

$$\Gamma(D_s^- K^+ K^+)/\Gamma(D_s^- \pi^+ K^+) \quad \Gamma_{239}/\Gamma_{235}$$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.054±0.013±0.006</b>	WIEHCZYN...15	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

$$\Gamma(D_s^{*-} K^+ K^+)/\Gamma_{\text{total}} \quad \Gamma_{240}/\Gamma$$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.15</b>	90	<sup>1</sup> AUBERT	08G BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$$\Gamma(\eta_c K^+)/\Gamma_{\text{total}} \quad \Gamma_{241}/\Gamma$$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.09±0.08 OUR AVERAGE</b>			

0.96±0.12±0.06±0.03	<sup>1,2</sup> LEES	20C BABR	$e^+e^- \rightarrow \Upsilon(4S)$
0.74 <sup>+0.09</sup> <sub>-0.08</sub> ±0.29	<sup>3</sup> CHILIKIN	19 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
1.20±0.08±0.07	<sup>1</sup> KATO	18 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
1.25 <sup>+0.25</sup> <sub>-0.20</sub> ±0.12	<sup>4</sup> AUBERT,B	05L BABR	$e^+e^- \rightarrow \Upsilon(4S)$
1.25±0.14 <sup>+0.39</sup> <sub>-0.40</sub>	<sup>5</sup> FANG	03 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
0.69 <sup>+0.26</sup> <sub>-0.21</sub> ±0.22	<sup>6</sup> EDWARDS	01 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.87±0.15	<sup>1,7</sup> AUBERT	06E BABR	Repl. by LEES 20C
1.02±0.12±0.06	<sup>7,8</sup> AUBERT,B	04B BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Measures absolute branching fractions using a missing-mass technique.

<sup>2</sup> LEES 20C measurement's last uncertainty is due to the used  $B(B^\pm \rightarrow K^\pm J/\psi)$  value.

<sup>3</sup> CHILIKIN 19 reports  $[\Gamma(B^+ \rightarrow \eta_c K^+)/\Gamma_{\text{total}}] \times [B(\eta_c(1S) \rightarrow \pi^+ \pi^- p\bar{p})] = (39.4^{+4.1+2.2}_{-3.9-1.8}) \times 10^{-7}$  which we divide by our best value  $B(\eta_c(1S) \rightarrow \pi^+ \pi^- p\bar{p}) = (5.3 \pm 2.1) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>4</sup> AUBERT,B 05L reports  $[\Gamma(B^+ \rightarrow \eta_c K^+)/\Gamma_{\text{total}}] \times [B(\eta_c(1S) \rightarrow p\bar{p})] = (1.8^{+0.3}_{-0.2} \pm 0.2) \times 10^{-6}$  which we divide by our best value  $B(\eta_c(1S) \rightarrow p\bar{p}) = (1.44 \pm 0.14) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>5</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>6</sup> EDWARDS 01 assumes equal production of  $B^0$  and  $B^+$  at the  $\Upsilon(4S)$ . The correlated uncertainties (28.3)% from  $B(J/\psi(1S) \rightarrow \gamma \eta_c)$  in those modes have been accounted for.

<sup>7</sup> The ratio of  $B(B^\pm \rightarrow K^\pm \eta_c) B(\eta_c \rightarrow K\bar{K}\pi) = (7.4 \pm 0.5 \pm 0.7) \times 10^{-5}$  reported in AUBERT,B 04B and  $B(B^\pm \rightarrow K^\pm \eta_c) = (8.7 \pm 1.5) \times 10^{-3}$  reported in AUBERT 06E contribute to the determination of  $B(\eta_c \rightarrow K\bar{K}\pi)$ , which is used by others for normalization.

<sup>8</sup> AUBERT,B 04B reports  $[\Gamma(B^+ \rightarrow \eta_c K^+)/\Gamma_{\text{total}}] \times [B(\eta_c(1S) \rightarrow K\bar{K}\pi)] = (0.074 \pm 0.005 \pm 0.007) \times 10^{-3}$  which we divide by our best value  $B(\eta_c(1S) \rightarrow K\bar{K}\pi) = (7.3 \pm 0.4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(B^+ \rightarrow \eta_c K^+)/\Gamma_{\text{total}} \times \Gamma(\eta_c(1S) \rightarrow \gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{241}/\Gamma \times \Gamma_{56}^{\eta_c(1S)}/\Gamma_{\eta_c(1S)}$

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
$0.22^{+0.09+0.04}_{-0.07-0.02}$	1 WICHT	08	BELL $e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

$\Gamma(\eta_c K^+, \eta_c \rightarrow K_S^0 K^\mp \pi^\pm)/\Gamma_{\text{total}}$   $\Gamma_{242}/\Gamma$

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
$26.7 \pm 1.4^{+5.7}_{-5.5}$	1,2 VINOKUROVA 11	BELL	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> Assumes equal production of  $B^0$  and  $B^+$  from Upsilon(4S) decays.

<sup>2</sup> VINOKUROVA 11 reports  $(26.7 \pm 1.4^{+2.9}_{-2.6} \pm 4.9) \times 10^{-6}$ , where the first uncertainty is statistical, the second is due to systematics, and the third comes from interference of  $\eta_c(1S) \rightarrow K_S^0 K^\pm \pi^\mp$  with nonresonant  $K_S^0 K^\pm \pi^\mp$ . We combined both systematic uncertainties to single values.

$\Gamma(\eta_c K^*(892)^+)/\Gamma_{\text{total}}$   $\Gamma_{243}/\Gamma$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
$1.1^{+0.5}_{-0.4} \pm 0.1$	1,2 AUBERT	07AV BABR	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> AUBERT 07AV reports  $[\Gamma(B^+ \rightarrow \eta_c K^*(892)^+)/\Gamma_{\text{total}}] \times [B(\eta_c(1S) \rightarrow \rho\bar{\rho})] = (1.57^{+0.56+0.45}_{-0.46-0.36}) \times 10^{-6}$  which we divide by our best value  $B(\eta_c(1S) \rightarrow \rho\bar{\rho}) = (1.44 \pm 0.14) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

$\Gamma(\eta_c K^+ \pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{244}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.9 \times 10^{-4}$	90	VINOKUROVA 15	BELL	$e^+e^- \rightarrow \gamma(4S)$

$\Gamma(\eta_c K^+ \omega(782))/\Gamma_{\text{total}}$   $\Gamma_{245}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<5.3 \times 10^{-4}$	90	VINOKUROVA 15	BELL	$e^+e^- \rightarrow \gamma(4S)$

$\Gamma(\eta_c K^+ \eta)/\Gamma_{\text{total}}$   $\Gamma_{246}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2.2 \times 10^{-4}$	90	VINOKUROVA 15	BELL	$e^+e^- \rightarrow \gamma(4S)$

$\Gamma(\eta_c K^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{247}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<6.2 \times 10^{-5}$	90	VINOKUROVA 15	BELL	$e^+e^- \rightarrow \gamma(4S)$

$\Gamma(\eta_c(2S) K^+)/\Gamma_{\text{total}}$   $\Gamma_{248}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>4.4 ± 1.0 OUR AVERAGE</b>			
$3.5 \pm 1.7 \pm 0.5 \pm 0.1$	1,2 LEES	20C	BABR $e^+e^- \rightarrow \gamma(4S)$
$4.8 \pm 1.1 \pm 0.3$	<sup>2</sup> KATO	18	BELL $e^+e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

3.4±1.8±0.3 <sup>2</sup> AUBERT 06E BABR Repl. by LEES 20C

<sup>1</sup> LEES 20C measurement's last uncertainty is due to the used  $B(B^\pm \rightarrow K^\pm J/\psi)$  value.

<sup>2</sup> Measures absolute branching fractions using a missing-mass technique.

$\Gamma(\eta_c(2S)K^+, \eta_c \rightarrow p\bar{p})/\Gamma_{\text{total}}$   $\Gamma_{249}/\Gamma$

VALUE (units 10 <sup>-8</sup> )	CL%	DOCUMENT ID	TECN	COMMENT
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<b>3.47±0.72±0.26</b>		<sup>1</sup> AAIJ	17AD LHCb	$pp$ at 7 and 8 TeV
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<10.6	95	<sup>2</sup> AAIJ	13S LHCb	Repl. by AAIJ 17AD
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<sup>1</sup> Measured relative to  $B^+ \rightarrow J/\psi K^+$  decay with charmonia reconstructed in  $p\bar{p}$  final state and using  $B(B^+ \rightarrow J/\psi K^+) \times B(J/\psi \rightarrow p\bar{p}) = (2.17 \pm 0.08) \times 10^{-6}$ . The last uncertainty includes the uncertainty of  $B(B^+ \rightarrow J/\psi K^+) \times B(J/\psi \rightarrow p\bar{p})$ .

<sup>2</sup> Measured relative to  $B^+ \rightarrow J/\psi K^+$  decay with charmonia reconstructed in  $p\bar{p}$  final state and using  $B(B^+ \rightarrow J/\psi K^+) = (1.013 \pm 0.034) \times 10^{-3}$  and  $B(J/\psi \rightarrow p\bar{p}) = (2.17 \pm 0.07) \times 10^{-3}$ .

$\Gamma(\eta_c(2S)K^+, \eta_c \rightarrow p\bar{p}\pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{251}/\Gamma$

VALUE (units 10 <sup>-7</sup> )	DOCUMENT ID	TECN	COMMENT
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<b>11.2+1.8+0.5 -1.6-0.7</b>	CHILIKIN	19	BELL $e^+e^- \rightarrow \Upsilon(4S)$
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$\Gamma(B^+ \rightarrow h_c(1P)K^+)/\Gamma_{\text{total}} \times \Gamma(h_c(1P) \rightarrow \gamma\eta_c(1S))/\Gamma_{\text{total}}$   
 $\Gamma_{344}/\Gamma \times \Gamma_{22}^{h_c(1P)}/\Gamma_{h_c(1P)}$

VALUE (units 10 <sup>-4</sup> )	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt;0.48</b>	90	<sup>1</sup> AUBERT	08AB BABR	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Uses the production ratio of  $(B^+ B^-)/(B^0 \bar{B}^0) = 1.026 \pm 0.032$  at  $\Upsilon(4S)$ .

$\Gamma(B^+ \rightarrow \eta_c(2S)K^+)/\Gamma_{\text{total}} \times \Gamma(\eta_c(2S) \rightarrow \gamma\gamma)/\Gamma_{\text{total}}$   
 $\Gamma_{248}/\Gamma \times \Gamma_{16}^{\eta_c(2S)}/\Gamma_{\eta_c(2S)}$

VALUE (units 10 <sup>-6</sup> )	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt;0.18</b>	90	<sup>1</sup> WICHT	08	BELL $e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\eta_c(2S)K^+, \eta_c \rightarrow K_S^0 K^\mp \pi^\pm)/\Gamma_{\text{total}}$   $\Gamma_{250}/\Gamma$

VALUE (units 10 <sup>-6</sup> )	DOCUMENT ID	TECN	COMMENT
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<b>3.4+2.2+0.5 -1.5-0.4</b>	1,2	VINOKUROVA 11	BELL $e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^0$  and  $B^+$  from Upsilon(4S) decays.

<sup>2</sup> The first uncertainty includes both statistical and interference effects while the second is due to systematics.

$\Gamma(J/\psi(1S)K^+)/\Gamma_{\text{total}}$   $\Gamma_{276}/\Gamma$

VALUE (units 10 <sup>-4</sup> )	EVTS	DOCUMENT ID	TECN	COMMENT
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**10.20± 0.19 OUR FIT**

**10.18± 0.20 OUR AVERAGE**

10.32± 0.07±0.24	<sup>1</sup>	CHOUDHURY 21	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
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9.4 ± 0.7 ±0.8	<sup>2</sup>	CHILIKIN	19	BELL $e^+e^- \rightarrow \Upsilon(4S)$
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8.9 ± 0.6 ±0.5	<sup>3</sup>	KATO	18	BELL $e^+e^- \rightarrow \Upsilon(4S)$
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8.1 ± 1.3 ± 0.7		<sup>3</sup> AUBERT	06E	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
10.61 ± 0.15 ± 0.48		<sup>4</sup> AUBERT	05J	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
10.4 ± 1.1 ± 0.1		<sup>5</sup> AUBERT,B	05L	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
10.2 ± 0.8 ± 0.7		<sup>4</sup> JESSOP	97	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
9.24 ± 3.04 ± 0.05		<sup>6</sup> BORTOLETTO92		CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
8.09 ± 3.50 ± 0.04	6	<sup>7</sup> ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

10.1 ± 0.2 ± 0.7		<sup>4</sup> ABE	03B	BELL	Repl. by CHOUDHURY 21
10.1 ± 0.3 ± 0.5		<sup>4</sup> AUBERT	02	BABR	Repl. by AUBERT 05J
11.0 ± 1.5 ± 0.9	59	<sup>4</sup> ALAM	94	CLE2	Repl. by JESSOP 97
22 ± 10 ± 2		BUSKULIC	92G	ALEP	$e^+e^- \rightarrow Z$
7 ± 4	3	<sup>8</sup> ALBRECHT	87D	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
10 ± 7 ± 2	3	<sup>9</sup> BEBEK	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
9 ± 5	3	<sup>10</sup> ALAM	86	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> CHOUDHURY 21 uses the relative production fraction of charged ( $f^{+-}$ ) to neutral ( $f^{00}$ )  $B$  mesons at  $\Upsilon(4S)$  value of  $f^{+-}/f^{00} = 1.058 \pm 0.024$ .

<sup>2</sup> CHILIKIN 19 reports  $[\Gamma(B^+ \rightarrow J/\psi(1S)K^+)/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \rightarrow p\bar{p}\pi^+\pi^-)] = (56.4^{+3.3+2.7}_{-3.2-2.5}) \times 10^{-7}$  which we divide by our best value  $B(J/\psi(1S) \rightarrow p\bar{p}\pi^+\pi^-) = (6.0 \pm 0.5) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup> Measures absolute branching fractions using a missing-mass technique.

<sup>4</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>5</sup> AUBERT,B 05L reports  $[\Gamma(B^+ \rightarrow J/\psi(1S)K^+)/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \rightarrow p\bar{p})] = (2.2 \pm 0.2 \pm 0.1) \times 10^{-6}$  which we divide by our best value  $B(J/\psi(1S) \rightarrow p\bar{p}) = (2.120 \pm 0.029) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>6</sup> BORTOLETTO 92 reports  $(8 \pm 2 \pm 2) \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow J/\psi(1S)K^+)/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \rightarrow e^+e^-)]$  assuming  $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$ , which we rescale to our best value  $B(J/\psi(1S) \rightarrow e^+e^-) = (5.971 \pm 0.032) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>7</sup> ALBRECHT 90J reports  $(7 \pm 3 \pm 1) \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow J/\psi(1S)K^+)/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \rightarrow e^+e^-)]$  assuming  $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$ , which we rescale to our best value  $B(J/\psi(1S) \rightarrow e^+e^-) = (5.971 \pm 0.032) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>8</sup> ALBRECHT 87D assume  $B^+B^-/B^0\bar{B}^0$  ratio is 55/45. Superseded by ALBRECHT 90J.

<sup>9</sup> BEBEK 87 value has been updated in BERKELMAN 91 to use same assumptions as noted for BORTOLETTO 92.

<sup>10</sup> ALAM 86 assumes  $B^\pm/B^0$  ratio is 60/40.

### $\Gamma(\eta_c K^+)/\Gamma(J/\psi(1S)K^+)$

$\Gamma_{241}/\Gamma_{276}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.88 ± 0.10 OUR AVERAGE</b>			
0.85 ± 0.06 ± 0.08	<sup>1</sup> AAIJ	13S	LHCB $pp$ at 7 TeV
1.33 ± 0.10 ± 0.43	<sup>2</sup> AUBERT,B	04B	BABR $e^+e^- \rightarrow \Upsilon(4S)$



<sup>1</sup> AAIJ 13S reports  $[\Gamma(B^+ \rightarrow \eta_c K^+)/\Gamma(B^+ \rightarrow J/\psi(1S) K^+)] \times [B(\eta_c(1S) \rightarrow p\bar{p}) / [B(J/\psi(1S) \rightarrow p\bar{p})] = 0.578 \pm 0.035 \pm 0.026$  which we multiply or divide by our best values  $B(\eta_c(1S) \rightarrow p\bar{p}) = (1.44 \pm 0.14) \times 10^{-3}$ ,  $B(J/\psi(1S) \rightarrow p\bar{p}) = (2.120 \pm 0.029) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best values.

<sup>2</sup> Uses BABAR measurement of  $B(B^+ \rightarrow J/\psi K^+) = (10.1 \pm 0.3 \pm 0.5) \times 10^{-4}$ .

$$\Gamma(B^+ \rightarrow J/\psi(1S) K^+)/\Gamma_{\text{total}} \times \Gamma(J/\psi(1S) \rightarrow \gamma\gamma)/\Gamma_{\text{total}} \times \Gamma_{276}/\Gamma \times \Gamma_{334}^{J/\psi(1S)}/\Gamma_{J/\psi(1S)}$$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<0.16	90	<sup>1</sup> WICHT 08	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$$\Gamma(J/\psi(1S) K^+ \pi^+ \pi^-)/\Gamma_{\text{total}} \quad \Gamma_{278}/\Gamma$$

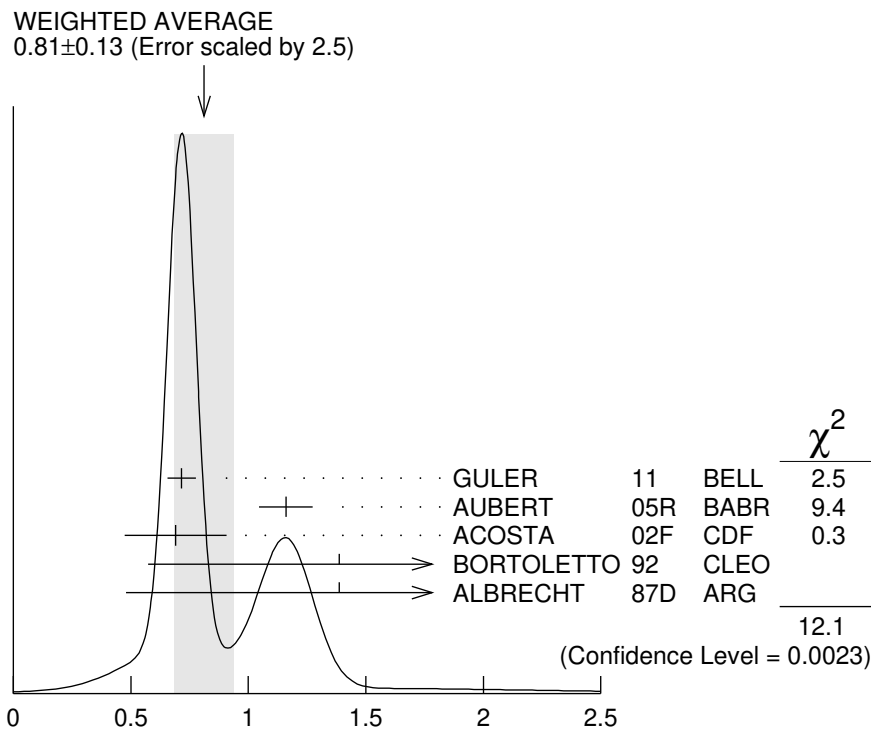
VALUE (units $10^{-3}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.81 ± 0.13 OUR AVERAGE** Error includes scale factor of 2.5. See the ideogram below.

0.716 ± 0.010 ± 0.060			<sup>1</sup> GULER 11	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
1.16 ± 0.07 ± 0.09			<sup>1</sup> AUBERT 05R	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
0.69 ± 0.18 ± 0.12			<sup>2</sup> ACOSTA 02F	CDF	$p\bar{p}$ 1.8 TeV
1.39 ± 0.81 ± 0.01			<sup>3</sup> BORTOLETTO92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
1.39 ± 0.91 ± 0.01		6	<sup>4</sup> ALBRECHT 87D	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<1.8	90		<sup>5</sup> ALBRECHT 90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> ACOSTA 02F uses as reference of  $B(B \rightarrow J/\psi(1S) K^+) = (10.1 \pm 0.6) \times 10^{-4}$ . The second error includes the systematic error and the uncertainties of the branching ratio.

<sup>3</sup> BORTOLETTO 92 reports  $(1.2 \pm 0.6 \pm 0.4) \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow J/\psi(1S) K^+ \pi^+ \pi^-) / \Gamma_{\text{total}}] \times [B(J/\psi(1S) \rightarrow e^+ e^-)]$  assuming  $B(J/\psi(1S) \rightarrow e^+ e^-) = 0.069 \pm 0.009$ , which we rescale to our best value  $B(J/\psi(1S) \rightarrow e^+ e^-) = (5.971 \pm 0.032) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>4</sup> ALBRECHT 87D reports  $(1.2 \pm 0.8) \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow J/\psi(1S) K^+ \pi^+ \pi^-) / \Gamma_{\text{total}}] \times [B(J/\psi(1S) \rightarrow e^+ e^-)]$  assuming  $B(J/\psi(1S) \rightarrow e^+ e^-) = 0.069 \pm 0.009$ , which we rescale to our best value  $B(J/\psi(1S) \rightarrow e^+ e^-) = (5.971 \pm 0.032) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. They actually report  $0.0011 \pm 0.0007$  assuming  $B^+ B^- / B^0 \bar{B}^0$  ratio is 55/45. We rescale to 50/50. Analysis explicitly removes  $B^+ \rightarrow \psi(2S) K^+$ .

<sup>5</sup> ALBRECHT 90J reports  $< 1.6 \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow J/\psi(1S) K^+ \pi^+ \pi^-) / \Gamma_{\text{total}}] \times [B(J/\psi(1S) \rightarrow e^+ e^-)]$  assuming  $B(J/\psi(1S) \rightarrow e^+ e^-) = 0.069$ , which we rescale to our best value  $B(J/\psi(1S) \rightarrow e^+ e^-) = 5.971 \times 10^{-2}$ . Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(J/\psi(1S) K^+ \pi^+ \pi^-) / \Gamma_{\text{total}}$  (units  $10^{-3}$ )

$\Gamma(J/\psi(1S) K^+ K^- K^+) / \Gamma_{\text{total}}$   $\Gamma_{279} / \Gamma$

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>33.7 \pm 2.5 \pm 1.4</math></b>	LEES	15	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

$\Gamma(h_c(1P) K^+, h_c \rightarrow J/\psi \pi^+ \pi^-) / \Gamma_{\text{total}}$   $\Gamma_{252} / \Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 3.4 \times 10^{-6}</math></b>	90	<sup>1</sup> AUBERT	05R	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(X(3730)^0 K^+, X^0 \rightarrow \eta_c \eta) / \Gamma_{\text{total}}$   $\Gamma_{253} / \Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 4.6 \times 10^{-5}</math></b>	90	VINOKUROVA	15	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

$\Gamma(X(3730)^0 K^+, X^0 \rightarrow \eta_c \pi^0) / \Gamma_{\text{total}}$   $\Gamma_{254} / \Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 5.7 \times 10^{-6}</math></b>	90	VINOKUROVA	15	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

$\Gamma(\eta_{c2}(1D) K^+, \eta_{c2} \rightarrow h_c \gamma) / \Gamma_{\text{total}}$   $\Gamma_{255} / \Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 3.7 \times 10^{-5}</math></b>	90	CHILIKIN	20	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

$\Gamma(\eta_{c2}(1D) \pi^+ K_S^0, \eta_{c2} \rightarrow h_c \gamma) / \Gamma_{\text{total}}$   $\Gamma_{256} / \Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 1.1 \times 10^{-4}</math></b>	90	CHILIKIN	20	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

$\Gamma(\psi_2(3823)K^+, \psi_2 \rightarrow J/\psi \pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{257}/\Gamma$ 

VALUE (units $10^{-7}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>2.82 \pm 0.54 \pm 0.13</math></b>		<sup>1</sup> AAIJ	20S	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> The first error is statistic; the second error is the total systematic error.

 $\Gamma(\chi_{c1}(3872)K^+)/\Gamma_{\text{total}}$   $\Gamma_{258}/\Gamma$ 

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>2.1 \pm 0.6 \pm 0.3 \pm 0.1</math></b>		<sup>1,2</sup> LEES	20C	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$< 2.6$	90	<sup>1</sup> KATO	18	BELL $e^+e^- \rightarrow \Upsilon(4S)$
$2.6 \pm 0.7 \pm 0.9$		<sup>3,4</sup> AUBERT	06	BABR Repl. by AUBERT 08Y
$< 3.2$	90	<sup>1</sup> AUBERT	06E	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$3.3 \pm 1.1 \pm 1.1$		<sup>3,5</sup> AUBERT	05R	BABR Repl. by AUBERT 06
$3.5 \pm 0.8 \pm 1.2$		<sup>6</sup> CHOI	03	BELL Repl. by CHOI 11

• • • We do not use the following data for averages, fits, limits, etc. • • •

<sup>1</sup> Measures absolute branching fractions using a missing-mass technique.

<sup>2</sup> LEES 20C measurement's last uncertainty is due to the used  $B(B^\pm \rightarrow K^\pm J/\psi)$  value.

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>4</sup> AUBERT 06 reports  $[\Gamma(B^+ \rightarrow \chi_{c1}(3872)K^+)/\Gamma_{\text{total}}] \times [B(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi(1S))] = (10.1 \pm 2.5 \pm 1.0) \times 10^{-6}$  which we divide by our best value  $B(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi(1S)) = (3.8 \pm 1.2) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>5</sup> AUBERT 05R reports  $[\Gamma(B^+ \rightarrow \chi_{c1}(3872)K^+)/\Gamma_{\text{total}}] \times [B(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi(1S))] = (12.8 \pm 4.1) \times 10^{-6}$  which we divide by our best value  $B(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi(1S)) = (3.8 \pm 1.2) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>6</sup> CHOI 03 reports  $[\Gamma(B^+ \rightarrow \chi_{c1}(3872)K^+)/\Gamma_{\text{total}}] \times [B(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi(1S))] = (13.6 \pm 3.0 \pm 0.5) \times 10^{-6}$  which we divide by our best value  $B(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi(1S)) = (3.8 \pm 1.2) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\chi_{c1}(3872)K^*(892)^+)/\Gamma_{\text{total}}$   $\Gamma_{267}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 6 \times 10^{-4}</math></b>	90	<sup>1,2</sup> AUBERT	09B	BABR $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 6 \times 10^{-4}$  90 <sup>2,3</sup> AUBERT 09B BABR  $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> AUBERT 09B reports  $[\Gamma(B^+ \rightarrow \chi_{c1}(3872)K^*(892)^+)/\Gamma_{\text{total}}] \times [B(\chi_{c1}(3872) \rightarrow \gamma J/\psi)] < 4.8 \times 10^{-6}$  which we divide by our best value  $B(\chi_{c1}(3872) \rightarrow \gamma J/\psi) = 8 \times 10^{-3}$ .

<sup>2</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+ B^-) = (51.6 \pm 0.6)\%$  and  $B(\Upsilon(4S) \rightarrow B^0 \bar{B}^0) = (48.4 \pm 0.6)\%$ .

<sup>3</sup> AUBERT 09B reports  $[\Gamma(B^+ \rightarrow \chi_{c1}(3872)K^*(892)^+)/\Gamma_{\text{total}}] \times [B(\chi_{c1}(3872) \rightarrow \gamma \psi(2S))] < 28 \times 10^{-6}$  which we divide by our best value  $B(\chi_{c1}(3872) \rightarrow \gamma \psi(2S)) = 4.5 \times 10^{-2}$ .

 $\Gamma(\chi_{c0}(3915)K^+)/\Gamma_{\text{total}}$   $\Gamma_{259}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 2.8 \times 10^{-4}</math></b>	90	<sup>1</sup> KATO	18	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Measures absolute branching fractions using a missing-mass technique.

$\Gamma(\chi_{c0}(3915)K^+, \chi_{c0} \rightarrow D^+ D^-)/\Gamma(D^- D^+ K^+)$   $\Gamma_{260}/\Gamma_{209}$

VALUE (units $10^{-2}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>3.7 \pm 0.9 \pm 0.2</math></b>		<sup>1</sup> AAIJ	20A1	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> Measured in Dalitz plot analysis of  $B^+ \rightarrow D^- D^+ K^+$  decays.

$\Gamma(\chi_{c0}(3915)K^+, \chi_{c0} \rightarrow \eta_c \eta)/\Gamma_{\text{total}}$   $\Gamma_{261}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 4.7 \times 10^{-5}</math></b>	90	<sup>1</sup> VINOKUROVA 15	BELL	$e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Upper limit is corrected in the Erratum.

$\Gamma((\chi_{c0})_{c0}(3915)K^+, \chi_{c0} \rightarrow \eta_c \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{262}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 1.7 \times 10^{-5}</math></b>	90	<sup>1</sup> VINOKUROVA 15	BELL	$e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Upper limit is corrected in the Erratum.

$\Gamma(X(4014)^0 K^+, X^0 \rightarrow \eta_c \eta)/\Gamma_{\text{total}}$   $\Gamma_{263}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 3.9 \times 10^{-5}</math></b>	90	VINOKUROVA 15	BELL	$e^+ e^- \rightarrow \gamma(4S)$

$\Gamma(X(4014)^0 K^+, X^0 \rightarrow \eta_c \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{264}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 1.2 \times 10^{-5}</math></b>	90	VINOKUROVA 15	BELL	$e^+ e^- \rightarrow \gamma(4S)$

$\Gamma(Z_c(3900)^0 K^+, Z_c^0 \rightarrow \eta_c \pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{265}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 4.7 \times 10^{-5}</math></b>	90	VINOKUROVA 15	BELL	$e^+ e^- \rightarrow \gamma(4S)$

$\Gamma(X(4020)^0 K^+, X^0 \rightarrow \eta_c \pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{266}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 1.6 \times 10^{-5}</math></b>	90	VINOKUROVA 15	BELL	$e^+ e^- \rightarrow \gamma(4S)$

$\Gamma(\chi_{c1}(3872)^+ K^0, \chi_{c1}^+ \rightarrow J/\psi(1S) \pi^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{268}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 6.1</math></b>	90	<sup>1,2</sup> CHOI	11	BELL $e^+ e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 22$	90	<sup>3</sup> AUBERT	05B	BABR $e^+ e^- \rightarrow \gamma(4S)$
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<sup>1</sup> Assumes  $\pi^+ \pi^0$  originates from  $\rho^+$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ . The isovector- $X$  hypothesis is excluded with a likelihood test at  $1 \times 10^{-4}$  level.

$\Gamma(\chi_{c1}(3872)K^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{269}/\Gamma$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>2.8 \pm 0.8 \pm 0.9</math></b>		<sup>1</sup> BALA	15	BELL $e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> BALA 15 reports  $[\Gamma(B^+ \rightarrow \chi_{c1}(3872)K^0 \pi^+)/\Gamma_{\text{total}}] \times [B(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi(1S))] = (10.6 \pm 3.0 \pm 0.9) \times 10^{-6}$  which we divide by our best value  $B(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi(1S)) = (3.8 \pm 1.2) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(Z_c(4430)^+ K^0, Z_c^+ \rightarrow J/\psi \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{270}/\Gamma$ 

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<1.5	95	<sup>1</sup> AUBERT	09AA BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(Z_c(4430)^+ K^0, Z_c^+ \rightarrow \psi(2S) \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{271}/\Gamma$ 

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<4.7	95	<sup>1</sup> AUBERT	09AA BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\psi(4230)^0 K^+, \psi^0 \rightarrow J/\psi \pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{272}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<15.6	95	<sup>1,2</sup> GARG	19 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<29	95	<sup>2</sup> AUBERT	06 BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Corresponds to a 90% CL upper limit of  $< 14 \times 10^{-6}$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\chi_{c0}(3915) K^+, \chi_{c0} \rightarrow J/\psi \gamma)/\Gamma_{\text{total}}$   $\Gamma_{273}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<14	90	<sup>1</sup> AUBERT, BE	06M BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\chi_{c0}(3915) K^+, \chi_{c0} \rightarrow \chi_{c1}(1P) \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{274}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< $3.8 \times 10^{-5}$	90	<sup>1</sup> BHARDWAJ	19 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(X(3930)^0 K^+, X^0 \rightarrow J/\psi \gamma)/\Gamma_{\text{total}}$   $\Gamma_{275}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<2.5	90	<sup>1</sup> AUBERT, BE	06M BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(J/\psi(1S) K^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{277}/\Gamma$ 

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.101 \pm 0.021$	<sup>1</sup> AUBERT	09AA BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Does not report systematic uncertainties.

$\Gamma(J/\psi(1S)K^*(892)^+)/\Gamma_{\text{total}}$  $\Gamma_{281}/\Gamma$ 

For polarization information see the Listings at the end of the “ $B^0$  Branching Ratios” section.

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**1.43 ± 0.08 OUR FIT****1.43 ± 0.08 OUR AVERAGE**

1.78 <sup>+0.36</sup> <sub>-0.32</sub> ± 0.02		1,2 AUBERT	07AV BABR	$e^+e^- \rightarrow \Upsilon(4S)$
1.454 ± 0.047 ± 0.097		2 AUBERT	05J BABR	$e^+e^- \rightarrow \Upsilon(4S)$
1.28 ± 0.07 ± 0.14		2 ABE	02N BELL	$e^+e^- \rightarrow \Upsilon(4S)$
1.41 ± 0.23 ± 0.24		2 JESSOP	97 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
1.58 ± 0.47 ± 0.27		3 ABE	96H CDF	$p\bar{p}$ at 1.8 TeV
1.50 ± 1.08 ± 0.01		4 BORTOLETTO	92 CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
1.85 ± 1.30 ± 0.01	2	5 ALBRECHT	90J ARG	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.37 ± 0.09 ± 0.11		2 AUBERT	02 BABR	Repl. by AUBERT 05J
1.78 ± 0.51 ± 0.23	13	2 ALAM	94 CLE2	Sup. by JESSOP 97

<sup>1</sup> AUBERT 07AV reports  $[\Gamma(B^+ \rightarrow J/\psi(1S)K^*(892)^+)/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \rightarrow p\bar{p})] = (3.78^{+0.72+0.28}_{-0.64-0.23}) \times 10^{-6}$  which we divide by our best value  $B(J/\psi(1S) \rightarrow p\bar{p}) = (2.120 \pm 0.029) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> ABE 96H assumes that  $B(B^+ \rightarrow J/\psi K^+) = (1.02 \pm 0.14) \times 10^{-3}$ .

<sup>4</sup> BORTOLETTO 92 reports  $(1.3 \pm 0.9 \pm 0.3) \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow J/\psi(1S)K^*(892)^+)/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \rightarrow e^+e^-)]$  assuming  $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$ , which we rescale to our best value  $B(J/\psi(1S) \rightarrow e^+e^-) = (5.971 \pm 0.032) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>5</sup> ALBRECHT 90J reports  $(1.6 \pm 1.1 \pm 0.3) \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow J/\psi(1S)K^*(892)^+)/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \rightarrow e^+e^-)]$  assuming  $B(J/\psi(1S) \rightarrow e^+e^-) = 0.069 \pm 0.009$ , which we rescale to our best value  $B(J/\psi(1S) \rightarrow e^+e^-) = (5.971 \pm 0.032) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(J/\psi(1S)K^*(892)^+)/\Gamma(J/\psi(1S)K^+)$  $\Gamma_{281}/\Gamma_{276}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
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**1.39 ± 0.09 OUR AVERAGE**

1.37 ± 0.05 ± 0.08	AUBERT	05J BABR	$e^+e^- \rightarrow \Upsilon(4S)$
1.45 ± 0.20 ± 0.17	1 JESSOP	97 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
1.92 ± 0.60 ± 0.17	ABE	96Q CDF	$p\bar{p}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.37 ± 0.10 ± 0.08	2 AUBERT	02 BABR	Repl. by AUBERT 05J
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<sup>1</sup> JESSOP 97 assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . The measurement is actually measured as an average over kaon charged and neutral states.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(J/\psi(1S)K(1270)^+)/\Gamma_{\text{total}}$   $\Gamma_{282}/\Gamma$ 

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>1.80 ± 0.34 ± 0.39</b>		<sup>1</sup> ABE	01L BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses the PDG value of  $B(B^+ \rightarrow J/\psi(1S)K^+) = (1.00 \pm 0.10) \times 10^{-3}$ .

 $\Gamma(J/\psi(1S)K(1400)^+)/\Gamma(J/\psi(1S)K(1270)^+)$   $\Gamma_{283}/\Gamma_{282}$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.30</b>	90	ABE	01L BELL	$e^+e^- \rightarrow \Upsilon(4S)$

 $\Gamma(J/\psi(1S)\eta K^+)/\Gamma_{\text{total}}$   $\Gamma_{284}/\Gamma$ 

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>12.4 ± 1.4 OUR AVERAGE</b>				
12.7 ± 1.1 ± 1.1		<sup>1</sup> IWASHITA	14 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
10.8 ± 2.3 ± 2.4		<sup>1</sup> AUBERT	04Y BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\chi_{c1-odd}(3872)K^+, \chi_{c1-odd} \rightarrow J/\psi\eta)/\Gamma_{\text{total}}$   $\Gamma_{285}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;3.8 × 10<sup>-6</sup></b>	90	IWASHITA	14 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

 $\Gamma(\psi(4160)K^+, \psi \rightarrow J/\psi\eta)/\Gamma_{\text{total}}$   $\Gamma_{286}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;7.4 × 10<sup>-6</sup></b>	90	IWASHITA	14 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

 $\Gamma(J/\psi(1S)\eta' K^+)/\Gamma_{\text{total}}$   $\Gamma_{287}/\Gamma$ 

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;8.8</b>	90	<sup>1</sup> XIE	07 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(J/\psi(1S)\phi K^+)/\Gamma_{\text{total}}$   $\Gamma_{288}/\Gamma$ 

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>5.0 ± 0.4 OUR AVERAGE</b>				
5.00 ± 0.37 ± 0.15		LEES	15 BABR	$e^+e^- \rightarrow \Upsilon(4S)$
4.4 ± 1.4 ± 0.5		<sup>1</sup> AUBERT	03O BABR	$e^+e^- \rightarrow \Upsilon(4S)$
8.8 $^{+3.5}_{-3.0}$ ± 1.3		<sup>2</sup> ANASTASSOV 00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> ANASTASSOV 00 finds 10 events on a background of  $0.5 \pm 0.2$ . Assumes equal production of  $B^0$  and  $B^+$  at the  $\Upsilon(4S)$ , a uniform Dalitz plot distribution, isotropic  $J/\psi(1S)$  and  $\phi$  decays, and  $B(B^+ \rightarrow J/\psi(1S)\phi K^+) = B(B^0 \rightarrow J/\psi(1S)\phi K^0)$ .

 $\Gamma(J/\psi(1S)K_1(1650), K_1 \rightarrow \phi K^+)/\Gamma(J/\psi(1S)\phi K^+)$   $\Gamma_{289}/\Gamma_{288}$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>0.12 ± 0.10 <math>^{+0.17}_{-0.06}</math></b>		<sup>1</sup> AAIJ	17 LHCB	$pp$ at 7, 8 TeV

<sup>1</sup> Measured in amplitude analysis of  $B^+ \rightarrow J/\psi(1S)\phi K^+$ .

$$\Gamma(J/\psi(1S)K^*(1680)^+, K^* \rightarrow \phi K^+)/\Gamma(J/\psi(1S)\phi K^+) \quad \Gamma_{290}/\Gamma_{288}$$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
$6.7 \pm 1.9^{+3.2}_{-3.9}$	<sup>1</sup> AAIJ	17	LHCB $pp$ at 7, 8 TeV

<sup>1</sup> Measured in amplitude analysis of  $B^+ \rightarrow J/\psi(1S)\phi K^+$ .

$$\Gamma(J/\psi(1S)K_2^*(1980), K_2^* \rightarrow \phi K^+)/\Gamma(J/\psi(1S)\phi K^+) \quad \Gamma_{291}/\Gamma_{288}$$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
$2.9 \pm 0.8^{+1.7}_{-0.7}$	<sup>1</sup> AAIJ	17	LHCB $pp$ at 7, 8 TeV

<sup>1</sup> Measured in amplitude analysis of  $B^+ \rightarrow J/\psi(1S)\phi K^+$ .

$$\Gamma(J/\psi(1S)K(1830)^+, K(1830)^+ \rightarrow \phi K^+)/\Gamma(J/\psi(1S)\phi K^+) \quad \Gamma_{292}/\Gamma_{288}$$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
$2.6 \pm 1.1^{+2.3}_{-1.8}$	<sup>1</sup> AAIJ	17	LHCB $pp$ at 7, 8 TeV

<sup>1</sup> Measured in amplitude analysis of  $B^+ \rightarrow J/\psi(1S)\phi K^+$ .

$$\Gamma(\chi_{c1}(4140)K^+, \chi_{c1} \rightarrow J/\psi(1S)\phi)/\Gamma(J/\psi(1S)\phi K^+) \quad \Gamma_{293}/\Gamma_{288}$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>0.19 ± 0.08 OUR AVERAGE</b>				

0.13 ± 0.032<sup>+4.8</sup><sub>-2.0</sub>      <sup>1</sup> AAIJ      17      LHCB       $pp$  at 7, 8 TeV

0.19 ± 0.07 ± 0.04      <sup>2</sup> ABAZOV      14A      D0       $p\bar{p}$  at 1.96 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.133      90      LEES      15      BABR       $e^+e^- \rightarrow \Upsilon(4S)$

<0.07      90      <sup>3</sup> AAIJ      12AA      LHCB       $pp$  at 7 TeV

<sup>1</sup> Measured in amplitude analysis of  $B^+ \rightarrow J/\psi(1S)\phi K^+$ .

<sup>2</sup> Reported a threshold enhancement in the  $J/\psi\phi$  mass distribution consistent with the  $\chi_{c1}(4140)$  state with a statistical significance of 3.1 standard deviations.

<sup>3</sup> Branching fractions are normalized to  $382 \pm 22$  events of  $B^+ \rightarrow J/\psi\phi K^+$ .

$$\Gamma(\chi_{c1}(4274)K^+, \chi_{c1} \rightarrow J/\psi(1S)\phi)/\Gamma(J/\psi(1S)\phi K^+) \quad \Gamma_{294}/\Gamma_{288}$$

VALUE (units $10^{-2}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>7.1 ± 2.5<sup>+3.5</sup><sub>-2.4</sub></b>		<sup>1</sup> AAIJ	17	LHCB $pp$ at 7, 8 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

<18.1      90      LEES      15      BABR       $e^+e^- \rightarrow \Upsilon(4S)$

< 8      90      <sup>2</sup> AAIJ      12AA      LHCB      Repl. by AAIJ 17

<sup>1</sup> Measured in amplitude analysis of  $B^+ \rightarrow J/\psi(1S)\phi K^+$ .

<sup>2</sup> Branching fractions are normalized to  $382 \pm 22$  events of  $B^+ \rightarrow J/\psi\phi K^+$ .

$$\Gamma(\chi_{c0}(4500)K^+, \chi_c^0 \rightarrow J/\psi(1S)\phi)/\Gamma(J/\psi(1S)\phi K^+) \quad \Gamma_{295}/\Gamma_{288}$$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b>6.6 ± 2.4<sup>+3.5</sup><sub>-2.3</sub></b>	<sup>1</sup> AAIJ	17	LHCB $pp$ at 7, 8 TeV

<sup>1</sup> Measured in amplitude analysis of  $B^+ \rightarrow J/\psi(1S)\phi K^+$ .



$\Gamma(\chi_{c0}(4700)K^+, \chi_{c0} \rightarrow J/\psi(1S)\phi)/\Gamma(J/\psi(1S)\phi K^+)$   $\Gamma_{296}/\Gamma_{288}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
$0.12 \pm 0.05^{+0.09}_{-0.05}$	<sup>1</sup> AAIJ	17	LHCB $pp$ at 7, 8 TeV

<sup>1</sup> Measured in amplitude analysis of  $B^+ \rightarrow J/\psi(1S)\phi K^+$ .

 $\Gamma(J/\psi(1S)\omega K^+)/\Gamma_{\text{total}}$   $\Gamma_{297}/\Gamma$ 

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
$3.2 \pm 0.1^{+0.6}_{-0.3}$	<sup>1</sup> DEL-AMO-SA..10B	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$3.5 \pm 0.2 \pm 0.4$	<sup>1</sup> AUBERT	08W	BABR Repl. by DEL-AMO-SANCHEZ 10B
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\chi_{c0}(3915)K^+, \chi_{c0} \rightarrow J/\psi\omega)/\Gamma_{\text{total}}$   $\Gamma_{298}/\Gamma$ 

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
$3.0^{+0.7+0.5}_{-0.6-0.3}$	<sup>1</sup> DEL-AMO-SA..10B	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$4.9^{+1.0}_{-0.9} \pm 0.5$	<sup>1</sup> AUBERT	08W	BABR Repl. by DEL-AMO-SANCHEZ 10B
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\chi_{c0}(3915)K^+, \chi_{c0} \rightarrow p\bar{p})/\Gamma_{\text{total}}$   $\Gamma_{280}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 7.1 \times 10^{-8}$	95	<sup>1</sup> AAIJ	13S	LHCB $pp$ at 7 TeV

<sup>1</sup> Measured relative to  $B^+ \rightarrow J/\psi K^+$  decay with charmonia reconstructed in  $p\bar{p}$  final state and using  $B(B^+ \rightarrow J/\psi K^+) = (1.013 \pm 0.034) \times 10^{-3}$  and  $B(J/\psi \rightarrow p\bar{p}) = (2.17 \pm 0.07) \times 10^{-3}$ .

 $\Gamma(J/\psi(1S)\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{299}/\Gamma$ 

VALUE	DOCUMENT ID	TECN	COMMENT
$(3.92 \pm 0.08) \times 10^{-5}$ <b>OUR FIT</b>	<sup>1</sup> ABE	03B	BELL $e^+e^- \rightarrow \Upsilon(4S)$
$(3.8 \pm 0.6 \pm 0.3) \times 10^{-5}$			

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(J/\psi(1S)\pi^+)/\Gamma(J/\psi(1S)K^+)$   $\Gamma_{299}/\Gamma_{276}$ 

VALUE (units $10^{-2}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>3.85 \pm 0.04</math> OUR FIT</b>				
<b><math>3.85 \pm 0.04</math> OUR AVERAGE</b>				
$3.83 \pm 0.03 \pm 0.03$		AAIJ	170	LHCB $pp$ at 7, 8 TeV
$3.5 \pm 0.3 \pm 1.2$		AABOUD	16L	ATLS $pp$ at 7, 8 TeV
$4.86 \pm 0.82 \pm 0.15$		ABULENCIA	09	CDF $p\bar{p}$ at 1.96 TeV
$5.37 \pm 0.45 \pm 0.11$		AUBERT	04P	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$5.0^{+1.9}_{-1.7} \pm 0.1$		ABE	96R	CDF $p\bar{p}$ 1.8 TeV
$5.2 \pm 2.4$		BISHAI	96	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

3.83±0.11±0.07	AAIJ	12AC	LHCB	Repl. by AAIJ 170
3.91±0.78±0.19	AUBERT	02F	BABR	Repl. by AUBERT 04P
4.3 ±2.3	5	<sup>1</sup> ALEXANDER	95 CLE2	Sup. by BISHAI 96

<sup>1</sup> Assumes equal production of  $B^+ B^-$  and  $B^0 \bar{B}^0$  on  $\Upsilon(4S)$ .

$\Gamma(J/\psi(1S)\pi^+\pi^+\pi^-\pi^-\pi^-)/\Gamma(\psi(2S)K^+)$   $\Gamma_{300}/\Gamma_{311}$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.88±0.17±0.09</b>	<sup>1</sup> AAIJ	17K	LHCB $pp$ at 7 and 8 TeV

<sup>1</sup> Contains also the contribution from  $B^+ \rightarrow \psi(2S)[\rightarrow J/\psi\pi^+\pi^-] \pi^+\pi^+\pi^-$  decays.

$\Gamma(\psi(2S)\pi^+\pi^+\pi^-)/\Gamma(\psi(2S)K^+)$   $\Gamma_{301}/\Gamma_{311}$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b>3.04±0.50±0.26</b>	AAIJ	17K	LHCB $pp$ at 7 and 8 TeV

$\Gamma(J/\psi(1S)\rho^+)/\Gamma_{total}$   $\Gamma_{302}/\Gamma$

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>4.1 ±0.5 OUR AVERAGE</b>		Error includes scale factor of 1.4.		

3.81<sup>+0.25</sup><sub>-0.24</sub>±0.35      AAIJ      190      LHCB       $pp$  at 7 and 8 TeV

5.0 ±0.7 ±0.3      <sup>1</sup>AUBERT      07AC      BABR       $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<77      90      BISHAI      96      CLE2       $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(J/\psi(1S)\pi^+\pi^0 nonresonant)/\Gamma_{total}$   $\Gamma_{303}/\Gamma$

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.73</b>	90	<sup>1</sup> AUBERT	07AC	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(J/\psi(1S)a_1(1260)^+)/\Gamma_{total}$   $\Gamma_{304}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;1.2 × 10<sup>-3</sup></b>	90	BISHAI	96	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(J/\psi(1S)\rho\bar{p}\pi^+)/\Gamma_{total}$   $\Gamma_{305}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;5.0 × 10<sup>-7</sup></b>	90	<sup>1</sup> AAIJ	13Z	LHCB $pp$ at 7 TeV

<sup>1</sup> Uses  $B(B_S^0 \rightarrow J/\psi(1S)\pi^+\pi^-) = (1.98 \pm 0.20) \times 10^{-4}$ .

$\Gamma(J/\psi(1S)\rho\bar{\Lambda})/\Gamma_{total}$   $\Gamma_{306}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>14.6±1.2 OUR AVERAGE</b>				

15.1±0.8±1.0      <sup>1</sup>SIRUNYAN      19CM      CMS       $pp$  at 8 TeV

11.7±2.8<sup>+1.8</sup><sub>-2.3</sub>      <sup>2</sup>XIE      05      BELL       $e^+e^- \rightarrow \Upsilon(4S)$

12 <sup>+9</sup><sub>-6</sub>      <sup>2</sup>AUBERT      03K      BABR       $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<41      90      ZANG      04      BELL       $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> SIRUNYAN 19CM reports  $B(B^+ \rightarrow J/\psi \bar{\Lambda} p)/B(B^+ \rightarrow J/\psi K^*(892)) = (1.054 \pm 0.057 \pm 0.035 \pm 0.011) \times 10^{-2}$  and rescaled with the best value of  $B(B^+ \rightarrow J/\psi K^*(892)) = (1.43 \pm 0.08) \times 10^{-3}$ , where the last uncertainty is the uncertainty from the branching fractions of  $\bar{\Lambda}$  and  $K^*(892)$  to reconstructed final states.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(J/\psi(1S)\bar{\Sigma}^0 p)/\Gamma_{\text{total}}$   $\Gamma_{307}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.1 \times 10^{-5}$	90	<sup>1</sup> XIE	05	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(J/\psi(1S)D^+)/\Gamma_{\text{total}}$   $\Gamma_{308}/\Gamma$

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$<12$	90	<sup>1</sup> AUBERT	05U	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(J/\psi(1S)\bar{D}^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{309}/\Gamma$

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$<2.5$	90	<sup>1</sup> ZHANG	05B	BELL $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<5.2$	90	<sup>1</sup> AUBERT	05R	BABR $e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\psi(2S)\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{310}/\Gamma$

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
$2.44 \pm 0.22 \pm 0.20$	<sup>1</sup> BHARDWAJ	08	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\psi(2S)\pi^+)/\Gamma(\psi(2S)K^+)$   $\Gamma_{310}/\Gamma_{311}$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>3.97 \pm 0.29</math> OUR AVERAGE</b>			
$3.95 \pm 0.40 \pm 0.12$	AAIJ	12AC	LHCB $pp$ at 7 TeV
$3.99 \pm 0.36 \pm 0.17$	BHARDWAJ	08	BELL $e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\psi(2S)K^+)/\Gamma_{\text{total}}$   $\Gamma_{311}/\Gamma$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>6.24 \pm 0.20</math> OUR FIT</b>				
<b><math>6.40 \pm 0.34</math> OUR AVERAGE</b>				
$4.6 \pm 1.0 \pm 0.7$		<sup>1</sup> LEES	20C	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$6.4 \pm 1.0 \pm 0.4$		<sup>1</sup> KATO	18	BELL $e^+e^- \rightarrow \Upsilon(4S)$
$6.65 \pm 0.17 \pm 0.55$		<sup>2</sup> GULER	11	BELL $e^+e^- \rightarrow \Upsilon(4S)$
$6.17 \pm 0.32 \pm 0.44$		<sup>2</sup> AUBERT	05J	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$7.8 \pm 0.7 \pm 0.9$		<sup>2</sup> RICHICHI	01	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
$18 \pm 8 \pm 4$	5	<sup>2</sup> ALBRECHT	90J	ARG $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$4.9 \pm 1.6 \pm 0.4$		<sup>1</sup> AUBERT	06E	BABR	Repl. by LEES 20C
$6.9 \pm 0.6$		<sup>2</sup> ABE	03B	BELL	Repl. by GULER 11
$6.4 \pm 0.5 \pm 0.8$		<sup>2</sup> AUBERT	02	BABR	Repl. by AUBERT 05J
$6.1 \pm 2.3 \pm 0.9$	7	<sup>2</sup> ALAM	94	CLE2	Repl. by RICHICHI 01
<5 at 90% CL		<sup>2</sup> BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
$22 \pm 17$	3	<sup>3</sup> ALBRECHT	87D	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Measures absolute branching fractions using a missing-mass technique.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> ALBRECHT 87D assume  $B^+ B^- / B^0 \bar{B}^0$  ratio is 55/45. Superseded by ALBRECHT 90J.

### $\Gamma(\psi(2S)K^+)/\Gamma(J/\psi(1S)K^+)$

$\Gamma_{311}/\Gamma_{276}$

<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.611±0.019 OUR FIT</b>				
<b>0.605±0.021 OUR AVERAGE</b>				
$0.58 \pm 0.11 \pm 0.02$		<sup>1</sup> AAIJ	13S	LHCB $pp$ at 7 TeV
$0.607 \pm 0.018 \pm 0.013$		<sup>2,3</sup> AAIJ	12L	LHCB $pp$ at 7 TeV
$0.63 \pm 0.05 \pm 0.08$		ABAZOV	09Y	D0 $p\bar{p}$ at 1.96 TeV
$0.558 \pm 0.082 \pm 0.056$		ABE	98O	CDF $p\bar{p}$ 1.8 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.64 \pm 0.06 \pm 0.07$		<sup>4</sup> AUBERT	02	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> AAIJ 13S reports  $[\Gamma(B^+ \rightarrow \psi(2S)K^+)/\Gamma(B^+ \rightarrow J/\psi(1S)K^+)] \times [B(\psi(2S) \rightarrow p\bar{p})] / [B(J/\psi(1S) \rightarrow p\bar{p})] = 0.080 \pm 0.012 \pm 0.009$  which we multiply or divide by our best values  $B(\psi(2S) \rightarrow p\bar{p}) = (2.94 \pm 0.08) \times 10^{-4}$ ,  $B(J/\psi(1S) \rightarrow p\bar{p}) = (2.120 \pm 0.029) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best values.

<sup>2</sup> AAIJ 12L reports  $0.594 \pm 0.006 \pm 0.016 \pm 0.015$  from a measurement of  $[\Gamma(B^+ \rightarrow \psi(2S)K^+)/\Gamma(B^+ \rightarrow J/\psi(1S)K^+)] \times [B(J/\psi(1S) \rightarrow e^+e^-)] / [B(\psi(2S) \rightarrow e^+e^-)]$  assuming  $B(J/\psi(1S) \rightarrow e^+e^-) = (5.94 \pm 0.06) \times 10^{-2}$ ,  $B(\psi(2S) \rightarrow e^+e^-) = (7.72 \pm 0.17) \times 10^{-3}$ , which we rescale to our best values  $B(J/\psi(1S) \rightarrow e^+e^-) = (5.971 \pm 0.032) \times 10^{-2}$ ,  $B(\psi(2S) \rightarrow e^+e^-) = (7.93 \pm 0.17) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best values.

<sup>3</sup> Assumes  $B(J/\psi \rightarrow \mu^+\mu^-) / B(\psi(2S) \rightarrow \mu^+\mu^-) = B(J/\psi \rightarrow e^+e^-) / B(\psi(2S) \rightarrow e^+e^-) = 7.69 \pm 0.19$ .

<sup>4</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(\psi(2S)K^*(892)^+)/\Gamma_{total}$

$\Gamma_{312}/\Gamma$

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>6.7 ±1.4 OUR AVERAGE</b>				Error includes scale factor of 1.3.
$5.92 \pm 0.85 \pm 0.89$		<sup>1</sup> AUBERT	05J	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$9.2 \pm 1.9 \pm 1.2$		<sup>1</sup> RICHICHI	01	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<30	90	<sup>1</sup> ALAM	94	CLE2	Repl. by RICHICHI 01
<35	90	<sup>1</sup> BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<49	90	<sup>1</sup> ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\psi(2S)K^*(892)^+)/\Gamma(\psi(2S)K^+)$   $\Gamma_{312}/\Gamma_{311}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.96±0.15±0.09</b>	AUBERT	05J	BABR $e^+e^- \rightarrow \Upsilon(4S)$

 $\Gamma(\psi(2S)K^0\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{313}/\Gamma$ 

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.588±0.034 <sup>1</sup> AUBERT 09AA BABR  $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Does not report systematic uncertainties.

 $\Gamma(\psi(2S)K^+\pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{314}/\Gamma$ 

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**4.3 ± 0.5 OUR AVERAGE**

4.31± 0.20±0.50 <sup>1</sup> GULER 11 BELL  $e^+e^- \rightarrow \Upsilon(4S)$   
 19 ±11 ±4 3 <sup>1</sup> ALBRECHT 90J ARG  $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\psi(2S)\phi(1020)K^+)/\Gamma_{\text{total}}$   $\Gamma_{315}/\Gamma$ 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
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**4.0±0.4±0.6** <sup>1,2</sup> KHACHATRY...17C CMS  $pp$  at 8 TeV

<sup>1</sup> Measured using  $B^+ \rightarrow \psi(2S)K^+$  as a normalization channel. The second error represents total systematic uncertainties including those from branching fractions which were taken from PDG 16 as  $B(\phi \rightarrow K^+K^-) = 0.489 \pm 0.005$  and  $B(B^+ \rightarrow \psi(2S)K^+) = (6.26 \pm 0.24) \times 10^{-4}$ .

<sup>2</sup> An upper limit on the fraction of the non- $\phi$  component in  $B^+ \rightarrow \psi(2S)K^+K^-K^+$  decays is set as 0.26 at the 95% confidence level.

 $\Gamma(\psi(3770)K^+)/\Gamma_{\text{total}}$   $\Gamma_{316}/\Gamma$ 

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**0.43±0.11 OUR AVERAGE**

0.32±0.20±0.05±0.01 <sup>1,2</sup> LEES 20C BABR  $e^+e^- \rightarrow \Upsilon(4S)$   
 0.48±0.11±0.07 <sup>3</sup> CHISTOV 04 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.23 90 <sup>2</sup> KATO 18 BELL  $e^+e^- \rightarrow \Upsilon(4S)$   
 3.5 ±2.5 ±0.3 <sup>2</sup> AUBERT 06E BABR Repl. by LEES 20C

<sup>1</sup> LEES 20C measurement's last uncertainty is due to the used  $B(B^\pm \rightarrow K^\pm J/\psi)$  value.

<sup>2</sup> Measures absolute branching fractions using a missing-mass technique.

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\psi(3770)K^+)/\Gamma(D^-D^+K^+)$   $\Gamma_{316}/\Gamma_{209}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
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**0.352±0.035<sup>+0.034</sup><sub>-0.031</sub>** <sup>1,2</sup> AAIJ 20AI LHCb  $pp$  at 7, 8, 13 TeV

<sup>1</sup> AAIJ 20AI reports  $[\Gamma(B^+ \rightarrow \psi(3770)K^+)/\Gamma(B^+ \rightarrow D^-D^+K^+)] \times [B(\psi(3770) \rightarrow D^+D^-)] = (14.5 \pm 1.2 \pm 0.8) \times 10^{-2}$  which we divide by our best value  $B(\psi(3770) \rightarrow D^+D^-) = (41 \pm 4) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> Measured in Dalitz plot analysis of  $B^+ \rightarrow D^-D^+K^+$  decays.

$\Gamma(\psi(3770)K^+, \psi \rightarrow D^0 \bar{D}^0)/\Gamma_{\text{total}}$   $\Gamma_{317}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.5 ± 0.5 OUR AVERAGE</b>	Error includes scale factor of 1.4.		
1.18 ± 0.41 ± 0.15	<sup>1</sup> LEES	15c BABR	$e^+e^- \rightarrow \Upsilon(4S)$
2.2 ± 0.5 ± 0.3	<sup>1</sup> BRODZICKA	08 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1.41 ± 0.30 ± 0.22	<sup>1</sup> AUBERT	08B BABR	Repl. by LEES 15C
3.4 ± 0.8 ± 0.5	<sup>1</sup> CHISTOV	04 BELL	Repl. by BRODZICKA 08
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ .			

$\Gamma(\psi(3770)K^+, \psi \rightarrow D^+ D^-)/\Gamma_{\text{total}}$   $\Gamma_{318}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>0.94 ± 0.35 OUR AVERAGE</b>			
0.84 ± 0.32 ± 0.21	<sup>1</sup> AUBERT	08B BABR	$e^+e^- \rightarrow \Upsilon(4S)$
1.4 ± 0.8 ± 0.2	<sup>1</sup> CHISTOV	04 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ .			

$\Gamma(\psi(3770)K^+, \psi \rightarrow p\bar{p})/\Gamma_{\text{total}}$   $\Gamma_{319}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 2 × 10<sup>-7</sup></b>	95	<sup>1</sup> AAIJ	17AD LHCb	$pp$ at 7 and 8 TeV
<sup>1</sup> Measured relative to $B^+ \rightarrow J/\psi K^+$ decay with charmonia reconstructed in $p\bar{p}$ final state and using $B(B^+ \rightarrow J/\psi K^+) \times B(J/\psi \rightarrow p\bar{p}) = (2.17 \pm 0.08) \times 10^{-6}$ .				

$\Gamma(\psi(4040)K^+)/\Gamma_{\text{total}}$   $\Gamma_{320}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 1.3 × 10<sup>-4</sup></b>	90	AAIJ	13BC LHCb	$pp$ at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 3.0 × 10 <sup>-3</sup>	90	<sup>1</sup> IWASHITA	14 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> IWASHITA 14 reports $[\Gamma(B^+ \rightarrow \psi(4040)K^+)/\Gamma_{\text{total}}] \times [B(\psi(4040) \rightarrow J/\psi\eta)] < 15.5 \times 10^{-6}$ which we divide by our best value $B(\psi(4040) \rightarrow J/\psi\eta) = 5.2 \times 10^{-3}$ .				

$\Gamma(\psi(4040)K^+, \psi \rightarrow D^+ D^-)/\Gamma(D^- D^+ K^+)$   $\Gamma_{321}/\Gamma_{209}$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b>5.0 ± 1.3 ± 0.4</b>	<sup>1</sup> AAIJ	20AI LHCb	$pp$ at 7, 8, 13 TeV
<sup>1</sup> Measured in Dalitz plot analysis of $B^+ \rightarrow D^- D^+ K^+$ decays.			

$\Gamma(\psi(4160)K^+)/\Gamma_{\text{total}}$   $\Gamma_{322}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>5.1<sup>+1.3+2.5</sup><sub>-1.2-2.4</sub></b>	<sup>1</sup> AAIJ	13BC LHCb	$pp$ at 7, 8 TeV
<sup>1</sup> AAIJ 13BC reports $[\Gamma(B^+ \rightarrow \psi(4160)K^+)/\Gamma_{\text{total}}] \times B(\psi(4160) \rightarrow \mu^+\mu^-) = (3.5^{+0.9}_{-0.8}) \times 10^{-9}$ which we divide by our best value $B(\psi(4160) \rightarrow e^+e^-) = (6.9 \pm 3.3) \times 10^{-6}$ assuming lepton universality. Our first error is their experiment's error and our second error is the systematic error from using our best value.			

$\Gamma(\psi(4160)K^+, \psi \rightarrow \bar{D}^0 D^0)/\Gamma_{\text{total}}$   $\Gamma_{323}/\Gamma$ 

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>0.84 \pm 0.41 \pm 0.33</math></b>	<sup>1</sup> LEES	15c	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\psi(4160)K^+, \psi \rightarrow D^+ D^-)/\Gamma(D^- D^+ K^+)$   $\Gamma_{324}/\Gamma_{209}$ 

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>6.6 \pm 1.5 \pm 1.2</math></b>	<sup>1</sup> AAIJ	20Ai	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> Measured in Dalitz plot analysis of  $B^+ \rightarrow D^- D^+ K^+$  decays.

 $\Gamma(\psi(4415)K^+, \psi \rightarrow D^+ D^-)/\Gamma(D^- D^+ K^+)$   $\Gamma_{325}/\Gamma_{209}$ 

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>9.2 \pm 1.4 \pm 1.5</math></b>	<sup>1</sup> AAIJ	20Ai	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> Measured in Dalitz plot analysis of  $B^+ \rightarrow D^- D^+ K^+$  decays.

 $\Gamma(\chi_{c0}\pi^+, \chi_{c0} \rightarrow \pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{326}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;0.1</math></b>	90	<sup>1</sup> AUBERT	09L	BABR $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<0.3$	90	<sup>1</sup> AUBERT,B	05G	BABR Repl. by AUBERT 09L
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\chi_{c0}K^+)/\Gamma_{\text{total}}$   $\Gamma_{327}/\Gamma$ 

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>1.51^{+0.15}_{-0.13}</math> OUR AVERAGE</b>				

2.0  $\pm 1.3 \pm 0.3 \pm 0.1$  <sup>1,2</sup> LEES 20c BABR  $e^+e^- \rightarrow \Upsilon(4S)$

1.8  $^{+0.6}_{-0.5} \pm 0.6$  <sup>3</sup> CHILIKIN 19 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

1.84  $\pm 0.25 \pm 0.14$  <sup>4,5</sup> LEES 120 BABR  $e^+e^- \rightarrow \Upsilon(4S)$

1.68  $\pm 0.32 \pm 0.16$  <sup>4,6</sup> LEES 120 BABR  $e^+e^- \rightarrow \Upsilon(4S)$

1.8  $\pm 0.8 \pm 0.1$  <sup>7</sup> LEES 11i BABR  $e^+e^- \rightarrow \Upsilon(4S)$

1.23  $^{+0.28}_{-0.25} \pm 0.05$  <sup>4,8</sup> AUBERT 08Ai BABR  $e^+e^- \rightarrow \Upsilon(4S)$

4.3  $\pm 2.0 \pm 0.2$  <sup>9</sup> AUBERT,BE 06M BABR  $e^+e^- \rightarrow \Upsilon(4S)$

1.12  $\pm 0.12^{+0.30}_{-0.20}$  <sup>4</sup> GARMASH 06 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<3.3$  90 <sup>2</sup> KATO 18 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

$<2.7$  95 <sup>10</sup> AAIJ 13s LHCB  $pp$  at 7 TeV

$<5$  90 <sup>4,11</sup> WICHT 08 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

$<1.8$  90 <sup>2</sup> AUBERT 06E BABR  $e^+e^- \rightarrow \Upsilon(4S)$

1.84  $\pm 0.32 \pm 0.31$  <sup>4,12</sup> AUBERT 06O BABR Repl. by LEES 120

$<8.9$  90 <sup>4</sup> AUBERT 05K BABR  $e^+e^- \rightarrow \Upsilon(4S)$

1.39  $\pm 0.49 \pm 0.11$  <sup>13</sup> AUBERT,B 05N BABR Repl. by AUBERT 08Ai

1.96  $\pm 0.35^{+2.00}_{-0.42}$  <sup>4</sup> GARMASH 05 BELL Repl. by GARMASH 06

2.7  $\pm 0.7$  <sup>14</sup> AUBERT 04T BABR Repl. by AUBERT,B 04P

3.0 ±0.8 ±0.3	15	AUBERT,B	04P	BABR	Repl. by AUBERT,B	05N
6.0 <sup>+2.1</sup> <sub>-1.8</sub> ±1.1	16	ABE	02B	BELL	Repl. by GARMASH	05
<4.8	90	17	EDWARDS	01	CLE2	e <sup>+</sup> e <sup>-</sup> → γ(4S)

<sup>1</sup> LEES 20C measurement's last uncertainty is due to the used  $B(B^\pm \rightarrow K^\pm J/\psi)$  value.

<sup>2</sup> Measures absolute branching fractions using a missing-mass technique.

<sup>3</sup> CHILIKIN 19 reports  $[\Gamma(B^+ \rightarrow \chi_{c0} K^+)/\Gamma_{\text{total}}] \times [B(\chi_{c0}(1P) \rightarrow p\bar{p}\pi^+\pi^-)] = (3.7^{+1.2+0.2}_{-1.0-0.3}) \times 10^{-7}$  which we divide by our best value  $B(\chi_{c0}(1P) \rightarrow p\bar{p}\pi^+\pi^-) = (2.1 \pm 0.7) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>4</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>5</sup> Measured in the  $B^+ \rightarrow K^+ K^- K^+$  decay.

<sup>6</sup> Measured in the  $B^+ \rightarrow K^+ K_S^0 K_S^0$  decay.

<sup>7</sup> LEES 11I reports  $[\Gamma(B^+ \rightarrow \chi_{c0} K^+)/\Gamma_{\text{total}}] \times [B(\chi_{c0}(1P) \rightarrow \pi\pi)] = (1.53 \pm 0.66 \pm 0.27) \times 10^{-6}$  which we divide by our best value  $B(\chi_{c0}(1P) \rightarrow \pi\pi) = (8.51 \pm 0.33) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>8</sup> AUBERT 08AI reports  $(0.70 \pm 0.10^{+0.12}_{-0.10}) \times 10^{-6}$  for  $B(B^+ \rightarrow \chi_{c0} K^+) \times B(\chi_{c0} \rightarrow \pi^+\pi^-)$ . We compute  $B(B^+ \rightarrow \chi_{c0} K^+)$  using the PDG value  $B(\chi_{c0} \rightarrow \pi\pi) = (8.51 \pm 0.33) \times 10^{-3}$  and 2/3 for the  $\pi^+\pi^-$  fraction. Our first error is their experiment's error and the second error is systematic error from using our best value.

<sup>9</sup> AUBERT, BE 06M reports  $[\Gamma(B^+ \rightarrow \chi_{c0} K^+)/\Gamma_{\text{total}}] \times [B(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S))] = (6.1 \pm 2.6 \pm 1.1) \times 10^{-6}$  which we divide by our best value  $B(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S)) = (1.40 \pm 0.05) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. The significance of the observed signal is 2.4  $\sigma$ .

<sup>10</sup> AAIJ 13S reports  $[\Gamma(B^+ \rightarrow \chi_{c0} K^+)/\Gamma_{\text{total}}] \times [B(\chi_{c0}(1P) \rightarrow p\bar{p})] < 6 \times 10^{-8}$  which we divide by our best value  $B(\chi_{c0}(1P) \rightarrow p\bar{p}) = 2.21 \times 10^{-4}$ .

<sup>11</sup> WICHT 08 reports  $[\Gamma(B^+ \rightarrow \chi_{c0} K^+)/\Gamma_{\text{total}}] \times [B(\chi_{c0}(1P) \rightarrow \gamma\gamma)] < 0.11 \times 10^{-6}$  which we divide by our best value  $B(\chi_{c0}(1P) \rightarrow \gamma\gamma) = 2.04 \times 10^{-4}$ .

<sup>12</sup> Measured in the  $B^+ \rightarrow K^+ K^- K^+$  decay.

<sup>13</sup> AUBERT, B 05N reports  $(0.66 \pm 0.22 \pm 0.08) \times 10^{-6}$  for  $B(B^+ \rightarrow \chi_c^0 K^+) \times B(\chi_c^0 \rightarrow \pi^+\pi^-)$ . We compute  $B(B^+ \rightarrow \chi_c^0 K^+)$  using the PDG value  $B(\chi_c^0 \rightarrow \pi^+\pi^-) = (7.1 \pm 0.6) \times 10^{-3}$  and 2/3 for the  $\pi^+\pi^-$  fraction.

<sup>14</sup> The measurement performed using decay channels  $\chi_{c0} \rightarrow \pi^+\pi^-$  and  $\chi_{c0} \rightarrow K^+K^-$ . The ratio of the branching ratios for these channels is found to be consistent with world average.

<sup>15</sup> AUBERT 04P reports  $B(B^+ \rightarrow \chi_{c0} K^+) \times B(\chi_{c0} \rightarrow \pi^+\pi^-) = (1.5 \pm 0.4 \pm 0.1) \times 10^{-6}$  and used PDG value of  $B(\chi_{c0} \rightarrow \pi\pi) = (7.4 \pm 0.8) \times 10^{-3}$  and Clebsh-Gordan coefficient to compute  $B(B^\pm \rightarrow \chi_{c0} K^+)$ .

<sup>16</sup> ABE 02B measures the ratio of  $B(B^+ \rightarrow \chi_{c0} K^+)/B(B^+ \rightarrow J/\psi(1S) K^+) = 0.60 + 0.21 - 0.18 \pm 0.05 \pm 0.08$ , where the third error is due to the uncertainty in the  $B(\chi_{c0} \rightarrow \pi^+\pi^-)$ , and uses  $B(B^+ \rightarrow J/\psi(1S) K^+) = (10.0 \pm 1.0) \times 10^{-4}$  to obtain the result.

<sup>17</sup> EDWARDS 01 assumes equal production of  $B^0$  and  $B^+$  at the  $\Upsilon(4S)$ . The correlated uncertainties (28.3)% from  $B(J/\psi(1S) \rightarrow \gamma\eta_c)$  in those modes have been accounted for.



$\Gamma(\chi_{c0} K^*(892)^+)/\Gamma_{\text{total}}$   $\Gamma_{328}/\Gamma$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 2.1</b>	90	<sup>1</sup> AUBERT	08BD BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<28.6	90	<sup>1</sup> AUBERT	05K BABR	Repl. by AUBERT 08BD
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ .				

$\Gamma(\chi_{c1}(1P)\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{329}/\Gamma$

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
<b>2.2±0.4±0.3</b>	<sup>1</sup> KUMAR	06 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> Assumes equal production of $B^+$ and $B^0$ at the $\Upsilon(4S)$ .			

$\Gamma(\chi_{c1}(1P)K^+)/\Gamma_{\text{total}}$   $\Gamma_{330}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>4.74± 0.22 OUR AVERAGE</b>			
4.0 ± 0.8 ±0.6 ±0.1	<sup>1,2</sup> LEES	20C BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
9 <sup>+3</sup> / <sub>-2</sub> ±4	<sup>3</sup> CHILIKIN	19 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
5.8 ± 0.9 ±0.5	<sup>1</sup> KATO	18 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
4.94± 0.11±0.33	<sup>4</sup> BHARDWAJ	11 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
4.5 ± 0.1 ±0.3	<sup>5</sup> AUBERT	09B BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
15.5 ± 5.4 ±2.0	<sup>6</sup> ACOSTA	02F CDF	$p\bar{p}$ 1.8 TeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
8.1 ± 1.4 ±0.7	<sup>1</sup> AUBERT	06E BABR	Repl. by LEES 20C
5.1 ± 0.4 ±0.1	<sup>7</sup> AUBERT,BE	06M BABR	Repl. by AUBERT 09B
4.49± 0.19±0.53	<sup>4</sup> SONI	06 BELL	Repl. by BHARDWAJ 11
5.79± 0.26±0.65	<sup>4</sup> AUBERT	05J BABR	Repl. by AUBERT,BE 06M
6.0 ± 0.9 ±0.2	<sup>8</sup> AUBERT	02 BABR	Repl. by AUBERT 05J
9.7 ± 4.0 ±0.9	<sup>4</sup> ALAM	94 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
19 ±13 ±6	<sup>9</sup> ALBRECHT	92E ARG	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Measures absolute branching fractions using a missing-mass technique.  
<sup>2</sup> LEES 20C measurement's last uncertainty is due to the used  $B(B^\pm \rightarrow K^\pm J/\psi)$  value.  
<sup>3</sup> CHILIKIN 19 reports  $[\Gamma(B^+ \rightarrow \chi_{c1}(1P)K^+)/\Gamma_{\text{total}}] \times [B(\chi_{c1}(1P) \rightarrow p\bar{p}\pi^+\pi^-)] = (4.7^{+1.3+0.4}_{-1.2-0.2}) \times 10^{-7}$  which we divide by our best value  $B(\chi_{c1}(1P) \rightarrow p\bar{p}\pi^+\pi^-) = (5.0 \pm 1.9) \times 10^{-4}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.  
<sup>4</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .  
<sup>5</sup> Uses  $\chi_{c1,2} \rightarrow J/\psi\gamma$ . Assumes  $B(\Upsilon(4S) \rightarrow B^+ B^-) = (51.6 \pm 0.6)\%$  and  $B(\Upsilon(4S) \rightarrow B^0 \bar{B}^0) = (48.4 \pm 0.6)\%$ .  
<sup>6</sup> ACOSTA 02F uses as reference of  $B(B \rightarrow J/\psi(1S)K^+) = (10.1 \pm 0.6) \times 10^{-4}$ . The second error includes the systematic error and the uncertainties of the branching ratio.  
<sup>7</sup> AUBERT,BE 06M reports  $[\Gamma(B^+ \rightarrow \chi_{c1}(1P)K^+)/\Gamma_{\text{total}}] \times [B(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S))] = (1.76 \pm 0.07 \pm 0.12) \times 10^{-4}$  which we divide by our best value  $B(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S)) = (34.3 \pm 1.0) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.  
<sup>8</sup> AUBERT 02 reports  $(7.5 \pm 0.9 \pm 0.8) \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow \chi_{c1}(1P)K^+)/\Gamma_{\text{total}}] \times [B(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S))]$  assuming  $B(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S)) = 0.273 \pm 0.016$ , which we rescale to our best value  $B(\chi_{c1}(1P) \rightarrow$

$\gamma J/\psi(1S)) = (34.3 \pm 1.0) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>9</sup> ALBRECHT 92E assumes no  $\chi_{c2}(1P)$  production and  $B(\Upsilon(4S) \rightarrow B^+ B^-) = 50\%$ .

$\Gamma(\chi_{c1}(1P)K^+)/\Gamma(J/\psi(1S)K^+)$   $\Gamma_{330}/\Gamma_{276}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.60±0.07±0.02</b>	<sup>1</sup> AUBERT	02	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> AUBERT 02 reports  $0.75 \pm 0.08 \pm 0.05$  from a measurement of  $[\Gamma(B^+ \rightarrow \chi_{c1}(1P)K^+)/\Gamma(B^+ \rightarrow J/\psi(1S)K^+)] \times [B(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S))]$  assuming  $B(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S)) = 0.273 \pm 0.016$ , which we rescale to our best value  $B(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S)) = (34.3 \pm 1.0) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\chi_{c1}(1P)\pi^+)/\Gamma(\chi_{c1}(1P)K^+)$   $\Gamma_{329}/\Gamma_{330}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.043±0.008±0.003</b>	<sup>1</sup> KUMAR	06	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\chi_{c1}(1P)K^*(892)^+)/\Gamma_{total}$   $\Gamma_{331}/\Gamma$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>3.0 ± 0.6</b>	<b>OUR AVERAGE</b>	Error includes scale factor of 1.1.		

2.6 ± 0.5 ± 0.4 <sup>1</sup> AUBERT 09B BABR  $e^+e^- \rightarrow \Upsilon(4S)$

4.05 ± 0.59 ± 0.95 <sup>2</sup> SONI 06 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

2.94 ± 0.95 ± 0.98 <sup>2</sup> AUBERT 05J BABR Repl. by AUBERT 09B

<21 90 <sup>2</sup> ALAM 94 CLE2  $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses  $\chi_{c1,2} \rightarrow J/\psi\gamma$ . Assumes  $B(\Upsilon(4S) \rightarrow B^+ B^-) = (51.6 \pm 0.6)\%$  and  $B(\Upsilon(4S) \rightarrow B^0 \bar{B}^0) = (48.4 \pm 0.6)\%$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\chi_{c1}(1P)K^*(892)^+)/\Gamma(\chi_{c1}(1P)K^+)$   $\Gamma_{331}/\Gamma_{330}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.51±0.17±0.16</b>	AUBERT	05J	BABR $e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\chi_{c1}(1P)K^0\pi^+)/\Gamma_{total}$   $\Gamma_{332}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>5.75±0.26±0.32</b>	<sup>1</sup> BHARDWAJ	16	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\chi_{c1}(1P)K^0\pi^+)/\Gamma(J/\psi(1S)K^0\pi^+)$   $\Gamma_{332}/\Gamma_{277}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.503±0.030±0.014</b>	<sup>1</sup> LEES	12B	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> LEES 12B reports  $0.501 \pm 0.024 \pm 0.028$  from a measurement of  $[\Gamma(B^+ \rightarrow \chi_{c1}(1P)K^0\pi^+)/\Gamma(B^+ \rightarrow J/\psi(1S)K^0\pi^+)] \times [B(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S))]$  assuming  $B(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S)) = (34.4 \pm 1.5) \times 10^{-2}$ , which we rescale to our best value  $B(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S)) = (34.3 \pm 1.0) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\chi_{c1}(1P)K^+\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{333}/\Gamma$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>3.29 \pm 0.29 \pm 0.19</math></b>		<sup>1</sup> BHARDWAJ 16	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\chi_{c1}(1P)K^+\pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{334}/\Gamma$

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>3.74 \pm 0.18 \pm 0.24</math></b>		<sup>1</sup> BHARDWAJ 16	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\chi_{c1}(2P)K^+, \chi_{c1}(2P) \rightarrow \pi^+\pi^-\chi_{c1}(1P))/\Gamma_{\text{total}}$   $\Gamma_{335}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 1.1 \times 10^{-5}</math></b>	90	<sup>1,2</sup> BHARDWAJ 16	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> BHARDWAJ 16 analysis fixes mass and width of the  $\chi_{c1}(2P)$  state to 3920 MeV and 20 MeV.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\chi_{c2}K^+)/\Gamma_{\text{total}}$   $\Gamma_{336}/\Gamma$

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>1.11^{+0.36}_{-0.34} \pm 0.09</math></b>		<sup>1</sup> BHARDWAJ 11	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 1.8$	90	<sup>2</sup> AUBERT 09B	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$< 20$	90	<sup>3</sup> AUBERT 06E	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$< 2.9$	90	<sup>1</sup> SONI 06	BELL	Repl. by BHARDWAJ 11
$< 3.0$	90	<sup>1</sup> AUBERT 05K	BABR	Repl. by AUBERT 06E

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Uses  $\chi_{c1,2} \rightarrow J/\psi\gamma$ . Assumes  $B(\Upsilon(4S) \rightarrow B^+B^-) = (51.6 \pm 0.6)\%$  and  $B(\Upsilon(4S) \rightarrow B^0\bar{B}^0) = (48.4 \pm 0.6)\%$ .

<sup>3</sup> Perform measurements of absolute branching fractions using a missing mass technique.

$\Gamma(\chi_{c2}K^+, \chi_{c2} \rightarrow p\bar{p}\pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{337}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 1.9 \times 10^{-7}</math></b>		CHILIKIN 19	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(B^+ \rightarrow \chi_{c2}K^+)/\Gamma_{\text{total}} \times \Gamma(\chi_{c2}(1P) \rightarrow \gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{336}/\Gamma \times \Gamma_{96}^{\chi_{c2}(1P)}/\Gamma_{\chi_{c2}(1P)}$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 0.09</math></b>	90	<sup>1</sup> WICHT 08	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\chi_{c2}K^*(892)^+)/\Gamma_{\text{total}}$   $\Gamma_{338}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 12 \times 10^{-5}</math></b>	90	<sup>1</sup> AUBERT 09B	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<12.7 \times 10^{-5}$	90	<sup>2</sup> SONI	06	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$<1.2 \times 10^{-5}$	90	<sup>2</sup> AUBERT	05K	BABR	Repl. by AUBERT 09B

<sup>1</sup> Uses  $\chi_{c1,2} \rightarrow J/\psi\gamma$ . Assumes  $B(\Upsilon(4S) \rightarrow B^+B^-) = (51.6 \pm 0.6)\%$  and  $B(\Upsilon(4S) \rightarrow B^0\bar{B}^0) = (48.4 \pm 0.6)\%$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

**$\Gamma(\chi_{c2}K^0\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{339}/\Gamma$**

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>1.16 \pm 0.22 \pm 0.12</math></b>	90	<sup>1</sup> BHARDWAJ	16	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

**$\Gamma(\chi_{c2}K^+\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{340}/\Gamma$**

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt;0.62 \times 10^{-4}</math></b>	90	<sup>1</sup> BHARDWAJ	16	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

**$\Gamma(\chi_{c2}K^+\pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{341}/\Gamma$**

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>1.34 \pm 0.17 \pm 0.09</math></b>	90	<sup>1</sup> BHARDWAJ	16	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

**$\Gamma(\chi_{c2}(3930)K^+, \chi_{c2} \rightarrow D^+D^-)/\Gamma(D^-D^+K^+)$   $\Gamma_{342}/\Gamma_{209}$**

<u>VALUE (units <math>10^{-2}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>7.2 \pm 1.2 \pm 0.3</math></b>	90	<sup>1</sup> AAIJ	20A1	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> Measured in Dalitz plot analysis of  $B^+ \rightarrow D^-D^+K^+$  decays.

**$\Gamma(\chi_{c2}(3930)\pi^+, \chi_{c2} \rightarrow \pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{343}/\Gamma$**

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt;0.1</math></b>	90	<sup>1</sup> AUBERT	09L	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

**$\Gamma(h_c(1P)K^+)/\Gamma_{\text{total}}$   $\Gamma_{344}/\Gamma$**

<u>VALUE (units <math>10^{-5}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>3.7^{+1.0+0.8}_{-0.9-0.8}</math></b>	90	CHILIKIN	19	BELL $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<3.8$	90	<sup>1</sup> FANG	06	BELL $e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$  and  $B(h_c \rightarrow \eta_c\gamma) = 50\%$ .

**$\Gamma(h_c(1P)K^+, h_c \rightarrow p\bar{p})/\Gamma_{\text{total}}$   $\Gamma_{345}/\Gamma$**

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt;6.4 \times 10^{-8}</math></b>	95	<sup>1</sup> AAIJ	13S	LHCB $pp$ at 7 TeV

<sup>1</sup> Measured relative to  $B^+ \rightarrow J/\psi K^+$  decay with charmonia reconstructed in  $p\bar{p}$  final state and using  $B(B^+ \rightarrow J/\psi K^+) = (1.013 \pm 0.034) \times 10^{-3}$  and  $B(J/\psi \rightarrow p\bar{p}) = (2.17 \pm 0.07) \times 10^{-3}$ .

$\Gamma(K^0\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{346}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**23.7 ± 0.8 OUR FIT****23.8 ± 0.7 OUR AVERAGE**23.97 ± 0.53 ± 0.71     <sup>1</sup> DUH     13     BELL      $e^+e^- \rightarrow \Upsilon(4S)$ 23.9 ± 1.1 ± 1.0     <sup>1</sup> AUBERT, BE     06C     BABR      $e^+e^- \rightarrow \Upsilon(4S)$ 18.8  $\begin{matrix} + 3.7 \\ - 3.3 \end{matrix}$   $\begin{matrix} + 2.1 \\ - 1.8 \end{matrix}$      <sup>1</sup> BORNHEIM     03     CLE2      $e^+e^- \rightarrow \Upsilon(4S)$ 

● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

22.8  $\begin{matrix} + 0.8 \\ - 0.7 \end{matrix}$  ± 1.3     <sup>1</sup> LIN     07     BELL     Repl. by DUH 1326.0 ± 1.3 ± 1.0     <sup>1</sup> AUBERT, BE     05E     BABR     Repl. by AUBERT, BE 06C22.3 ± 1.7 ± 1.1     <sup>1</sup> AUBERT     04M     BABR     Repl. by AUBERT, BE 05E22.0 ± 1.9 ± 1.1     <sup>1</sup> CHAO     04     BELL     Repl. by LIN 0719.4  $\begin{matrix} + 3.1 \\ - 3.0 \end{matrix}$  ± 1.6     <sup>1</sup> CASEY     02     BELL     Repl. by CHAO 0413.7  $\begin{matrix} + 5.7 \\ - 4.8 \end{matrix}$   $\begin{matrix} + 1.9 \\ - 1.8 \end{matrix}$      <sup>1</sup> ABE     01H     BELL     Repl. by CASEY 0218.2  $\begin{matrix} + 3.3 \\ - 3.0 \end{matrix}$  ± 2.0     <sup>1</sup> AUBERT     01E     BABR     Repl. by AUBERT 04M18.2  $\begin{matrix} + 4.6 \\ - 4.0 \end{matrix}$  ± 1.6     <sup>1</sup> CRONIN-HEN..00     CLE2     Repl. by BORNHEIM 0323  $\begin{matrix} + 11 \\ - 10 \end{matrix}$  ± 3.6     GODANG     98     CLE2     Repl. by CRONIN-HENNESSY 00

&lt; 48     90     ASNER     96     CLE2     Repl. by GODANG 98

< 190     90     ALBRECHT     91B     ARG      $e^+e^- \rightarrow \Upsilon(4S)$ < 100     90     <sup>2</sup> AVERY     89B     CLEO      $e^+e^- \rightarrow \Upsilon(4S)$ < 680     90     AVERY     87     CLEO      $e^+e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>2</sup> AVERY 89B reports  $< 9 \times 10^{-5}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0\bar{B}^0$ . We rescale to 50%.
 $\Gamma(K^+\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{347}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**12.9 ± 0.5 OUR AVERAGE**12.62 ± 0.31 ± 0.56     <sup>1</sup> DUH     13     BELL      $e^+e^- \rightarrow \Upsilon(4S)$ 13.6 ± 0.6 ± 0.7     <sup>1</sup> AUBERT     07BC     BABR      $e^+e^- \rightarrow \Upsilon(4S)$ 12.9  $\begin{matrix} + 2.4 \\ - 2.2 \end{matrix}$   $\begin{matrix} + 1.2 \\ - 1.1 \end{matrix}$      <sup>1</sup> BORNHEIM     03     CLE2      $e^+e^- \rightarrow \Upsilon(4S)$ 

● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

12.4 ± 0.5 ± 0.6     <sup>1</sup> LIN     07A     BELL     Repl. by DUH 1312.0 ± 0.7 ± 0.6     <sup>1</sup> AUBERT     05L     BABR     Repl. by AUBERT 07BC12.0 ± 1.3  $\begin{matrix} + 1.3 \\ - 0.9 \end{matrix}$      <sup>1</sup> CHAO     04     BELL     Repl. by LIN 07A12.8  $\begin{matrix} + 1.2 \\ - 1.1 \end{matrix}$  ± 1.0     <sup>1</sup> AUBERT     03L     BABR     Repl. by AUBERT 05L13.0  $\begin{matrix} + 2.5 \\ - 2.4 \end{matrix}$  ± 1.3     <sup>1</sup> CASEY     02     BELL     Repl. by CHAO 0416.3  $\begin{matrix} + 3.5 \\ - 3.3 \end{matrix}$   $\begin{matrix} + 1.6 \\ - 1.8 \end{matrix}$      <sup>1</sup> ABE     01H     BELL     Repl. by CASEY 0210.8  $\begin{matrix} + 2.1 \\ - 1.9 \end{matrix}$  ± 1.0     <sup>1</sup> AUBERT     01E     BABR     Repl. by AUBERT 03L11.6  $\begin{matrix} + 3.0 \\ - 2.7 \end{matrix}$   $\begin{matrix} + 1.4 \\ - 1.3 \end{matrix}$      <sup>1</sup> CRONIN-HEN..00     CLE2     Repl. by BORNHEIM 03

<16	90	GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00
<14	90	ASNER	96	CLE2	Repl. by GODANG 98

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(K^+\pi^0)/\Gamma(K^0\pi^+)$ $\Gamma_{347}/\Gamma_{346}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.54 \pm 0.03 \pm 0.04</math></b>	LIN	07A	BELL $e^+e^- \rightarrow \Upsilon(4S)$
$2.38^{+0.98+0.39}_{-1.10-0.26}$	ABE	01H	BELL Repl. by LIN 07A

• • • We do not use the following data for averages, fits, limits, etc. • • •

### $\Gamma(\eta' K^+)/\Gamma_{\text{total}}$ $\Gamma_{348}/\Gamma$

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>70.4 \pm 2.5</math> OUR AVERAGE</b>			
$71.5 \pm 1.3 \pm 3.2$	<sup>1</sup> AUBERT	09AV	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$61^{+10}_{-8} \pm 1$	<sup>1,2</sup> WICHT	08	BELL $e^+e^- \rightarrow \Upsilon(4S)$
$69.2 \pm 2.2 \pm 3.7$	<sup>1</sup> SCHUEMANN	06	BELL $e^+e^- \rightarrow \Upsilon(4S)$
$80^{+10}_{-9} \pm 7$	<sup>1</sup> RICHICHI	00	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
$70.0 \pm 1.5 \pm 2.8$	<sup>1</sup> AUBERT	07AE	BABR Repl. by AUBERT 09AV
$68.9 \pm 2.0 \pm 3.2$	<sup>1</sup> AUBERT	05M	BABR Repl. by AUBERT 07AE
$76.9 \pm 3.5 \pm 4.4$	<sup>1</sup> AUBERT	03W	BABR Repl. by AUBERT 05M
$79^{+12}_{-11} \pm 9$	<sup>1</sup> ABE	01M	BELL Repl. by SCHUEMANN 06
$70 \pm 8 \pm 5$	<sup>1</sup> AUBERT	01G	BABR Repl. by AUBERT 03W
$65^{+15}_{-14} \pm 9$	BEHRENS	98	CLE2 Repl. by RICHICHI 00

• • • We do not use the following data for averages, fits, limits, etc. • • •

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> WICHT 08 reports  $[\Gamma(B^+ \rightarrow \eta' K^+)/\Gamma_{\text{total}}] \times [B(\eta'(958) \rightarrow \gamma\gamma)] = (1.40^{+0.16+0.15}_{-0.15-0.12}) \times 10^{-6}$  which we divide by our best value  $B(\eta'(958) \rightarrow \gamma\gamma) = (2.307 \pm 0.033) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

### $\Gamma(\eta' K^*(892)^+)/\Gamma_{\text{total}}$ $\Gamma_{349}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>4.8^{+1.6}_{-1.4} \pm 0.8</math></b>		<sup>1</sup> DEL-AMO-SA..10A	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$4.9^{+1.9}_{-1.7} \pm 0.8$		<sup>1</sup> AUBERT	07E	BABR Repl. by DEL-AMO-SANCHEZ 10A
< 2.9	90	<sup>1</sup> SCHUEMANN	07	BELL $e^+e^- \rightarrow \Upsilon(4S)$
<14	90	<sup>1</sup> AUBERT,B	04D	BABR Repl. by AUBERT 07E
<35	90	<sup>1</sup> RICHICHI	00	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
<13	90	BEHRENS	98	CLE2 Repl. by RICHICHI 00

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\eta' K_0^*(1430)^+)/\Gamma_{\text{total}}$   $\Gamma_{350}/\Gamma$ 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>5.2 \pm 1.9 \pm 1.0</math></b>	<sup>1</sup> DEL-AMO-SA..10A	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\eta' K_2^*(1430)^+)/\Gamma_{\text{total}}$   $\Gamma_{351}/\Gamma$ 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>28.0^{+4.6}_{-4.3} \pm 2.6</math></b>	<sup>1</sup> DEL-AMO-SA..10A	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\eta K^+)/\Gamma_{\text{total}}$   $\Gamma_{352}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>2.4 \pm 0.4</math> OUR AVERAGE</b>		Error includes scale factor of 1.7.		
$2.12 \pm 0.23 \pm 0.11$		<sup>1</sup> HOI	12 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$2.94^{+0.39}_{-0.34} \pm 0.21$		<sup>1</sup> AUBERT	09AV BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$2.2^{+2.8}_{-2.2}$		<sup>1</sup> RICHICHI	00 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$2.21^{+0.48}_{-0.42} \pm 0.01$		<sup>1,2</sup> WICHT	08 BELL	Repl. by HOI 12
$3.7 \pm 0.4 \pm 0.1$		<sup>1</sup> AUBERT	07AE BABR	Repl. by AUBERT 09AV
$1.9 \pm 0.3^{+0.2}_{-0.1}$		<sup>1</sup> CHANG	07B BELL	Repl. by HOI 12
$3.3 \pm 0.6 \pm 0.3$		<sup>1</sup> AUBERT,B	05K BABR	Repl. by AUBERT 07AE
$2.1 \pm 0.6 \pm 0.2$		<sup>1</sup> CHANG	05A BELL	Repl. by CHANG 07B
$3.4 \pm 0.8 \pm 0.2$		<sup>1</sup> AUBERT	04H BABR	Repl. by AUBERT,B 05K
<14	90	BEHRENS	98 CLE2	Repl. by RICHICHI 00

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> WICHT 08 reports  $[\Gamma(B^+ \rightarrow \eta K^+)/\Gamma_{\text{total}}] \times [B(\eta \rightarrow 2\gamma)] = (0.87^{+0.16+0.10}_{-0.15-0.07}) \times 10^{-6}$  which we divide by our best value  $B(\eta \rightarrow 2\gamma) = (39.36 \pm 0.18) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\eta K^*(892)^+)/\Gamma_{\text{total}}$   $\Gamma_{353}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>19.3 \pm 1.6</math> OUR AVERAGE</b>				
$19.3^{+2.0}_{-1.9} \pm 1.5$		<sup>1</sup> WANG	07B BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$18.9 \pm 1.8 \pm 1.3$		<sup>1</sup> AUBERT,B	06H BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$26.4^{+9.6}_{-8.2} \pm 3.3$		<sup>1</sup> RICHICHI	00 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$25.6 \pm 4.0 \pm 2.4$		<sup>1</sup> AUBERT,B	04D BABR	Repl. by AUBERT,B 06H
<30	90	BEHRENS	98 CLE2	Repl. by RICHICHI 00

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\eta K_0^*(1430)^+)/\Gamma_{\text{total}}$   $\Gamma_{354}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>18.2 \pm 2.6 \pm 2.6</math></b>		<sup>1</sup> AUBERT,B	06H BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(\eta K_2^*(1430)^+)/\Gamma_{\text{total}}$   $\Gamma_{355}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>9.1 \pm 2.7 \pm 1.4</math></b>		<sup>1</sup> AUBERT,B	06H BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(\eta(1295) K^+ \times B(\eta(1295) \rightarrow \eta \pi \pi))/\Gamma_{\text{total}}$   $\Gamma_{356}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>2.9^{+0.8}_{-0.7} \pm 0.2</math></b>		<sup>1</sup> AUBERT	08X BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(\eta(1405) K^+ \times B(\eta(1405) \rightarrow \eta \pi \pi))/\Gamma_{\text{total}}$   $\Gamma_{357}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;1.3</math></b>	90	<sup>1</sup> AUBERT	08X BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(\eta(1405) K^+ \times B(\eta(1405) \rightarrow K^* K))/\Gamma_{\text{total}}$   $\Gamma_{358}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;1.2</math></b>	90	<sup>1</sup> AUBERT	08X BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(\eta(1475) K^+ \times B(\eta(1475) \rightarrow K^* K))/\Gamma_{\text{total}}$   $\Gamma_{359}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>13.8^{+1.8+1.0}_{-1.7-0.6}</math></b>		<sup>1</sup> AUBERT	08X BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(f_1(1285) K^+)/\Gamma_{\text{total}}$   $\Gamma_{360}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;2.0</math></b>	90	<sup>1</sup> AUBERT	08X BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(f_1(1420) K^+ \times B(f_1(1420) \rightarrow \eta \pi \pi))/\Gamma_{\text{total}}$   $\Gamma_{361}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;2.9</math></b>	90	<sup>1</sup> AUBERT	08X BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(f_1(1420) K^+ \times B(f_1(1420) \rightarrow K^* K))/\Gamma_{\text{total}}$   $\Gamma_{362}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;4.1</math></b>	90	<sup>1</sup> AUBERT	08X BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .



$\Gamma(\phi(1680)K^+ \times B(\phi(1680) \rightarrow K^*K))/\Gamma_{\text{total}}$   $\Gamma_{363}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;3.4</b>	90	<sup>1</sup> AUBERT	08X BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(f_0(1500)K^+)/\Gamma_{\text{total}}$   $\Gamma_{364}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>3.7 ± 2.2 OUR AVERAGE</b>				
17 ± 4 ± 12		<sup>1</sup> LEES	120 BABR	$e^+e^- \rightarrow \Upsilon(4S)$
20 ± 10 ± 27		<sup>2</sup> LEES	120 BABR	$e^+e^- \rightarrow \Upsilon(4S)$
3.2 <sup>+</sup> <sub>-</sub> 2.2 <sup>+</sup> <sub>-</sub> ± 0.2		<sup>3,4</sup> AUBERT	08AI BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<19                      90                      <sup>4,5</sup> AUBERT,B                      05N BABR                      Repl. by AUBERT 08AI

<sup>1</sup> Measured in the  $B^+ \rightarrow K^+K^-K^+$  decay.

<sup>2</sup> Measured in the  $B^+ \rightarrow K^+K_S^0K_S^0$  decay.

<sup>3</sup> AUBERT 08AI reports  $B(B^+ \rightarrow f_0(1500)K^+) \cdot B(f_0(1500) \rightarrow \pi^+\pi^-) = (0.73 \pm 0.21^{+0.47}_{-0.48}) \times 10^{-6}$ . We divide this result by our best value of  $B(f_0(1500) \rightarrow \pi\pi) = (34.5 \pm 2.2) \times 10^{-2}$  multiplied by 2/3 to account for the  $\pi^+\pi^-$  fraction. Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using our best value.

<sup>4</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>5</sup> AUBERT,B 05N reports  $B(B^+ \rightarrow f_0(1500)K^+) \cdot B(f_0(1500) \rightarrow \pi^+\pi^-) < 4.4 \times 10^{-6}$ . We divide this result by our best value of  $B(f_0(1500) \rightarrow \pi\pi) = (34.5 \pm 2.2) \times 10^{-2}$  multiplied by 2/3 to account for the  $\pi^+\pi^-$  fraction. Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using our best value.

 $\Gamma(\omega K^+)/\Gamma_{\text{total}}$   $\Gamma_{365}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>6.5 ± 0.4 OUR AVERAGE</b>				
6.8 ± 0.4 ± 0.4		<sup>1</sup> CHOBANOVA	14 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
6.3 ± 0.5 ± 0.3		<sup>1</sup> AUBERT	07AE BABR	$e^+e^- \rightarrow \Upsilon(4S)$
3.2 <sup>+</sup> <sub>-</sub> 2.4 <sup>+</sup> <sub>-</sub> ± 0.8		<sup>1</sup> JESSOP	00 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

6.1 ± 0.6 ± 0.4                      <sup>1</sup> AUBERT,B                      06E BABR                      AUBERT 07AE

8.1 ± 0.6 ± 0.6                      <sup>1</sup> JEN                      06 BELL                      Repl. by CHOBANOVA 14

4.8 ± 0.8 ± 0.4                      <sup>1</sup> AUBERT                      04H BABR                      Repl. by AUBERT,B 06E

6.5<sup>+</sup><sub>-</sub> 1.3<sup>+</sup><sub>-</sub> ± 0.6                      <sup>1</sup> WANG                      04A BELL                      Repl. by JEN 06

9.2<sup>+</sup><sub>-</sub> 2.6<sup>+</sup><sub>-</sub> ± 1.0                      <sup>1</sup> LU                      02 BELL                      Repl. by WANG 04A

<4                      90                      <sup>1</sup> AUBERT                      01G BABR                       $e^+e^- \rightarrow \Upsilon(4S)$

1.5<sup>+</sup><sub>-</sub> 7 ± 2                      <sup>1</sup> BERGFELD                      98 CLE2                      Repl. by JESSOP 00

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\omega K^*(892)^+)/\Gamma_{\text{total}}$   $\Gamma_{366}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 7.4</b>	90	<sup>1</sup> AUBERT	09H BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 3.4	90	<sup>1</sup> AUBERT,B	06T BABR	Repl. by AUBERT 09H
< 7.4	90	<sup>1</sup> AUBERT	05O BABR	Repl. by AUBERT,B 06T
<87	90	<sup>1</sup> BERGFELD	98 CLE2	

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(\omega(K\pi)_0^{*+})/\Gamma_{\text{total}}$   $\Gamma_{367}/\Gamma$  $(K\pi)_0^{*+}$  is the total S-wave composed of  $K_0^*(1430)$  and nonresonant that are described using LASS shape.

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b>27.5 ± 3.0 ± 2.6</b>	<sup>1</sup> AUBERT	09H BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(\omega K_0^*(1430)^+)/\Gamma_{\text{total}}$   $\Gamma_{368}/\Gamma$ 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b>24.0 ± 2.6 ± 4.4</b>	<sup>1</sup> AUBERT	09H BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(\omega K_2^*(1430)^+)/\Gamma_{\text{total}}$   $\Gamma_{369}/\Gamma$ 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b>21.5 ± 3.6 ± 2.4</b>	<sup>1</sup> AUBERT	09H BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(a_0(980)^0 K^+ \times B(a_0(980)^0 \rightarrow \eta\pi^0))/\Gamma_{\text{total}}$   $\Gamma_{371}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;2.5</b>	90	<sup>1</sup> AUBERT,BE	04 BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of charged and neutral  $B$  mesons from  $\Upsilon(4S)$  decays. $\Gamma(a_0(980)^+ K^0 \times B(a_0(980)^+ \rightarrow \eta\pi^+))/\Gamma_{\text{total}}$   $\Gamma_{370}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;3.9</b>	90	<sup>1</sup> AUBERT,BE	04 BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of charged and neutral  $B$  mesons from  $\Upsilon(4S)$  decays. $\Gamma(K^*(892)^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{372}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>10.1 ± 0.8 OUR AVERAGE</b>				
10.1 ± 1.7 ± 1.0		<sup>1</sup> LEES	17G BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
10.8 ± 0.6 <sup>+1.2</sup> <sub>-1.4</sub>		<sup>2</sup> AUBERT	08AI BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
9.67 ± 0.64 <sup>+0.81</sup> <sub>-0.89</sub>		<sup>2</sup> GARMASH	06 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

13.5 ±1.2 <sup>+0.8</sup> / <sub>-0.9</sub>		<sup>2</sup> AUBERT,B	05N	BABR	Repl. by AUBERT 08AI
9.8 ±0.9 <sup>+1.1</sup> / <sub>-1.2</sub>		<sup>2</sup> GARMASH	05	BELL	Repl. by GARMASH 06
15.5 ±1.8 <sup>+1.5</sup> / <sub>-4.0</sub>		<sup>2,3</sup> AUBERT,B	04P	BABR	Repl. by AUBERT,B 05N
19.4 <sup>+4.2</sup> / <sub>-3.9</sub> <sup>+4.1</sup> / <sub>-7.1</sub>		<sup>4</sup> GARMASH	02	BELL	Repl. by GARMASH 05
<119	90	<sup>5</sup> ABE	00C	SLD	$e^+e^- \rightarrow Z$
< 16	90	<sup>2</sup> JESSOP	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
<390	90	<sup>6</sup> ADAM	96D	DLPH	$e^+e^- \rightarrow Z$
< 41	90	ASNER	96	CLE2	Repl. by JESSOP 00
<480	90	<sup>6</sup> ABREU	95N	DLPH	Sup. by ADAM 96D
<170	90	ALBRECHT	91B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
<150	90	<sup>7</sup> AVERY	89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<260	90	AVERY	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Obtains the result from a Dalitz analysis of  $B^+ \rightarrow K_S^0 \pi^+ \pi^0$  decays. The first error is statistical, the second combines all the systematic uncertainties reported in the paper, including signal modelling.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> AUBERT 04P also report a branching ratio for  $B^+ \rightarrow$  "higher  $K^*$  resonances"  $\pi^+$ ,  $K^* \rightarrow K^+ \pi^-$ ,  $(25.1 \pm 2.0^{+11.0}_{-5.7}) \times 10^{-6}$ .

<sup>4</sup> Uses a reference decay mode  $B^+ \rightarrow \bar{D}^0 \pi^+$  and  $\bar{D}^0 \rightarrow K^+ \pi^-$  with  $B(B^+ \rightarrow \bar{D}^0 \pi^+) \cdot B(\bar{D}^0 \rightarrow K^+ \pi^-) = (20.3 \pm 2.0) \times 10^{-5}$ .

<sup>5</sup> ABE 00C assumes  $B(Z \rightarrow b\bar{b}) = (21.7 \pm 0.1)\%$  and the  $B$  fractions  $f_{B^0} = f_{B^+} = (39.7^{+1.8}_{-2.2})\%$  and  $f_{B_s} = (10.5^{+1.8}_{-2.2})\%$ .

<sup>6</sup> Assumes a  $B^0, B^-$  production fraction of 0.39 and a  $B_s$  production fraction of 0.12.

<sup>7</sup> AVERY 89B reports  $< 1.3 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0 \bar{B}^0$ . We rescale to 50%.

### $\Gamma(K^*(892)^+ \pi^0) / \Gamma_{\text{total}} \quad \Gamma_{373} / \Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**6.8 ± 0.9 OUR AVERAGE**

6.4 ± 0.9 <sup>+0.4</sup>/<sub>-0.5</sub> <sup>1</sup> LEES 17G BABR  $e^+e^- \rightarrow \Upsilon(4S)$

8.2 ± 1.5 ± 1.1 <sup>2</sup> LEES 11I BABR  $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

6.9 ± 2.0 ± 1.3		<sup>2</sup> AUBERT	05X	BABR	Repl. by LEES 11I
<31	90	<sup>2</sup> JESSOP	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
<99	90	ASNER	96	CLE2	Repl. by JESSOP 00

<sup>1</sup> Obtains the result from a Dalitz analysis of  $B^+ \rightarrow K_S^0 \pi^+ \pi^0$  decays. The first error is statistical, the second combines all the systematic uncertainties reported in the paper, including signal modelling.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(K^+ \pi^- \pi^+) / \Gamma(K^+ K^- K^+) \quad \Gamma_{374} / \Gamma_{426}$

VALUE	DOCUMENT ID	TECN	COMMENT
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**1.703 ± 0.011 ± 0.022** AAIJ 20AJ LHCB  $pp$  at 7 and 8 TeV

$\Gamma(K^+ \pi^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{374}/\Gamma$ 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
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**51.0 $\pm$ 2.9 OUR AVERAGE**54.4 $\pm$ 1.1 $\pm$ 4.6 <sup>1</sup> AUBERT 08AI BABR  $e^+ e^- \rightarrow \Upsilon(4S)$ 48.8 $\pm$ 1.1 $\pm$ 3.6 <sup>1</sup> GARMASH 06 BELL  $e^+ e^- \rightarrow \Upsilon(4S)$ 

• • • We do not use the following data for averages, fits, limits, etc. • • •

64.1 $\pm$ 2.4 $\pm$ 4.0 <sup>1</sup> AUBERT,B 05N BABR Repl. by AUBERT 08AI46.6 $\pm$ 2.1 $\pm$ 4.3 <sup>1</sup> GARMASH 05 BELL Repl. by GARMASH 0653.6 $\pm$ 3.1 $\pm$ 5.1 <sup>1</sup> GARMASH 04 BELL Repl. by GARMASH 0559.1 $\pm$ 3.8 $\pm$ 3.2 <sup>2</sup> AUBERT 03M BABR Repl. by AUBERT,B 05N55.6 $\pm$ 5.8 $\pm$ 7.7 <sup>3</sup> GARMASH 02 BELL Repl. by GARMASH 04<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>2</sup> Assumes equal production of  $B^0$  and  $B^+$  at the  $\Upsilon(4S)$ ; charm and charmonium contributions are subtracted, otherwise no assumptions about intermediate resonances.<sup>3</sup> Uses a reference decay mode  $B^+ \rightarrow \bar{D}^0 \pi^+$  and  $\bar{D}^0 \rightarrow K^+ \pi^-$  with  $B(B^+ \rightarrow \bar{D}^0 \pi^+) \cdot B(\bar{D}^0 \rightarrow K^+ \pi^-) = (20.3 \pm 2.0) \times 10^{-5}$ . $\Gamma(K^+ \pi^- \pi^+ \text{nonresonant})/\Gamma_{\text{total}}$   $\Gamma_{375}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**16.3 $^{+2.1}_{-1.5}$  OUR AVERAGE**9.3 $\pm$ 1.0 $^{+6.9}_{-1.7}$  <sup>1,2</sup> AUBERT 08AI BABR  $e^+ e^- \rightarrow \Upsilon(4S)$ 16.9 $\pm$ 1.3 $^{+1.7}_{-1.6}$  <sup>1</sup> GARMASH 06 BELL  $e^+ e^- \rightarrow \Upsilon(4S)$ 

• • • We do not use the following data for averages, fits, limits, etc. • • •

2.9 $\pm$ 0.6 $^{+0.8}_{-0.5}$  <sup>1</sup> AUBERT,B 05N BABR Repl. by AUBERT 08AI17.3 $\pm$ 1.7 $^{+17.2}_{-8.0}$  <sup>1</sup> GARMASH 05 BELL Repl. by GARMASH 06< 17 90 <sup>1</sup> AUBERT,B 04P BABR Repl. by AUBERT,B 05N< 330 90 <sup>3</sup> ADAM 96D DLPH  $e^+ e^- \rightarrow Z$ < 28 90 BERGFELD 96B CLE2  $e^+ e^- \rightarrow \Upsilon(4S)$ < 400 90 <sup>3</sup> ABREU 95N DLPH Sup. by ADAM 96D< 330 90 ALBRECHT 91E ARG  $e^+ e^- \rightarrow \Upsilon(4S)$ < 190 90 <sup>4</sup> AVERY 89B CLEO  $e^+ e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>2</sup> Calculate the total nonresonant contribution by combining the S-wave composed of  $K_0^*(1430)$  and nonresonant that are described using LASS shape.<sup>3</sup> Assumes a  $B^0$ ,  $B^-$  production fraction of 0.39 and a  $B_s$  production fraction of 0.12.<sup>4</sup> AVERY 89B reports  $< 1.7 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0 \bar{B}^0$ . We rescale to 50%. $\Gamma(\omega(782)K^+)/\Gamma_{\text{total}}$   $\Gamma_{376}/\Gamma$ 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
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**5.9 $^{+8.8+0.5}_{-9.0-0.4}$**  <sup>1,2</sup> AUBERT 08AI BABR  $e^+ e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>2</sup> AUBERT 08AI reports  $[\Gamma(B^+ \rightarrow \omega(782)K^+)/\Gamma_{\text{total}}] \times [B(\omega(782) \rightarrow \pi^+ \pi^-)] = (0.09 \pm 0.13^{+0.036}_{-0.045}) \times 10^{-6}$  which we divide by our best value  $B(\omega(782) \rightarrow \pi^+ \pi^-)$

$= (1.53_{-0.13}^{+0.11}) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

### $\Gamma(K^+ f_0(980) \times B(f_0(980) \rightarrow \pi^+ \pi^-)) / \Gamma_{\text{total}} \quad \Gamma_{377} / \Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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#### 9.4 $\frac{+1.0}{-1.2}$ OUR AVERAGE

10.3 $\pm 0.5$ $\frac{+2.0}{-1.4}$		1 AUBERT	08AI BABR	$e^+ e^- \rightarrow \gamma(4S)$
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8.78 $\pm 0.82$ $\frac{+0.85}{-1.76}$		1 GARMASH	06 BELL	$e^+ e^- \rightarrow \gamma(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

9.47 $\pm 0.97$ $\frac{+0.62}{-0.88}$		1 AUBERT,B	05N BABR	Repl. by AUBERT 08AI
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7.55 $\pm 1.24$ $\frac{+1.63}{-1.18}$		1 GARMASH	05 BELL	Repl. by GARMASH 06
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9.2 $\pm 1.2$ $\frac{+2.1}{-2.6}$		2 AUBERT,B	04P BABR	Repl. by AUBERT,B 05N
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9.6 $\frac{+2.5}{-2.3}$ $\frac{+3.7}{-1.7}$		3 GARMASH	02 BELL	Repl. by GARMASH 05
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<80	90	4 AVERY	89B CLEO	$e^+ e^- \rightarrow \gamma(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

<sup>2</sup> AUBERT,B 04P also reports  $B(B^+ \rightarrow \text{"higher } f^0 \text{ resonances"} \pi^+, f(980)^0 \rightarrow \pi^+ \pi^-)$   
 $= (3.2 \pm 1.2_{-2.9}^{+6.0}) \times 10^{-6}$ .

<sup>3</sup> Uses a reference decay mode  $B^+ \rightarrow \bar{D}^0 \pi^+$  and  $\bar{D}^0 \rightarrow K^+ \pi^-$  with  $B(B^+ \rightarrow \bar{D}^0 \pi^+) \times B(\bar{D}^0 \rightarrow K^+ \pi^-) = (20.3 \pm 2.0) \times 10^{-5}$ . Only charged pions from the  $f_0(980)$  are used.

<sup>4</sup> AVERY 89B reports  $< 7 \times 10^{-5}$  assuming the  $\gamma(4S)$  decays 43% to  $B^0 \bar{B}^0$ . We rescale to 50%.

### $\Gamma(f_2(1270)^0 K^+) / \Gamma_{\text{total}} \quad \Gamma_{378} / \Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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#### 1.07 $\pm 0.27$ OUR AVERAGE

0.89 $\frac{+0.38}{-0.33}$ $\frac{+0.01}{-0.03}$		1,2 AUBERT	08AI BABR	$e^+ e^- \rightarrow \gamma(4S)$
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1.33 $\pm 0.30$ $\frac{+0.23}{-0.34}$		1 GARMASH	06 BELL	$e^+ e^- \rightarrow \gamma(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<16	90	3 AUBERT,B	05N BABR	Repl. by AUBERT 08AI
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< 2.3	90	4 GARMASH	05 BELL	Repl. by GARMASH 06
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

<sup>2</sup> AUBERT 08AI reports  $(0.50 \pm 0.15_{-0.11}^{+0.15}) \times 10^{-6}$  for  $B(B^+ \rightarrow f_2(1270) K^+) \times B(f_2 \rightarrow \pi^+ \pi^-)$ . We compute  $B(B^+ \rightarrow f_2(1270) K^+)$  using the PDG value  $B(f_2(1270) \rightarrow \pi \pi) = (84.2_{-0.9}^{+2.9}) \times 10^{-2}$  and 2/3 for the  $\pi^+ \pi^-$  fraction. Our first error is their experiment's error and the second error is systematic error from using our best value.

<sup>3</sup> AUBERT,B 05N reports  $8.9 \times 10^{-6}$  at 90% CL for  $B(B^+ \rightarrow f_2(1270) K^+) \times B(f_2(1270) \rightarrow \pi^+ \pi^-)$ . We rescaled it using the PDG value  $B(f_2(1270) \rightarrow \pi \pi) = 84.7\%$  and 2/3 for the  $\pi^+ \pi^-$  fraction.

<sup>4</sup> GARMASH 05 reports  $1.3 \times 10^{-6}$  at 90% CL for  $B(B^+ \rightarrow f_2(1270) K^+) \times B(f_2(1270) \rightarrow \pi^+ \pi^-)$ . We rescaled it using the PDG value  $B(f_2(1270) \rightarrow \pi \pi) = 84.7\%$  and 2/3 for the  $\pi^+ \pi^-$  fraction.

$$\Gamma(f_0(1370)^0 K^+ \times B(f_0(1370)^0 \rightarrow \pi^+ \pi^-))/\Gamma_{\text{total}} \quad \Gamma_{379}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<10.7 \times 10^{-6}$	90	<sup>1</sup> AUBERT,B	05N BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$$\Gamma(\rho^0(1450) K^+ \times B(\rho^0(1450) \rightarrow \pi^+ \pi^-))/\Gamma_{\text{total}} \quad \Gamma_{380}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<11.7 \times 10^{-6}$	90	<sup>1</sup> AUBERT,B	05N BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$$\Gamma(f'_2(1525) K^+ \times B(f'_2(1525) \rightarrow \pi^+ \pi^-))/\Gamma_{\text{total}} \quad \Gamma_{381}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.4 \times 10^{-6}$	90	<sup>1</sup> AUBERT,B	05N BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$$\Gamma(K^+ \rho^0)/\Gamma_{\text{total}} \quad \Gamma_{382}/\Gamma$$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>3.7 ± 0.5 OUR AVERAGE</b>				

3.56 ± 0.45<sup>+0.57</sup><sub>-0.46</sub>      <sup>1</sup> AUBERT      08AI BABR       $e^+ e^- \rightarrow \Upsilon(4S)$

3.89 ± 0.47<sup>+0.43</sup><sub>-0.41</sub>      <sup>1</sup> GARMASH      06 BELL       $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

5.07 ± 0.75<sup>+0.55</sup><sub>-0.88</sub>      <sup>1</sup> AUBERT,B      05N BABR      Repl. by AUBERT 08AI

4.78 ± 0.75<sup>+1.01</sup><sub>-0.97</sub>      <sup>1</sup> GARMASH      05 BELL      Repl. by GARMASH 06

< 6.2      90      <sup>2</sup> AUBERT,B      04P BABR      Repl. by AUBERT,B 05N

< 12      90      <sup>3</sup> GARMASH      02 BELL       $e^+ e^- \rightarrow \Upsilon(4S)$

< 86      90      <sup>4</sup> ABE      00C SLD       $e^+ e^- \rightarrow Z$

< 17      90      <sup>1</sup> JESSOP      00 CLE2       $e^+ e^- \rightarrow \Upsilon(4S)$

<120      90      <sup>5</sup> ADAM      96D DLPH       $e^+ e^- \rightarrow Z$

< 19      90      ASNER      96 CLE2      Repl. by JESSOP 00

<190      90      <sup>5</sup> ABREU      95N DLPH      Sup. by ADAM 96D

<180      90      ALBRECHT      91B ARG       $e^+ e^- \rightarrow \Upsilon(4S)$

< 80      90      <sup>6</sup> AVERY      89B CLEO       $e^+ e^- \rightarrow \Upsilon(4S)$

<260      90      AVERY      87 CLEO       $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> AUBERT 04P reports a central value of  $(3.9 \pm 1.2^{+1.3}_{-3.5}) \times 10^{-6}$  for this branching ratio.

<sup>3</sup> Uses a reference decay mode  $B^+ \rightarrow \bar{D}^0 \pi^+$  and  $\bar{D}^0 \rightarrow K^+ \pi^-$  with  $B(B^+ \rightarrow \bar{D}^0 \pi^+) \cdot B(\bar{D}^0 \rightarrow K^+ \pi^-) = (20.3 \pm 2.0) \times 10^{-5}$ .

<sup>4</sup> ABE 00C assumes  $B(Z \rightarrow b\bar{b}) = (21.7 \pm 0.1)\%$  and the  $B$  fractions  $f_{B^0} = f_{B^+} = (39.7^{+1.8}_{-2.2})\%$  and  $f_{B_s} = (10.5^{+1.8}_{-2.2})\%$ .

<sup>5</sup> Assumes production fractions  $f_{B^0} = f_{B^-} = 0.39$  and  $f_{B_s} = 0.12$ .

<sup>6</sup> AVERY 89B reports  $< 7 \times 10^{-5}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0 \bar{B}^0$ . We rescale to 50%.

$\Gamma(K_0^*(1430)^0 \pi^+) / \Gamma_{\text{total}}$   $\Gamma_{383} / \Gamma$

VALUE (units  $10^{-6}$ )      DOCUMENT ID      TECN      COMMENT

**39  $\pm_{-5}^{+6}$  OUR AVERAGE** Error includes scale factor of 1.4. See the ideogram below.

34.6  $\pm 3.3 \pm 4.6$       <sup>1</sup> LEES      17G      BABR       $e^+ e^- \rightarrow \Upsilon(4S)$

32.0  $\pm 1.2 \pm_{-6.0}^{+10.8}$       <sup>2</sup> AUBERT      08AI      BABR       $e^+ e^- \rightarrow \Upsilon(4S)$

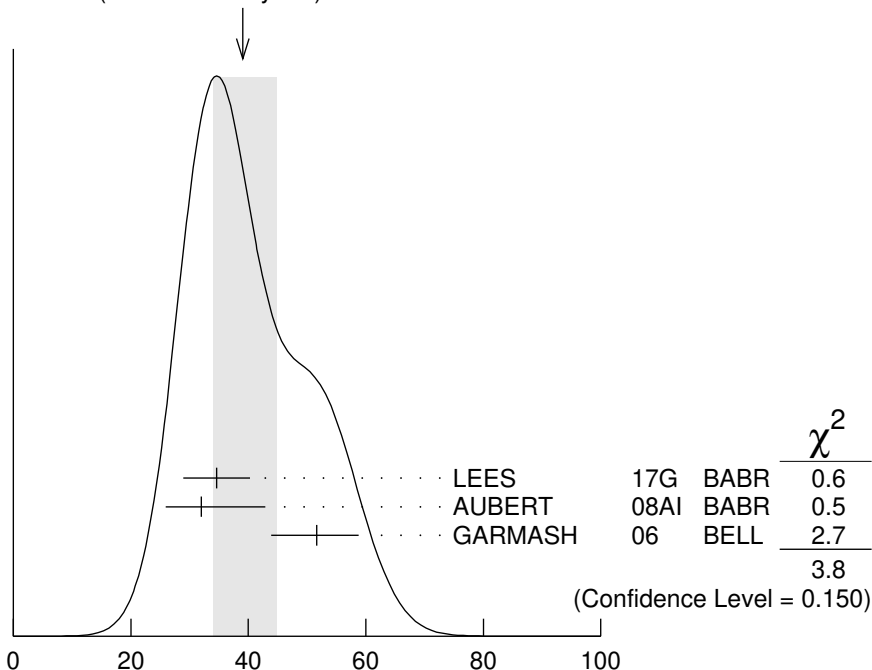
51.6  $\pm 1.7 \pm_{-7.5}^{+7.0}$       <sup>2</sup> GARMASH      06      BELL       $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

44.4  $\pm 2.2 \pm 5.3$       <sup>2,3</sup> AUBERT,B      05N      BABR      Repl. by AUBERT 08AI

45.0  $\pm 2.9 \pm_{-10.7}^{+15.0}$       <sup>2</sup> GARMASH      05      BELL      Repl. by GARMASH 06

WEIGHTED AVERAGE  
39+6-5 (Error scaled by 1.4)



<sup>1</sup> Obtains the result from a Dalitz analysis of  $B^+ \rightarrow K_S^0 \pi^+ \pi^0$  decays. The first error is statistical, the second combines all the systematic uncertainties reported in the paper, including signal modelling.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> See erratum: AUBERT, BE 06A.

$\Gamma(K_0^*(1430)^0 \pi^+) / \Gamma_{\text{total}}$  (units  $10^{-6}$ )

$\Gamma(K_2^*(1430)^0 \pi^+) / \Gamma_{\text{total}}$   $\Gamma_{384} / \Gamma$

VALUE (units  $10^{-6}$ )      CL%      DOCUMENT ID      TECN      COMMENT

**5.6  $\pm_{-1.5}^{+2.2} \pm 0.1$**       <sup>1,2</sup> AUBERT      08AI      BABR       $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 23      90      <sup>3</sup> AUBERT,B      05N      BABR      Repl. by AUBERT 08AI

< 6.9      90      <sup>4</sup> GARMASH      05      BELL       $e^+ e^- \rightarrow \Upsilon(4S)$

<680 90 ALBRECHT 91B ARG  $e^+e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>2</sup> AUBERT 08AI reports  $(1.85 \pm 0.41^{+0.61}_{-0.29}) \times 10^{-6}$  for  $B(B^+ \rightarrow K_2^*(1430)^0 \pi^+) \times B(K_2^*(1430)^0 \rightarrow K^+ \pi^-)$ . We compute  $B(B^+ \rightarrow K_2^*(1430)^0 \pi^+)$  using the PDG value  $B(K_2^*(1430)^0 \rightarrow K \pi) = (49.9 \pm 1.2) \times 10^{-2}$  and 2/3 for the  $K^+ \pi^-$  fraction. Our first error is their experiment's error and the second error is systematic error from using our best value.<sup>3</sup> AUBERT,B 05N reports  $7.7 \times 10^{-6}$  at 90% CL for  $B(B^+ \rightarrow K_2^*(1430)^0 \pi^+) \times B(K_2^*(1430)^0 \rightarrow K^+ \pi^-)$ . We rescaled it using the PDG value  $B(K_2^*(1430)^0 \rightarrow K \pi) = 49.9\%$  and 2/3 for the  $K^+ \pi^-$  fraction.<sup>4</sup> GARMASH 05 reports  $2.3 \times 10^{-6}$  at 90% CL for  $B(B^+ \rightarrow K_2^*(1430)^0 \pi^+) \times B(K_2^*(1430)^0 \rightarrow K^+ \pi^-)$ . We rescaled it using the PDG value  $B(K_2^*(1430)^0 \rightarrow K \pi) = 49.9\%$  and 2/3 for the  $K^+ \pi^-$  mode. **$\Gamma(K^*(1410)^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{385}/\Gamma$** 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**<45** 90 <sup>1</sup> GARMASH 05 BELL  $e^+e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> GARMASH 05 reports  $2.0 \times 10^{-6}$  at 90% CL for  $B(B^+ \rightarrow K^*(1410)^0 \pi^+) \times B(K^*(1410)^0 \rightarrow K^+ \pi^-)$ . We rescaled it using the PDG value  $B(K^*(1410)^0 \rightarrow K \pi) = 6.6\%$  and 2/3 for the  $K^+ \pi^-$  mode. **$\Gamma(K^*(1680)^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{386}/\Gamma$** 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**<12** 90 <sup>1</sup> GARMASH 05 BELL  $e^+e^- \rightarrow \Upsilon(4S)$ 

• • • We do not use the following data for averages, fits, limits, etc. • • •

<15 90 <sup>2</sup> AUBERT,B 05N BABR  $e^+e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> GARMASH 05 reports  $3.1 \times 10^{-6}$  at 90% CL for  $B(B^+ \rightarrow K^*(1680)^0 \pi^+) \times B(K^*(1680)^0 \rightarrow K^+ \pi^-)$ . We rescaled it using the PDG value  $B(K^*(1680)^0 \rightarrow K \pi) = 38.7\%$  and 2/3 for the  $K^+ \pi^-$  mode.<sup>2</sup> AUBERT,B 05N reports  $3.8 \times 10^{-6}$  at 90% CL for  $B(B^+ \rightarrow K^*(1680)^0 \pi^+) \times B(K^*(1680)^0 \rightarrow K^+ \pi^-)$ . We rescaled it using the PDG value  $B(K^*(1680)^0 \rightarrow K \pi) = 38.7\%$  and 2/3 for the  $K^+ \pi^-$  fraction. **$\Gamma(K^+ \pi^0 \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{387}/\Gamma$** 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
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**16.2 ± 1.2 ± 1.5** <sup>1</sup> LEES 11I BABR  $e^+e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . **$\Gamma(f_0(980) K^+ \times B(f_0 \rightarrow \pi^0 \pi^0))/\Gamma_{\text{total}}$   $\Gamma_{388}/\Gamma$** 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
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**2.8 ± 0.6 ± 0.5** <sup>1</sup> LEES 11I BABR  $e^+e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .



$\Gamma(K^- \pi^+ \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{389}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<4.6 \times 10^{-8}$	90	AAIJ	17E LHCB	$p\bar{p}$ at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<9.5 \times 10^{-7}$	90	<sup>1</sup> AUBERT	08BE BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$<4.5 \times 10^{-6}$	90	<sup>1</sup> GARMASH	04 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$<1.8 \times 10^{-6}$	90	<sup>2</sup> AUBERT	03M BABR	Repl. by AUBERT 08BE
$<7.0 \times 10^{-6}$	90	<sup>3</sup> GARMASH	02 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Assumes equal production of  $B^0$  and  $B^+$  at the  $\Upsilon(4S)$ ; charm and charmonium contributions are subtracted, otherwise no assumptions about intermediate resonances.

<sup>3</sup> Uses a reference decay mode  $B^+ \rightarrow \bar{D}^0 \pi^+$  and  $\bar{D}^0 \rightarrow K^+ \pi^-$  with  $B(B^+ \rightarrow \bar{D}^0 \pi^+) \cdot B(\bar{D}^0 \rightarrow K^+ \pi^-) = (20.3 \pm 2.0) \times 10^{-5}$ .

 $\Gamma(K^- \pi^+ \pi^+ \text{nonresonant})/\Gamma_{\text{total}}$   $\Gamma_{390}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$<56$	90	BERGFELD	96B CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

 $\Gamma(K_1(1270)^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{391}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<4.0 \times 10^{-5}$	90	<sup>1</sup> AUBERT	10D BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(K_1(1400)^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{392}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.9 \times 10^{-5}$	90	<sup>1</sup> AUBERT	10D BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<2.6 \times 10^{-3}$	90	ALBRECHT	91B ARG	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(K^0 \pi^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{393}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$31.8 \pm 1.8^{+6.3}_{-2.1}$		<sup>1</sup> LEES	17G BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$<66$	90	<sup>2</sup> ECKHART	02 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Obtains the result from a Dalitz analysis of  $B^+ \rightarrow K_S^0 \pi^+ \pi^0$  decays. The first error is statistical, the second combines all the systematic uncertainties reported in the paper, including signal modelling.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(K^0 \rho^+)/\Gamma_{\text{total}}$   $\Gamma_{395}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$7.3^{+1.0}_{-1.2}$ OUR AVERAGE				
$6.5 \pm 1.1^{+0.8}_{-1.9}$		<sup>1</sup> LEES	17G BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$8.0^{+1.4}_{-1.3} \pm 0.6$		AUBERT	07Z BABR	$e^+e^- \rightarrow \Upsilon(4S)$



$\Gamma(b_1^+ K^0 \times B(b_1^+ \rightarrow \omega\pi^+))/\Gamma_{\text{total}}$   $\Gamma_{400}/\Gamma$ 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>9.6 \pm 1.7 \pm 0.9</math></b>	<sup>1</sup> AUBERT	08AG BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(K^*(892)^0 \rho^+)/\Gamma_{\text{total}}$   $\Gamma_{401}/\Gamma$ 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>9.2 \pm 1.5</math> OUR AVERAGE</b>			
$9.6 \pm 1.7 \pm 1.5$	<sup>1</sup> AUBERT,B	06G BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$8.9 \pm 1.7 \pm 1.2$	<sup>1</sup> ZHANG	05D BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(K_1(1400)^+ \rho^0)/\Gamma_{\text{total}}$   $\Gamma_{402}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 7.8 \times 10^{-4}$	90	ALBRECHT	91B ARG	$e^+e^- \rightarrow \Upsilon(4S)$

 $\Gamma(K_2^*(1430)^+ \rho^0)/\Gamma_{\text{total}}$   $\Gamma_{403}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.5 \times 10^{-3}$	90	ALBRECHT	91B ARG	$e^+e^- \rightarrow \Upsilon(4S)$

 $\Gamma(b_1^0 K^+ \times B(b_1^0 \rightarrow \omega\pi^0))/\Gamma_{\text{total}}$   $\Gamma_{404}/\Gamma$ 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>9.1 \pm 1.7 \pm 1.0</math></b>	<sup>1</sup> AUBERT	07BI BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(b_1^+ K^{*0} \times B(b_1^+ \rightarrow \omega\pi^+))/\Gamma_{\text{total}}$   $\Gamma_{405}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 5.9 \times 10^{-6}$	90	<sup>1</sup> AUBERT	09AF BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(b_1^0 K^{*+} \times B(b_1^0 \rightarrow \omega\pi^0))/\Gamma_{\text{total}}$   $\Gamma_{406}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 6.7 \times 10^{-6}$	90	<sup>1</sup> AUBERT	09AF BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(K^+ \bar{K}^0)/\Gamma_{\text{total}}$   $\Gamma_{407}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>1.31 \pm 0.17</math> OUR FIT</b>		Error includes scale factor of 1.2.		
<b><math>1.19 \pm 0.18</math> OUR AVERAGE</b>				
$1.11 \pm 0.19 \pm 0.05$		<sup>1</sup> DUH	13 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$1.61 \pm 0.44 \pm 0.09$		<sup>1</sup> AUBERT,BE	06c BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.22^{+0.32+0.13}_{-0.28-0.16}$		<sup>1</sup> LIN	07	BELL	Repl. by DUH 13
$1.0 \pm 0.4 \pm 0.1$		<sup>1</sup> ABE	05G	BELL	Repl. by LIN 07
$1.5 \pm 0.5 \pm 0.1$		<sup>1</sup> AUBERT,BE	05E	BABR	Repl. by AUBERT,BE 06C
< 2.5	90	<sup>1</sup> AUBERT	04M	BABR	Repl. by AUBERT,BE 05E
< 3.3	90	<sup>1</sup> CHAO	04	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
< 3.3	90	<sup>1</sup> BORNHEIM	03	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
< 2.0	90	<sup>1</sup> CASEY	02	BELL	Repl. by CHAO 04
< 5.0	90	<sup>1</sup> ABE	01H	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
< 2.4	90	<sup>1</sup> AUBERT	01E	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
< 5.1	90	<sup>1</sup> CRONIN-HEN..00	CLE2		$e^+e^- \rightarrow \Upsilon(4S)$
<21	90	GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(K^+\bar{K}^0)/\Gamma(K^0\pi^+)$   $\Gamma_{407}/\Gamma_{346}$

<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.055±0.007 OUR FIT</b>	Error includes scale factor of 1.2.			
<b>0.064±0.009±0.004</b>		AAIJ	13BS	LHCB $pp$ at 7 TeV

$\Gamma(\bar{K}^0 K^+ \pi^0)/\Gamma_{total}$   $\Gamma_{408}/\Gamma$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;24 × 10<sup>-6</sup></b>	90	<sup>1</sup> ECKHART	02	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(K^+ K_S^0 K_S^0)/\Gamma_{total}$   $\Gamma_{409}/\Gamma$

<u>VALUE (units 10<sup>-6</sup>)</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>10.5 ±0.4 OUR AVERAGE</b>				
10.42±0.43±0.22		<sup>1</sup> KALIYAR	19	BELL $e^+e^- \rightarrow \Upsilon(4S)$
10.6 ±0.5 ±0.3		<sup>1,2</sup> LEES	120	BABR $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

10.7 ±1.2 ±1.0		<sup>1</sup> AUBERT,B	04V	BABR	Repl. by LEES 120
13.4 ±1.9 ±1.5		<sup>1</sup> GARMASH	04	BELL	Repl. by KALIYAR 19

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> All intermediate charmonium and charm resonances are removed, except of  $\chi_{c0}$ .

$\Gamma(f_0(980)K^+, f_0 \rightarrow K_S^0 K_S^0)/\Gamma_{total}$   $\Gamma_{410}/\Gamma$

<u>VALUE (units 10<sup>-6</sup>)</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>14.7±2.8±1.8</b>		<sup>1</sup> LEES	120	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(f_0(1710)K^+, f_0 \rightarrow K_S^0 K_S^0)/\Gamma_{total}$   $\Gamma_{411}/\Gamma$

<u>VALUE (units 10<sup>-6</sup>)</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.48<sup>+0.40</sup><sub>-0.24</sub> ±0.11</b>		<sup>1</sup> LEES	120	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(K^+ K_S^0 K_S^0 \text{nonresonant})/\Gamma_{\text{total}}$   $\Gamma_{412}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>19.8 ± 3.7 ± 2.5</b>		<sup>1</sup> LEES	120 BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(K_S^0 K_S^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{413}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 5.1 × 10<sup>-7</sup></b>	90	<sup>1</sup> AUBERT	09J BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 8.7 × 10 <sup>-7</sup>		<sup>1</sup> KALIYAR	19 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
< 3.2 × 10 <sup>-6</sup>	90	<sup>1</sup> GARMASH	04 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(K^+ K^- \pi^+)/\Gamma(K^+ K^- K^+)$   $\Gamma_{414}/\Gamma_{426}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.151 ± 0.004 ± 0.008</b>	AAIJ	20AJ LHCB	$pp$ at 7 and 8 TeV

 $\Gamma(K^+ K^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{414}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>5.2 ± 0.4 OUR AVERAGE</b>				
5.38 ± 0.40 ± 0.35		<sup>1,2</sup> HSU	17 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
5.0 ± 0.5 ± 0.5		<sup>2</sup> AUBERT	07BB BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 13	90	<sup>2</sup> GARMASH	04 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
< 6.3	90	<sup>2,3</sup> AUBERT	03M BABR	Repl. by AUBERT 07BB
< 12	90	<sup>4</sup> GARMASH	02 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> HSU 17 provides also measurement as a function of  $K^+ K^-$  invariant mass.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> Charm and charmonium contributions are subtracted, otherwise no assumptions about intermediate resonances.

<sup>4</sup> Uses a reference decay mode  $B^+ \rightarrow \bar{D}^0 \pi^+$  and  $\bar{D}^0 \rightarrow K^+ \pi^-$  with  $B(B^+ \rightarrow \bar{D}^0 \pi^+) \cdot B(\bar{D}^0 \rightarrow K^+ \pi^-) = (20.3 \pm 2.0) \times 10^{-5}$ .

 $\Gamma(K^+ K^- \pi^+ \text{nonresonant})/\Gamma_{\text{total}}$   $\Gamma_{415}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>1.68 ± 0.23 ± 0.13</b>		<sup>1</sup> AAIJ	19AL LHCB	$pp$ at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 75	90	BERGFELD	96B CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> AAIJ 19AL reports  $0.323 \pm 0.015 \pm 0.041$  fit fraction for  $B^+ \rightarrow K^+ K^- \pi^+$  nonresonant from the amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays. We use the PDG 19 value  $B(B^+ \rightarrow K^+ K^- \pi^+) = (5.2 \pm 0.4) \times 10^{-6}$  to obtain  $B(B^+ \rightarrow K^+ K^- \pi^+ \text{nonresonant})$ . Our first error is the experiment's error and the second error is systematic error from using our best value.

 $\Gamma(K^+ \bar{K}^*(892)^0)/\Gamma_{\text{total}}$   $\Gamma_{416}/\Gamma$ 

VALUE (units $10^{-7}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>5.9 ± 0.6 ± 0.5</b>		<sup>1</sup> AAIJ	19AL LHCB	$pp$ at 7, 8 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 11	90	<sup>2</sup> AUBERT	07AR BABR	$e^+e^- \rightarrow \Upsilon(4S)$
<1290	90	ABBIENDI	00B OPAL	$e^+e^- \rightarrow Z$
<1380	90	<sup>3</sup> ABE	00C SLD	$e^+e^- \rightarrow Z$
< 53	90	<sup>2</sup> JESSOP	00 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> AAIJ 19AL reports  $(7.5 \pm 0.6 \pm 0.5) \times 10^{-2}$  fit fraction for  $B^+ \rightarrow K^+ \bar{K}^*(892)^0$  from the amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays. We use the PDG 19 value  $B(B^+ \rightarrow K^+ K^- \pi^+) = (5.2 \pm 0.4) \times 10^{-6}$  to obtain  $B(B^+ \rightarrow K^+ \bar{K}^*(892)^0, \bar{K}^*(892)^0 \rightarrow K^+ \pi^-)$ . We compute  $B(B^+ \rightarrow K^+ \bar{K}^*(892)^0)$  using 2/3 of  $B(\bar{K}^*(892)^0 \rightarrow (K\pi)^0) = (99.754 \pm 0.021)\%$  for the  $K^+ \pi^-$  fraction. Our first error is the experiment's error and the second error is systematic error from using our best value.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> ABE 00C assumes  $B(Z \rightarrow b\bar{b}) = (21.7 \pm 0.1)\%$  and the  $B$  fractions  $f_{B^0} = f_{B^+} = (39.7^{+1.8}_{-2.2})\%$  and  $f_{B_s} = (10.5^{+1.8}_{-2.2})\%$ .

### $\Gamma(K^+ \bar{K}_0^*(1430)^0) / \Gamma_{\text{total}}$ $\Gamma_{417} / \Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>0.38 ± 0.12 ± 0.05</b>		<sup>1</sup> AAIJ	19AL LHCB	$pp$ at 7, 8 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

<2.2	90	<sup>2</sup> AUBERT	07AR BABR	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> AAIJ 19AL reports  $(4.5 \pm 0.7 \pm 1.2) \times 10^{-2}$  for fit fraction for  $B^+ \rightarrow K^+ \bar{K}_0^*(1430)^0$  from the amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays. We use the PDG 19 value  $B(B^+ \rightarrow K^+ K^- \pi^+) = (5.2 \pm 0.4) \times 10^{-6}$  to obtain  $B(B^+ \rightarrow K^+ \bar{K}_0^*(1430)^0, \bar{K}_0^*(1430)^0 \rightarrow K^+ \pi^-)$ . We compute  $B(B^+ \rightarrow K^+ \bar{K}_0^*(1430)^0)$  using 2/3 of PDG 19 value  $B(K_0^*(1430)^0 \rightarrow K\pi) = (93 \pm 10)\%$  for the  $K^+ \pi^-$  fraction. Our first error is the experiment's error and the second error is systematic error from using our best value.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(\rho(1450)^0 \pi^+, \rho^0 \rightarrow K^+ K^-) / \Gamma_{\text{total}}$ $\Gamma_{473} / \Gamma$

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.60 ± 0.08 ± 0.12</b>	<sup>1</sup> AAIJ	19AL LHCB	$pp$ at 7, 8 TeV

<sup>1</sup> AAIJ 19AL reports  $0.307 \pm 0.012 \pm 0.009$  fit fraction for  $B^+ \rightarrow \rho(1450)\pi^+$  from the amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays. We use the PDG 19 value  $B(B^+ \rightarrow K^+ K^- \pi^+) = (5.2 \pm 0.4) \times 10^{-6}$  to obtain  $B(B^+ \rightarrow \rho(1450)\pi^+, \rho(1450) \rightarrow K^+ K^-)$ . Our first error is the experiment's error and the second error is systematic error from using our best value.

### $\Gamma(\pi^+(K^+ K^-)_{S\text{-wave}}) / \Gamma_{\text{total}}$ $\Gamma_{418} / \Gamma$

VALUE (units $10^{-7}$ )	DOCUMENT ID	TECN	COMMENT
<b>8.53 ± 0.67 ± 0.66</b>	<sup>1</sup> AAIJ	19AL LHCB	$pp$ at 7, 8 TeV

<sup>1</sup> AAIJ 19AL reports  $0.164 \pm 0.008 \pm 0.01$  fit fraction for  $B^+ \rightarrow \pi^+(K^+ K^-)_{S\text{-wave}}$  in the region of  $0.95 < m(K^+ K^-) < 1.42 \text{ GeV}/c^2$  from the amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays. We use the PDG 19 value  $B(B^+ \rightarrow K^+ K^- \pi^+) = (5.2 \pm 0.4) \times 10^{-6}$  to obtain  $B(B^+ \rightarrow \pi^+(K^+ K^-)_{S\text{-wave}})$ . Our first error is the experiment's error and the second error is systematic error from using our best value.

$\Gamma(K^+ K^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{419}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.1 \times 10^{-8}$	90	AAIJ	17E LHCB	$p\bar{p}$ at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<1.6 \times 10^{-7}$	90	<sup>1</sup> AUBERT	08BE BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$<2.4 \times 10^{-6}$	90	<sup>1</sup> GARMASH	04 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$<1.3 \times 10^{-6}$	90	<sup>2</sup> AUBERT	03M BABR	Repl. by AUBERT 08BE
$<3.2 \times 10^{-6}$	90	<sup>3</sup> GARMASH	02 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Assumes equal production of  $B^0$  and  $B^+$  at the  $\Upsilon(4S)$ ; charm and charmonium contributions are subtracted, otherwise no assumptions about intermediate resonances.

<sup>3</sup> Uses a reference decay mode  $B^+ \rightarrow \bar{D}^0 \pi^+$  and  $\bar{D}^0 \rightarrow K^+ \pi^-$  with  $B(B^+ \rightarrow \bar{D}^0 \pi^+) \cdot B(\bar{D}^0 \rightarrow K^+ \pi^-) = (20.3 \pm 2.0) \times 10^{-5}$ .

 $\Gamma(K^+ K^+ \pi^- \text{ nonresonant})/\Gamma_{\text{total}}$   $\Gamma_{420}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$<87.9$	90	ABBIENDI	00B OPAL	$e^+e^- \rightarrow Z$

 $\Gamma(f'_2(1525) K^+)/\Gamma_{\text{total}}$   $\Gamma_{421}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>1.8 \pm 0.5</math> OUR AVERAGE</b>		Error includes scale factor of 1.1.		
$1.56 \pm 0.36 \pm 0.30$		<sup>1,2</sup> LEES	120 BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$2.8 \pm 0.9^{+0.5}_{-0.4}$		<sup>1,3</sup> LEES	120 BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<8$  90 <sup>1,4</sup> GARMASH 05 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Measured in the  $B^+ \rightarrow K^+ K^- K^+$  decay.

<sup>3</sup> Measured in the  $B^+ \rightarrow K^+ K_S^0 K_S^0$  decay.

<sup>4</sup> GARMASH 05 reports  $B(B^+ \rightarrow f'_2(1525) K^+) \cdot B(f'_2(1525) \rightarrow K^+ K^-) < 4.9 \times 10^{-6}$  at 90% CL. We divide this result by our best value of  $B(f'_2(1525) \rightarrow K \bar{K}) = 87.6 \times 10^{-2}$  multiplied by 2/3 to account for the  $K^+ K^-$  fraction.

 $\Gamma(K^+ f_J(2220))/\Gamma_{\text{total}}$   $\Gamma_{422}/\Gamma$ 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
not seen	<sup>1</sup> HUANG	03 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> No evidence is found for such decay and set a limit on  $B(B^+ \rightarrow f_J(2220)) \times B(f_J(2220) \rightarrow \phi\phi) < 1.2 \times 10^{-6}$  at 90%CL where the  $f_J(2220)$  is a possible glueball state.

 $\Gamma(K^{*+} \pi^+ K^-)/\Gamma_{\text{total}}$   $\Gamma_{423}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$<11.8$	90	<sup>1</sup> AUBERT,B	06U BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(K^*(892)^+ K^*(892)^0)/\Gamma_{\text{total}}$   $\Gamma_{424}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**0.91 ± 0.29 OUR AVERAGE**0.77<sup>+0.35</sup><sub>-0.30</sub> ± 0.121 GOH 15 BELL  $e^+ e^- \rightarrow \gamma(4S)$ 

1.2 ± 0.5 ± 0.1

2 AUBERT 09F BABR  $e^+ e^- \rightarrow \gamma(4S)$ 

• • • We do not use the following data for averages, fits, limits, etc. • • •

&lt;71

90

3 GODANG 02 CLE2  $e^+ e^- \rightarrow \gamma(4S)$ <sup>1</sup> Signal significance is 2.7 standard deviations. This measurement corresponds to an upper limit of  $< 1.31 \times 10^{-6}$  at 90% CL.<sup>2</sup> Signal significance is 3.7 standard deviations.<sup>3</sup> Assumes a helicity 00 configuration. For a helicity 11 configuration, the limit decreases to  $4.8 \times 10^{-5}$ . $\Gamma(K^{*+} K^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{425}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**<6.1**

90

1 AUBERT,B 06U BABR  $e^+ e^- \rightarrow \gamma(4S)$ <sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ . $\Gamma(K^+ K^- K^+)/\Gamma_{\text{total}}$   $\Gamma_{426}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**34.0 ± 1.4 OUR AVERAGE** Error includes scale factor of 1.4.

34.6 ± 0.6 ± 0.9

1,2 LEES 120 BABR  $e^+ e^- \rightarrow \gamma(4S)$ 

30.6 ± 1.2 ± 2.3

1 GARMASH 05 BELL  $e^+ e^- \rightarrow \gamma(4S)$ 

• • • We do not use the following data for averages, fits, limits, etc. • • •

35.2 ± 0.9 ± 1.6

1 AUBERT 060 BABR Repl. by LEES 120

32.8 ± 1.8 ± 2.8

1 GARMASH 04 BELL Repl. by GARMASH 05

29.6 ± 2.1 ± 1.6

3 AUBERT 03M BABR Repl. by AUBERT 060

35.3 ± 3.7 ± 4.5

4 GARMASH 02 BELL Repl. by GARMASH 04

&lt;200

90

5 ADAM 96D DLPH  $e^+ e^- \rightarrow Z$ 

&lt;320

90

5 ABREU 95N DLPH Sup. by ADAM 96D

&lt;350

90

ALBRECHT 91E ARG  $e^+ e^- \rightarrow \gamma(4S)$ <sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .<sup>2</sup> All intermediate charmonium and charm resonances are removed, except of  $\chi_{c0}$ .<sup>3</sup> Assumes equal production of  $B^0$  and  $B^+$  at the  $\gamma(4S)$ ; charm and charmonium contributions are subtracted, otherwise no assumptions about intermediate resonances.<sup>4</sup> Uses a reference decay mode  $B^+ \rightarrow \bar{D}^0 \pi^+$  and  $\bar{D}^0 \rightarrow K^+ \pi^-$  with  $B(B^+ \rightarrow \bar{D}^0 \pi^+) \cdot B(\bar{D}^0 \rightarrow K^+ \pi^-) = (20.3 \pm 2.0) \times 10^{-5}$ .<sup>5</sup> Assumes  $B^0$  and  $B^-$  production fractions of 0.39, and  $B_s$  production fraction of 0.12. $\Gamma(K^+ \phi)/\Gamma_{\text{total}}$   $\Gamma_{427}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**8.8<sup>+0.7</sup><sub>-0.6</sub> OUR AVERAGE** Error includes scale factor of 1.1.9.2 ± 0.4<sup>+0.7</sup><sub>-0.5</sub>1 LEES 120 BABR  $e^+ e^- \rightarrow \gamma(4S)$ 

7.6 ± 1.3 ± 0.6

2 ACOSTA 05J CDF  $p\bar{p}$  at 1.96 TeV9.60 ± 0.92<sup>+1.05</sup><sub>-0.85</sub>1 GARMASH 05 BELL  $e^+ e^- \rightarrow \gamma(4S)$ 5.5<sup>+2.1</sup><sub>-1.8</sub> ± 0.61 BRIERE 01 CLE2  $e^+ e^- \rightarrow \gamma(4S)$



• • • We do not use the following data for averages, fits, limits, etc. • • •

$8.4 \pm 0.7 \pm 0.7$		<sup>1</sup> AUBERT	060	BABR	Repl. by LEES 120
$10.0 \begin{smallmatrix} +0.9 \\ -0.8 \end{smallmatrix} \pm 0.5$		<sup>1</sup> AUBERT	04A	BABR	Repl. by AUBERT 060
$9.4 \pm 1.1 \pm 0.7$		<sup>1</sup> CHEN	03B	BELL	Repl. by GARMASH 05
$14.6 \begin{smallmatrix} +3.0 \\ -2.8 \end{smallmatrix} \pm 2.0$		<sup>3</sup> GARMASH	02	BELL	Repl. by CHEN 03B
$7.7 \begin{smallmatrix} +1.6 \\ -1.4 \end{smallmatrix} \pm 0.8$		<sup>1</sup> AUBERT	01D	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
<144	90	<sup>4</sup> ABE	00C	SLD	$e^+e^- \rightarrow Z$
< 5	90	<sup>1</sup> BERGFELD	98	CLE2	
<280	90	<sup>5</sup> ADAM	96D	DLPH	$e^+e^- \rightarrow Z$
< 12	90	ASNER	96	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
<440	90	<sup>6</sup> ABREU	95N	DLPH	Sup. by ADAM 96D
<180	90	ALBRECHT	91B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
< 90	90	<sup>7</sup> AVERY	89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<210	90	AVERY	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Uses  $B(B^+ \rightarrow J/\psi K^+) = (1.00 \pm 0.04) \times 10^{-3}$  and  $B(J/\psi \rightarrow \mu^+ \mu^-) = 0.0588 \pm 0.0010$ .

<sup>3</sup> Uses a reference decay mode  $B^+ \rightarrow \bar{D}^0 \pi^+$  and  $\bar{D}^0 \rightarrow K^+ \pi^-$  with  $B(B^+ \rightarrow \bar{D}^0 \pi^+) \cdot B(\bar{D}^0 \rightarrow K^+ \pi^-) = (20.3 \pm 2.0) \times 10^{-5}$ .

<sup>4</sup> ABE 00C assumes  $B(Z \rightarrow b\bar{b}) = (21.7 \pm 0.1)\%$  and the  $B$  fractions  $f_{B^0} = f_{B^+} = (39.7 \begin{smallmatrix} +1.8 \\ -2.2 \end{smallmatrix})\%$  and  $f_{B_s} = (10.5 \begin{smallmatrix} +1.8 \\ -2.2 \end{smallmatrix})\%$ .

<sup>5</sup> ADAM 96D assumes  $f_{B^0} = f_{B^-} = 0.39$  and  $f_{B_s} = 0.12$ .

<sup>6</sup> Assumes a  $B^0, B^-$  production fraction of 0.39 and a  $B_s$  production fraction of 0.12.

<sup>7</sup> AVERY 89B reports  $< 8 \times 10^{-5}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0 \bar{B}^0$ . We rescale to 50%.

### $\Gamma(f_0(980) K^+ \times B(f_0(980) \rightarrow K^+ K^-)) / \Gamma_{\text{total}} \quad \Gamma_{428} / \Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>9.4 \pm 1.6 \pm 2.8</math></b>		<sup>1</sup> LEES	120	BABR $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$6.5 \pm 2.5 \pm 1.6$		<sup>1</sup> AUBERT	060	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
<2.9	90	<sup>1</sup> GARMASH	05	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(a_2(1320) K^+ \times B(a_2(1320) \rightarrow K^+ K^-)) / \Gamma_{\text{total}} \quad \Gamma_{429} / \Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 1.1 \times 10^{-6}</math></b>	90	<sup>1</sup> GARMASH	05	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(X_0(1550) K^+ \times B(X_0(1550) \rightarrow K^+ K^-)) / \Gamma_{\text{total}} \quad \Gamma_{430} / \Gamma$

$X_0(1550)$  is a possible spin zero state near 1.55 GeV/c<sup>2</sup> invariant mass of  $K^+ K^-$ .

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>4.3 \pm 0.6 \pm 0.3</math></b>	<sup>1</sup> AUBERT	060	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\phi(1680)K^+ \times B(\phi(1680) \rightarrow K^+K^-))/\Gamma_{\text{total}}$   $\Gamma_{431}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<0.8 \times 10^{-6}$	90	<sup>1</sup> GARMASH 05	BELL	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ . $\Gamma(f_0(1710)K^+ \times B(f_0(1710) \rightarrow K^+K^-))/\Gamma_{\text{total}}$   $\Gamma_{432}/\Gamma$ 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>1.12 \pm 0.25 \pm 0.50</math></b>	<sup>1</sup> LEES 120	BABR	$e^+e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.7 \pm 1.0 \pm 0.3$	<sup>1</sup> AUBERT 060	BABR	Repl. by LEES 120
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ . $\Gamma(K^+K^-K^+ \text{ nonresonant})/\Gamma_{\text{total}}$   $\Gamma_{433}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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 **$23.8^{+2.8}_{-5.0}$  OUR AVERAGE**

$22.8 \pm 2.7 \pm 7.6$	<sup>1</sup> LEES 120	BABR	$e^+e^- \rightarrow \gamma(4S)$
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$24.0 \pm 1.5^{+2.6}_{-6.0}$	<sup>1</sup> GARMASH 05	BELL	$e^+e^- \rightarrow \gamma(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$50.0 \pm 6.0 \pm 4.0$	<sup>1</sup> AUBERT 060	BABR	Repl. by LEES 120
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$<38$	90	BERGFELD 96B	CLE2 $e^+e^- \rightarrow \gamma(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ . $\Gamma(K^*(892)^+K^+K^-)/\Gamma_{\text{total}}$   $\Gamma_{434}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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 **$36.2 \pm 3.3 \pm 3.6$**  <sup>1</sup> AUBERT,B 06U BABR  $e^+e^- \rightarrow \gamma(4S)$ 

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<1600$	90	ALBRECHT 91E	ARG $e^+e^- \rightarrow \gamma(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ . $\Gamma(K^*(892)^+\phi)/\Gamma_{\text{total}}$   $\Gamma_{435}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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 **$10.0 \pm 2.0$  OUR AVERAGE** Error includes scale factor of 1.7.

$11.2 \pm 1.0 \pm 0.9$	<sup>1</sup> AUBERT 07BA	BABR	$e^+e^- \rightarrow \gamma(4S)$
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$6.7^{+2.1+0.7}_{-1.9-1.0}$	<sup>1</sup> CHEN 03B	BELL	$e^+e^- \rightarrow \gamma(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$12.7^{+2.2}_{-2.0} \pm 1.1$	<sup>1</sup> AUBERT 03V	BABR	Repl. by AUBERT 07BA
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$9.7^{+4.2}_{-3.4} \pm 1.7$	<sup>1</sup> AUBERT 01D	BABR	Repl. by AUBERT 03V
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$< 22.5$	90	<sup>1</sup> BRIERE 01	CLE2 $e^+e^- \rightarrow \gamma(4S)$
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$< 41$	90	<sup>1</sup> BERGFELD 98	CLE2
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$< 70$	90	ASNER 96	CLE2 $e^+e^- \rightarrow \gamma(4S)$
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$<1300$	90	ALBRECHT 91B	ARG $e^+e^- \rightarrow \gamma(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

$\Gamma(\phi(K\pi)_0^{*+})/\Gamma_{\text{total}}$   $\Gamma_{436}/\Gamma$ 

$(K\pi)_0^{*+}$  is the total S-wave composed of  $K_0^*(1430)$  and nonresonant that are described using LASS shape.

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>8.3 \pm 1.4 \pm 0.8</math></b>	<sup>1</sup> AUBERT	08BI BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\phi K_1(1270)^+)/\Gamma_{\text{total}}$   $\Gamma_{437}/\Gamma$ 

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>6.1 \pm 1.6 \pm 1.1</math></b>	<sup>1</sup> AUBERT	08BI BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\phi K_1(1400)^+)/\Gamma_{\text{total}}$   $\Gamma_{438}/\Gamma$ 

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt; 3.2</math></b>	90	<sup>1</sup> AUBERT	08BI BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 1100$	90	ALBRECHT	91B ARG	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\phi K^*(1410)^+)/\Gamma_{\text{total}}$   $\Gamma_{439}/\Gamma$ 

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt; 4.3</math></b>	90	<sup>1</sup> AUBERT	08BI BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\phi K_0^*(1430)^+)/\Gamma_{\text{total}}$   $\Gamma_{440}/\Gamma$ 

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>7.0 \pm 1.3 \pm 0.9</math></b>	<sup>1</sup> AUBERT	08BI BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\phi K_2^*(1430)^+)/\Gamma_{\text{total}}$   $\Gamma_{441}/\Gamma$ 

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>8.4 \pm 1.8 \pm 1.0</math></b>		<sup>1</sup> AUBERT	08BI BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 3400$	90	ALBRECHT	91B ARG	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\phi K_2^*(1770)^+)/\Gamma_{\text{total}}$   $\Gamma_{442}/\Gamma$ 

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt; 15.0</math></b>	90	<sup>1</sup> AUBERT	08BI BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\phi K_2^*(1820)^+)/\Gamma_{\text{total}}$   $\Gamma_{443}/\Gamma$ 

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt; 16.3</math></b>	90	<sup>1</sup> AUBERT	08BI BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(a_1^+ K^{*0})/\Gamma_{\text{total}}$   $\Gamma_{444}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;3.6</b>	90	1,2 DEL-AMO-SA..10I	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes  $B(a_1^\pm \rightarrow \pi^\pm \pi^\mp \pi^\pm) = 0.5$

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(K^+ \phi\phi)/\Gamma_{\text{total}}$   $\Gamma_{445}/\Gamma$

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b>4.2 ± 0.8 OUR AVERAGE</b>	Error includes scale factor of 2.2. See the ideogram below.		

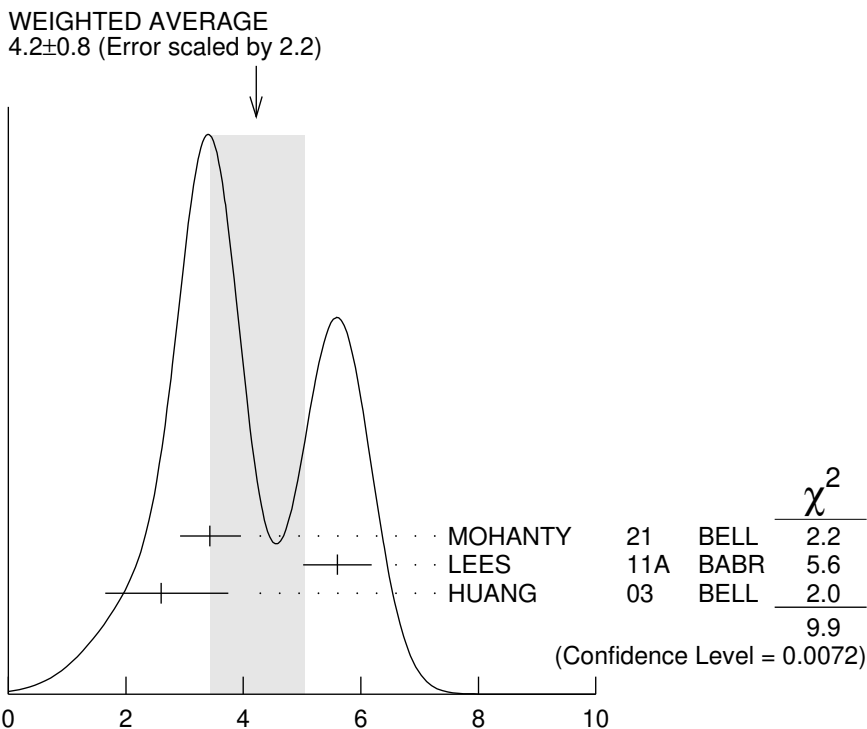
3.43<sup>+0.48</sup><sub>-0.46</sub> ± 0.22 <sup>1</sup> MOHANTY 21 BELL  $e^+ e^- \rightarrow \Upsilon(4S)$

5.6 ± 0.5 ± 0.3 <sup>1</sup> LEES 11A BABR  $e^+ e^- \rightarrow \Upsilon(4S)$

2.6<sup>+1.1</sup><sub>-0.9</sub> ± 0.3 <sup>1</sup> HUANG 03 BELL  $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

7.5 ± 1.0 ± 0.7 <sup>1</sup> AUBERT, BE 06H BABR Repl. by LEES 11A



<sup>1</sup> Assumes equal production of  $B^0$  and  $B^+$  at the  $\Upsilon(4S)$  and the  $\phi\phi$  invariant mass below 2.85 GeV/ $c^2$ .

$\Gamma(K^+ \phi\phi)/\Gamma_{\text{total}}$  (units  $10^{-6}$ )

$\Gamma(\eta' \eta' K^+)/\Gamma_{\text{total}}$   $\Gamma_{446}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;25</b>	90	<sup>1</sup> AUBERT, B 06P	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\omega\phi K^+)/\Gamma_{\text{total}}$   $\Gamma_{447}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;1.9</b>	90	<sup>1</sup> LIU	09 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(X(1812)K^+ \times B(X \rightarrow \omega\phi))/\Gamma_{\text{total}}$   $\Gamma_{448}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.32</b>	90	<sup>1</sup> LIU	09 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(K^*(892)^+\gamma)/\Gamma_{\text{total}}$   $\Gamma_{449}/\Gamma$ 

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>3.92 \pm 0.22</math> OUR AVERAGE</b>		Error includes scale factor of 1.7.		
$3.76 \pm 0.10 \pm 0.12$		<sup>1</sup> HORIGUCHI	17 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$4.22 \pm 0.14 \pm 0.16$		<sup>2</sup> AUBERT	09AO BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$3.76^{+0.89}_{-0.83} \pm 0.28$		<sup>3</sup> COAN	00 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$3.87 \pm 0.28 \pm 0.26$		<sup>4</sup> AUBERT, BE	04A BABR	Repl. by AUBERT 09AO
$4.25 \pm 0.31 \pm 0.24$		<sup>3</sup> NAKAO	04 BELL	Repl. by HORIGUCHI 17
$3.83 \pm 0.62 \pm 0.22$		<sup>3</sup> AUBERT	02C BABR	Repl. by AUBERT, BE 04A
$5.7 \pm 3.1 \pm 1.1$		<sup>5</sup> AMMAR	93 CLE2	Repl. by COAN 00
< 55	90	<sup>6</sup> ALBRECHT	89G ARG	$e^+e^- \rightarrow \Upsilon(4S)$
< 55	90	<sup>6</sup> AVERY	89B CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
< 180	90	AVERY	87 CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+B^-) = (51.4 \pm 0.6)\%$  and  $B(\Upsilon(4S) \rightarrow B^0\bar{B}^0) = (48.6 \pm 0.6)\%$ .

<sup>2</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+B^-) = (51.6 \pm 0.6)\%$  and  $B(\Upsilon(4S) \rightarrow B^0\bar{B}^0) = (48.4 \pm 0.6)\%$ .

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>4</sup> Uses the production ratio of charged and neutral B from  $\Upsilon(4S)$  decays  $R^{+/0} = 1.006 \pm 0.048$ .

<sup>5</sup> AMMAR 93 observed  $4.1 \pm 2.3$  events above background.

<sup>6</sup> Assumes the  $\Upsilon(4S)$  decays 43% to  $B^0\bar{B}^0$ .

 $\Gamma(K_1(1270)^+\gamma)/\Gamma_{\text{total}}$   $\Gamma_{450}/\Gamma$ 

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>4.4^{+0.7}_{-0.6}</math> OUR AVERAGE</b>				

$4.41^{+0.63}_{-0.44} \pm 0.58$  <sup>1,2</sup> DEL-AMO-SA..16 BABR  $e^+e^- \rightarrow \Upsilon(4S)$

$4.3 \pm 0.9 \pm 0.9$  <sup>3</sup> YANG 05 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 9.9	90	<sup>3</sup> NISHIDA	02 BELL	Repl. by YANG 05
< 730	90	<sup>4</sup> ALBRECHT	89G ARG	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Requires  $M_{K\pi\pi} < 1.8 \text{ GeV}/c^2$ .

<sup>2</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+B^-) = 0.513 \pm 0.006$ .

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>4</sup> ALBRECHT 89G reports  $< 0.0066$  assuming the  $\Upsilon(4S)$  decays 45% to  $B^0\bar{B}^0$ . We rescale to 50%.

$\Gamma(\eta K^+ \gamma)/\Gamma_{\text{total}}$   $\Gamma_{451}/\Gamma$ 

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**7.9 $\pm$ 0.9 OUR AVERAGE**7.7 $\pm$ 1.0 $\pm$ 0.4      1,2 AUBERT      09 BABR       $e^+e^- \rightarrow \Upsilon(4S)$ 8.4 $\pm$ 1.5 $^{+1.2}_{-0.9}$       2,3 NISHIDA      05 BELL       $e^+e^- \rightarrow \Upsilon(4S)$ 

• • • We do not use the following data for averages, fits, limits, etc. • • •

10.0 $\pm$ 1.3 $\pm$ 0.5      1,2 AUBERT,B      06M BABR      Repl. by AUBERT 09<sup>1</sup>  $m_{\eta K} < 3.25 \text{ GeV}/c^2$ .<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>3</sup>  $m_{\eta K} < 2.4 \text{ GeV}/c^2$  $\Gamma(\eta' K^+ \gamma)/\Gamma_{\text{total}}$   $\Gamma_{452}/\Gamma$ 

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**2.9 $^{+1.0}_{-0.9}$  OUR AVERAGE**3.6 $\pm$ 1.2 $\pm$ 0.4      1,2 WEDD      10 BELL       $e^+e^- \rightarrow \Upsilon(4S)$ 1.9 $^{+1.5}_{-1.2}$  $\pm$ 0.1      1,3 AUBERT,B      06M BABR       $e^+e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>2</sup>  $m_{\eta' K} < 3.4 \text{ GeV}/c^2$ .<sup>3</sup> Set the upper limit of  $4.2 \times 10^{-6}$  at 90% CL with  $m_{\eta' K} < 3.25 \text{ GeV}/c^2$ . $\Gamma(\phi K^+ \gamma)/\Gamma_{\text{total}}$   $\Gamma_{453}/\Gamma$ 

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**2.7  $\pm$ 0.4 OUR AVERAGE** Error includes scale factor of 1.2.2.48 $\pm$ 0.30 $\pm$ 0.24      1 SAHOO      11A BELL       $e^+e^- \rightarrow \Upsilon(4S)$ 3.5  $\pm$ 0.6  $\pm$ 0.4      1 AUBERT      07Q BABR       $e^+e^- \rightarrow \Upsilon(4S)$ 

• • • We do not use the following data for averages, fits, limits, etc. • • •

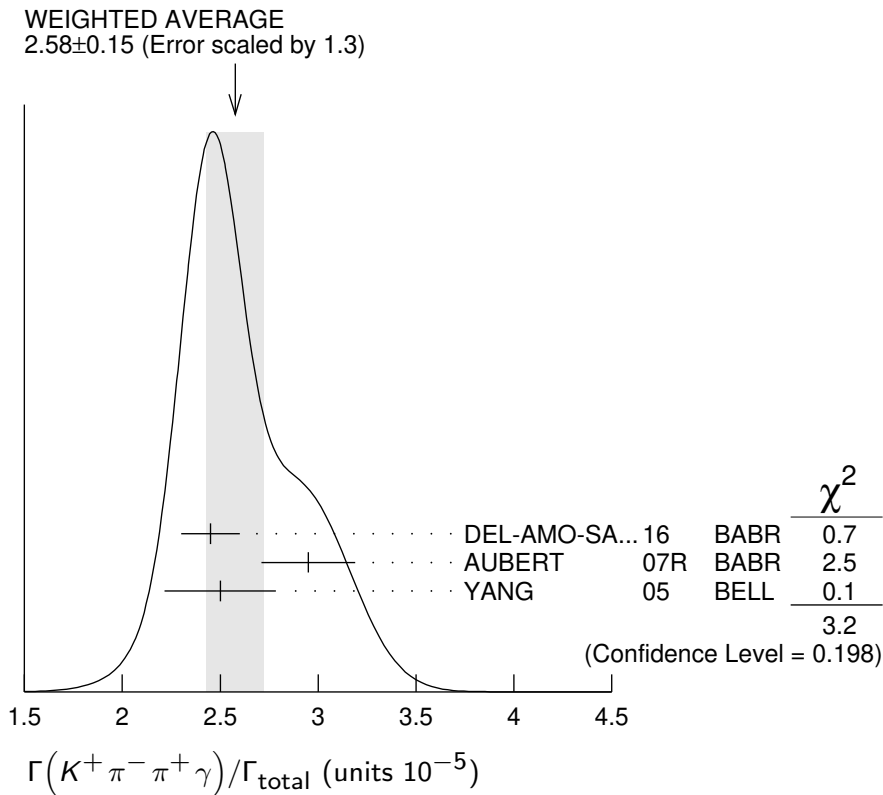
3.4  $\pm$ 0.9  $\pm$ 0.4      1 DRUTSKOY      04 BELL      Repl. by SAHOO 11A<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at  $\Upsilon(4S)$ . $\Gamma(K^+ \pi^- \pi^+ \gamma)/\Gamma_{\text{total}}$   $\Gamma_{454}/\Gamma$ 

<u>VALUE (units <math>10^{-5}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**2.58 $\pm$ 0.15 OUR AVERAGE** Error includes scale factor of 1.3. See the ideogram below.2.45 $\pm$ 0.09 $\pm$ 0.12      1,2 DEL-AMO-SA..16      BABR       $e^+e^- \rightarrow \Upsilon(4S)$ 2.95 $\pm$ 0.13 $\pm$ 0.20      1,3 AUBERT      07R BABR       $e^+e^- \rightarrow \Upsilon(4S)$ 2.50 $\pm$ 0.18 $\pm$ 0.22      3,4 YANG      05 BELL       $e^+e^- \rightarrow \Upsilon(4S)$ 

• • • We do not use the following data for averages, fits, limits, etc. • • •

2.4  $\pm$ 0.5  $^{+0.4}_{-0.2}$       3,5 NISHIDA      02 BELL      Repl. by YANG 05<sup>1</sup>  $M_{K\pi\pi} < 1.8 \text{ GeV}/c^2$ .<sup>2</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+ B^-) = 0.513 \pm 0.006$ .<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>4</sup>  $M_{K\pi\pi} < 2.0 \text{ GeV}/c^2$ .<sup>5</sup>  $M_{K\pi\pi} < 2.4 \text{ GeV}/c^2$ .



**$\Gamma(K^*(892)^0 \pi^+ \gamma) / \Gamma_{\text{total}}$**   **$\Gamma_{455} / \Gamma$**

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
<b>2.33±0.12 OUR AVERAGE</b>			
2.34±0.09 <sup>+0.08</sup> <sub>-0.07</sub>	1,2 DEL-AMO-SA..16	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
2.0 <sup>+0.7</sup> <sub>-0.6</sub> ±0.2	3,4 NISHIDA 02	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

- <sup>1</sup> Requires  $M_{K\pi\pi} < 1.8 \text{ GeV}/c^2$ .
- <sup>2</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+ B^-) = 0.513 \pm 0.006$ .
- <sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .
- <sup>4</sup>  $M_{K\pi\pi} < 2.4 \text{ GeV}/c^2$ .

**$\Gamma(K^+ \rho^0 \gamma) / \Gamma_{\text{total}}$**   **$\Gamma_{455} / \Gamma$**

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>8.2±0.4±0.8</b>		1,2 DEL-AMO-SA..16	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
<20	90	3,4 NISHIDA 02	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

- <sup>1</sup> Requires  $M_{K\pi\pi} < 1.8 \text{ GeV}/c^2$ .
- <sup>2</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+ B^-) = 0.513 \pm 0.006$ .
- <sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .
- <sup>4</sup>  $M_{K\pi\pi} < 2.4 \text{ GeV}/c^2$ .

$\Gamma((K^+\pi^-)_{NR}\pi^+\gamma)/\Gamma_{\text{total}}$   $\Gamma_{457}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$9.9 \pm 0.7 \pm 1.5$ $-1.9$		1,2 DEL-AMO-SA..16	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<9.2                      90            3,4 NISHIDA            02    BELL     $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Requires  $M_{K\pi\pi} < 1.8 \text{ GeV}/c^2$ .

<sup>2</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+B^-) = 0.513 \pm 0.006$ .

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>4</sup>  $M_{K\pi\pi} < 2.4 \text{ GeV}/c^2$ .

 $\Gamma(K^0\pi^+\pi^0\gamma)/\Gamma_{\text{total}}$   $\Gamma_{458}/\Gamma$ 

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
$4.56 \pm 0.42 \pm 0.31$	1,2 AUBERT            07R	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup>  $M_{K\pi\pi} < 1.8 \text{ GeV}/c^2$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(K_1(1400)^+\gamma)/\Gamma_{\text{total}}$   $\Gamma_{459}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$9.7 \pm 4.6 \pm 2.9$ $-2.9 - 2.4$		1,2 DEL-AMO-SA..16	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 15                      90            3 YANG            05    BELL     $e^+e^- \rightarrow \Upsilon(4S)$

< 50                      90            3 NISHIDA            02    BELL    Repl. by YANG 05

<2200                    90            4 ALBRECHT        89G    ARG     $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Requires  $M_{K\pi\pi} < 1.8 \text{ GeV}/c^2$ .

<sup>2</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+B^-) = 0.513 \pm 0.006$ .

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>4</sup> ALBRECHT 89G reports  $< 0.0020$  assuming the  $\Upsilon(4S)$  decays 45% to  $B^0\bar{B}^0$ . We rescale to 50%.

 $\Gamma(K^*(1410)^+\gamma)/\Gamma_{\text{total}}$   $\Gamma_{460}/\Gamma$ 

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
$2.71 \pm 0.54 \pm 0.59$ $-0.48 - 0.37$	1,2 DEL-AMO-SA..16	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Requires  $M_{K\pi\pi} < 1.8 \text{ GeV}/c^2$ .

<sup>2</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+B^-) = 0.513 \pm 0.006$ .

 $\Gamma(K_0^*(1430)^0\pi^+\gamma)/\Gamma_{\text{total}}$   $\Gamma_{461}/\Gamma$ 

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
$1.32 \pm 0.09 \pm 0.24$ $-0.10 - 0.30$	1,2 DEL-AMO-SA..16	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Requires  $M_{K\pi\pi} < 1.8 \text{ GeV}/c^2$ .

<sup>2</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+B^-) = 0.513 \pm 0.006$ .



$\Gamma(K_2^*(1430)^+\gamma)/\Gamma_{\text{total}}$   $\Gamma_{462}/\Gamma$ 

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**1.4 ± 0.4 OUR AVERAGE**0.87<sup>+0.70+0.87</sup><sub>-0.53-1.04</sub> 1,2 DEL-AMO-SA..16 BABR  $e^+e^- \rightarrow \Upsilon(4S)$ 1.45 ± 0.40 ± 0.15 3 AUBERT,B 04U BABR  $e^+e^- \rightarrow \Upsilon(4S)$ 

• • • We do not use the following data for averages, fits, limits, etc. • • •

<140 90 4 ALBRECHT 89G ARG  $e^+e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> Requires  $M_{K\pi\pi} < 1.8 \text{ GeV}/c^2$ .<sup>2</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+B^-) = 0.513 \pm 0.006$ .<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>4</sup> ALBRECHT 89G reports  $< 0.0013$  assuming the  $\Upsilon(4S)$  decays 45% to  $B^0\bar{B}^0$ . We rescale to 50%. $\Gamma(K^*(1680)^+\gamma)/\Gamma_{\text{total}}$   $\Gamma_{463}/\Gamma$ 

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**6.67<sup>+0.93+1.44</sup><sub>-0.78-1.14</sub>** 1,2 DEL-AMO-SA..16 BABR  $e^+e^- \rightarrow \Upsilon(4S)$ 

• • • We do not use the following data for averages, fits, limits, etc. • • •

<190 90 3 ALBRECHT 89G ARG  $e^+e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> Requires  $M_{K\pi\pi} < 1.8 \text{ GeV}/c^2$ .<sup>2</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+B^-) = 0.513 \pm 0.006$ .<sup>3</sup> ALBRECHT 89G reports  $< 0.0017$  assuming the  $\Upsilon(4S)$  decays 45% to  $B^0\bar{B}^0$ . We rescale to 50%. $\Gamma(K_3^*(1780)^+\gamma)/\Gamma_{\text{total}}$   $\Gamma_{464}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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< **39** 90 1,2 NISHIDA 05 BELL  $e^+e^- \rightarrow \Upsilon(4S)$ 

• • • We do not use the following data for averages, fits, limits, etc. • • •

<5500 90 3 ALBRECHT 89G ARG  $e^+e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>2</sup> Uses  $B(K_3^*(1780) \rightarrow \eta K) = 0.11^{+0.05}_{-0.04}$ .<sup>3</sup> ALBRECHT 89G reports  $< 0.005$  assuming the  $\Upsilon(4S)$  decays 45% to  $B^0\bar{B}^0$ . We rescale to 50%. $\Gamma(K_4^*(2045)^+\gamma)/\Gamma_{\text{total}}$   $\Gamma_{465}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<**0.0099** 90 1 ALBRECHT 89G ARG  $e^+e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> ALBRECHT 89G reports  $< 0.0090$  assuming the  $\Upsilon(4S)$  decays 45% to  $B^0\bar{B}^0$ . We rescale to 50%. $\Gamma(\rho^+\gamma)/\Gamma_{\text{total}}$   $\Gamma_{466}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**0.98 ± 0.25 OUR AVERAGE**1.20<sup>+0.42</sup><sub>-0.37</sub> ± 0.20 1 AUBERT 08BH BABR  $e^+e^- \rightarrow \Upsilon(4S)$ 0.87<sup>+0.29+0.09</sup><sub>-0.27-0.11</sub> 1 TANIGUCHI 08 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.10^{+0.37}_{-0.33} \pm 0.09$		<sup>1</sup> AUBERT	07L	BABR	Repl. by AUBERT 08BH
$0.55^{+0.42+0.09}_{-0.36-0.08}$		<sup>1</sup> MOHAPATRA	06	BELL	Repl. by TANIGUCHI 08
$0.9^{+0.6}_{-0.5} \pm 0.1$	90	<sup>1</sup> AUBERT	05	BABR	Repl. by AUBERT 07L
< 2.2	90	<sup>1</sup> MOHAPATRA	05	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
< 2.1	90	<sup>1</sup> AUBERT	04C	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
< 13	90	<sup>1,2</sup> COAN	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at  $\Upsilon(4S)$ .

<sup>2</sup> No evidence for a nonresonant  $K\pi\gamma$  contamination was seen; the central value assumes no contamination.

$\Gamma(\pi^+\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{467}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>5.5 ± 0.4</b>	<b>OUR AVERAGE</b>	Error includes scale factor of 1.2.		
$5.86 \pm 0.26 \pm 0.38$		<sup>1</sup> DUH	13	BELL $e^+e^- \rightarrow \Upsilon(4S)$
$5.02 \pm 0.46 \pm 0.29$		<sup>1</sup> AUBERT	07BC	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$4.6^{+1.8+0.6}_{-1.6-0.7}$		<sup>1</sup> BORNHEIM	03	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$6.5 \pm 0.4 \pm 0.4$		<sup>1</sup> LIN	07A	BELL	Repl. by DUH 13
$5.8 \pm 0.6 \pm 0.4$		<sup>1</sup> AUBERT	05L	BABR	Repl. by AUBERT 07BC
$5.0 \pm 1.2 \pm 0.5$		<sup>1</sup> CHAO	04	BELL	Repl. by LIN 07A
$5.5^{+1.0}_{-1.9} \pm 0.6$		<sup>1</sup> AUBERT	03L	BABR	Repl. by AUBERT 05L
$7.4^{+2.3}_{-2.2} \pm 0.9$		<sup>1</sup> CASEY	02	BELL	Repl. by CHAO 04
< 13.4	90	<sup>1</sup> ABE	01H	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
< 9.6	90	<sup>1</sup> AUBERT	01E	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
< 12.7	90	<sup>1</sup> CRONIN-HEN.	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
< 20	90	GODANG	98	CLE2	Repl. by CRONIN-HENNESSY 00
< 17	90	ASNER	96	CLE2	Repl. by GODANG 98
< 240	90	<sup>1</sup> ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
< 2300	90	<sup>2</sup> BEBEK	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> BEBEK 87 assume the  $\Upsilon(4S)$  decays 43% to  $B^0\bar{B}^0$ .

$\Gamma(\pi^+\pi^0)/\Gamma(K^0\pi^+)$   $\Gamma_{467}/\Gamma_{346}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.285 ± 0.02 ± 0.02</b>	LIN	07A	BELL $e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\pi^+\pi^+\pi^-)/\Gamma(K^+K^-K^+)$   $\Gamma_{468}/\Gamma_{426}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.488 ± 0.005 ± 0.009</b>	AAIJ	20AJ	LHCB $pp$ at 7 and 8 TeV

$\Gamma(\pi^+\pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{468}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>15.2 ± 0.6<sup>+1.3</sup><sub>-1.2</sub></b>		<sup>1</sup> AUBERT	09L	BABR $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$16.2 \pm 1.2 \pm 0.9$		<sup>1</sup> AUBERT,B	05G	BABR	Repl. by AUBERT 09L
$10.9 \pm 3.3 \pm 1.6$		<sup>1</sup> AUBERT	03M	BABR	Repl. by AUBERT 05G
<130	90	<sup>2</sup> ADAM	96D	DLPH	$e^+e^- \rightarrow Z$
<220	90	<sup>3</sup> ABREU	95N	DLPH	Sup. by ADAM 96D
<450	90	<sup>4</sup> ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
<190	90	<sup>5</sup> BORTOLETTO89	CLEO	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^0$  and  $B^+$  at the  $\Upsilon(4S)$ ; charm and charmonium contributions are subtracted, otherwise no assumptions about intermediate resonances.

<sup>2</sup> ADAM 96D assumes  $f_{B^0} = f_{B^-} = 0.39$  and  $f_{B_s} = 0.12$ .

<sup>3</sup> Assumes a  $B^0, B^-$  production fraction of 0.39 and a  $B_s$  production fraction of 0.12.

<sup>4</sup> ALBRECHT 90B limit assumes equal production of  $B^0 \bar{B}^0$  and  $B^+ B^-$  at  $\Upsilon(4S)$ .

<sup>5</sup> BORTOLETTO 89 reports  $< 1.7 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0 \bar{B}^0$ . We rescale to 50%.

$\Gamma(\rho^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{469}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>8.3 ± 1.2 OUR AVERAGE</b>				
$8.1 \pm 0.7^{+1.3}_{-1.6}$		<sup>1</sup> AUBERT	09L	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$8.0^{+2.3}_{-2.0} \pm 0.7$		<sup>1</sup> GORDON	02	BELL $e^+e^- \rightarrow \Upsilon(4S)$
$10.4^{+3.3}_{-3.4} \pm 2.1$		<sup>1</sup> JESSOP	00	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$8.8 \pm 1.0^{+0.6}_{-0.9}$		<sup>1</sup> AUBERT,B	05G	BABR	Repl. by AUBERT 09L
$9.5 \pm 1.1 \pm 0.9$		<sup>1</sup> AUBERT	04Z	BABR	Repl. by AUBERT 05G
< 83	90	<sup>2</sup> ABE	00C	SLD	$e^+e^- \rightarrow Z$
<160	90	<sup>3</sup> ADAM	96D	DLPH	$e^+e^- \rightarrow Z$
< 43	90	ASNER	96	CLE2	Repl. by JESSOP 00
<260	90	<sup>4</sup> ABREU	95N	DLPH	Sup. by ADAM 96D
<150	90	<sup>1</sup> ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
<170	90	<sup>5</sup> BORTOLETTO89	CLEO	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<230	90	<sup>5</sup> BEBEK	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<600	90	GILES	84	CLEO	Repl. by BEBEK 87

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> ABE 00C assumes  $B(Z \rightarrow b\bar{b}) = (21.7 \pm 0.1)\%$  and the  $B$  fractions  $f_{B^0} = f_{B^+} = (39.7^{+1.8}_{-2.2})\%$  and  $f_{B_s} = (10.5^{+1.8}_{-2.2})\%$ .

<sup>3</sup> ADAM 96D assumes  $f_{B^0} = f_{B^-} = 0.39$  and  $f_{B_s} = 0.12$ .

<sup>4</sup> Assumes a  $B^0, B^-$  production fraction of 0.39 and a  $B_s$  production fraction of 0.12.

<sup>5</sup> Papers assume the  $\Upsilon(4S)$  decays 43% to  $B^0 \bar{B}^0$ . We rescale to 50%.

$[\Gamma(K^*(892)^0 \pi^+) + \Gamma(\rho^0 \pi^+)]/\Gamma_{\text{total}}$   $(\Gamma_{372} + \Gamma_{469})/\Gamma$

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
$170^{+120}_{-80} \pm 20$	<sup>1</sup> ADAM	96D	DLPH $e^+e^- \rightarrow Z$

<sup>1</sup> ADAM 96D assumes  $f_{B^0} = f_{B^-} = 0.39$  and  $f_{B_s} = 0.12$ .

$\Gamma(\pi^+ f_0(980), f_0 \rightarrow \pi^+ \pi^-) / \Gamma_{\text{total}}$   $\Gamma_{470} / \Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 1.5</b>	90	<sup>1</sup> AUBERT	09L BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
< 3.0	90	<sup>1</sup> AUBERT,B	05G BABR	Repl. by AUBERT 09L
<140	90	<sup>2</sup> BORTOLETTO89	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>2</sup> BORTOLETTO 89 reports  $< 1.2 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0 \bar{B}^0$ . We rescale to 50%. $\Gamma(\pi^+ f_2(1270)) / \Gamma_{\text{total}}$   $\Gamma_{471} / \Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>2.2 <math>^{+0.7}_{-0.4}</math> OUR AVERAGE</b>				
17.0 $\pm 2.4 \pm 2.1$		<sup>1</sup> AAIJ	19AL LHCb	$pp$ at 7, 8 TeV
1.60 $^{+0.67+0.02}_{-0.44-0.06}$		<sup>2,3</sup> AUBERT	09L BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

4.10 $\pm 1.28$ $^{+0.04}_{-0.14}$		<sup>3,4</sup> AUBERT,B	05G BABR	Repl. by AUBERT 09L
<240	90	<sup>5</sup> BORTOLETTO89	CLEO	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> AAIJ 19AL reports  $0.075 \pm 0.008 \pm 0.007$  fit fraction for  $B^+ \rightarrow f_2(1270) \pi^+$  from the amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays. We use the PDG 19 value  $B(B^+ \rightarrow K^+ K^- \pi^+) = (5.2 \pm 0.4) \times 10^{-6}$  to obtain  $B(B^+ \rightarrow f_2(1270) \pi^+, f_2(1270) \rightarrow K^+ K^-)$ . We compute  $B(B^+ \rightarrow f_2(1270) \pi^+)$  using 1/2 of PDG 19 value of  $B(f_2(1270) \rightarrow K \bar{K}) = (4.6^{+0.5}_{-0.4})\%$  for  $K^+ K^-$  fraction. Our first error is the experiment's error and the second error is systematic error from using our best value.<sup>2</sup> AUBERT 09L reports  $[\Gamma(B^+ \rightarrow \pi^+ f_2(1270)) / \Gamma_{\text{total}}] \times [B(f_2(1270) \rightarrow \pi^+ \pi^-)] = (0.9 \pm 0.2 \pm 0.1)^{+0.3}_{-0.1} \times 10^{-6}$  which we divide by our best value  $B(f_2(1270) \rightarrow \pi^+ \pi^-) = (56.2^{+1.9}_{-0.6}) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>4</sup> AUBERT,B 05G reports  $[\Gamma(B^+ \rightarrow \pi^+ f_2(1270)) / \Gamma_{\text{total}}] \times [B(f_2(1270) \rightarrow \pi^+ \pi^-)] = (2.3 \pm 0.6 \pm 0.4) \times 10^{-6}$  which we divide by our best value  $B(f_2(1270) \rightarrow \pi^+ \pi^-) = (56.2^{+1.9}_{-0.6}) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.<sup>5</sup> BORTOLETTO 89 reports  $< 2.1 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0 \bar{B}^0$ . We rescale to 50%. $\Gamma(\rho(1450)^0 \pi^+, \rho^0 \rightarrow \pi^+ \pi^-) / \Gamma_{\text{total}}$   $\Gamma_{472} / \Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>1.4 <math>\pm 0.4</math> <math>^{+0.5}_{-0.8}</math></b>		<sup>1</sup> AUBERT	09L BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

<2.3	90	<sup>1</sup> AUBERT,B	05G BABR	Repl. by AUBERT 09L
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(f_0(1370)\pi^+, f_0 \rightarrow \pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{474}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt;4.0</b>	90	<sup>1</sup> AUBERT	09L BABR	$e^+e^- \rightarrow \gamma(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<3.0	90	<sup>1</sup> AUBERT,B	05G BABR	Repl. by AUBERT 09L
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

 $\Gamma(f_0(500)\pi^+, f_0 \rightarrow \pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{475}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt;4.1</b>	90	<sup>1</sup> AUBERT,B	05G BABR	$e^+e^- \rightarrow \gamma(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

 $\Gamma(\pi^+\pi^-\pi^+\text{nonresonant})/\Gamma_{\text{total}}$   $\Gamma_{476}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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<b><math>5.3 \pm 0.7^{+1.3}_{-0.8}</math></b>		<sup>1</sup> AUBERT	09L BABR	$e^+e^- \rightarrow \gamma(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 4.6	90	<sup>1</sup> AUBERT,B	05G BABR	Repl. by AUBERT 09L
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<41	90	BERGFELD	96B CLE2	$e^+e^- \rightarrow \gamma(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

 $\Gamma(\pi^+\pi^0\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{477}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt;8.9 <math>\times 10^{-4}</math></b>	90	<sup>1</sup> ALBRECHT	90B ARG	$e^+e^- \rightarrow \gamma(4S)$
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<sup>1</sup> ALBRECHT 90B limit assumes equal production of  $B^0\bar{B}^0$  and  $B^+B^-$  at  $\gamma(4S)$ .

 $\Gamma(\rho^+\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{478}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**10.9  $\pm$  1.4 OUR AVERAGE**

10.2 $\pm$ 1.4 $\pm$ 0.9		<sup>1</sup> AUBERT	07X BABR	$e^+e^- \rightarrow \gamma(4S)$
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13.2 $\pm$ 2.3 $^{+1.4}_{-1.9}$		<sup>1</sup> ZHANG	05A BELL	$e^+e^- \rightarrow \gamma(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

10.9 $\pm$ 1.9 $\pm$ 1.9		<sup>1</sup> AUBERT	04Z BABR	Repl. by AUBERT 07X
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< 43	90	<sup>1,2</sup> JESSOP	00 CLE2	$e^+e^- \rightarrow \gamma(4S)$
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< 77	90	ASNER	96 CLE2	Repl. by JESSOP 00
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<550	90	<sup>1</sup> ALBRECHT	90B ARG	$e^+e^- \rightarrow \gamma(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

<sup>2</sup> Assumes no nonresonant contributions of  $B^+ \rightarrow \pi^+\pi^0\pi^0$ .

 $\Gamma(\pi^+\pi^-\pi^+\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{479}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt;4.0 <math>\times 10^{-3}</math></b>	90	<sup>1</sup> ALBRECHT	90B ARG	$e^+e^- \rightarrow \gamma(4S)$
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<sup>1</sup> ALBRECHT 90B limit assumes equal production of  $B^0\bar{B}^0$  and  $B^+B^-$  at  $\gamma(4S)$ .

$\Gamma(\rho^+ \rho^0)/\Gamma_{\text{total}}$   $\Gamma_{480}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**24.0 ± 1.9 OUR AVERAGE**

23.7 ± 1.4 ± 1.4		<sup>1</sup> AUBERT	09G BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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31.7 ± 7.1 <sup>+3.8</sup> <sub>-6.7</sub>		<sup>1,2</sup> ZHANG	03B BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

16.8 ± 2.2 ± 2.3		<sup>1</sup> AUBERT, BE	06G BABR	Repl. by AUBERT 09G
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22.5 <sup>+5.7</sup> <sub>-5.4</sub> ± 5.8		<sup>1</sup> AUBERT	03V BABR	Repl. by AUBERT, BE 06G
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< 1000	90	<sup>1</sup> ALBRECHT	90B ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> The systematic error includes the error associated with the helicity-mix uncertainty.

 $\Gamma(\rho^+ f_0(980), f_0 \rightarrow \pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{481}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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< 2.0	90	<sup>1</sup> AUBERT	09G BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 1.9	90	<sup>1</sup> AUBERT, BE	06G BABR	Repl. by AUBERT 09G
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(a_1(1260)^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{482}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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<b>26.4 ± 5.4 ± 4.1</b>		<sup>1,2</sup> AUBERT	07BL BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 1700	90	<sup>1</sup> ALBRECHT	90B ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Assumes  $a_1^+$  decays only to  $3\pi$  and  $B(a_1^+ \rightarrow \pi^\pm \pi^\mp \pi^+) = 0.5$ .

 $\Gamma(a_1(1260)^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{483}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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<b>20.4 ± 4.7 ± 3.4</b>		<sup>1,2</sup> AUBERT	07BL BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 900	90	<sup>1</sup> ALBRECHT	90B ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Assumes  $a_1^0$  decays only to  $3\pi$  and  $B(a_1^+ \rightarrow \pi^\pm \pi^\mp \pi^0) = 1.0$ .

 $\Gamma(\omega \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{484}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**6.9 ± 0.5 OUR AVERAGE**

6.7 ± 0.5 ± 0.4		<sup>1</sup> AUBERT	07AE BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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6.9 ± 0.6 ± 0.5		<sup>1</sup> JEN	06 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
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11.3 <sup>+3.3</sup> <sub>-2.9</sub> ± 1.4		<sup>1</sup> JESSOP	00 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
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- • • We do not use the following data for averages, fits, limits, etc. • • •

$6.1 \pm 0.7 \pm 0.4$		<sup>1</sup> AUBERT,B	06E	BABR	Repl. by AUBERT 07AE
$5.5 \pm 0.9 \pm 0.5$		<sup>1</sup> AUBERT	04H	BABR	Repl. by AUBERT,B 06E
$5.7^{+1.4}_{-1.3} \pm 0.6$		<sup>1</sup> WANG	04A	BELL	Repl. by JEN 06
$4.2^{+2.0}_{-1.8} \pm 0.5$		<sup>1</sup> LU	02	BELL	Repl. by WANG 04A
$6.6^{+2.1}_{-1.8} \pm 0.7$		<sup>1</sup> AUBERT	01G	BABR	Repl. by AUBERT 04H
< 23	90	<sup>1</sup> BERGFELD	98	CLE2	Repl. by JESSOP 00
<400	90	<sup>1</sup> ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(\omega\rho^+)/\Gamma_{\text{total}}$ $\Gamma_{485}/\Gamma$

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>15.9±1.6±1.4</b>		<sup>1</sup> AUBERT	09H	BABR $e^+e^- \rightarrow \Upsilon(4S)$

- • • We do not use the following data for averages, fits, limits, etc. • • •

$10.6 \pm 2.1^{+1.6}_{-1.0}$		<sup>1</sup> AUBERT,B	06T	BABR	Repl. by AUBERT 09H
$12.6^{+3.7}_{-3.3} \pm 1.6$		<sup>1</sup> AUBERT	050	BABR	Repl. by AUBERT,B 06T
<61	90	<sup>1</sup> BERGFELD	98	CLE2	

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(\eta\pi^+)/\Gamma_{\text{total}}$ $\Gamma_{486}/\Gamma$

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>4.02±0.27 OUR AVERAGE</b>				
$4.07 \pm 0.26 \pm 0.21$		<sup>1</sup> HOI	12	BELL $e^+e^- \rightarrow \Upsilon(4S)$
$4.00 \pm 0.40 \pm 0.24$		<sup>1</sup> AUBERT	09AV	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$1.2^{+2.8}_{-1.2}$		<sup>1</sup> RICHICHI	00	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

- • • We do not use the following data for averages, fits, limits, etc. • • •

$5.0 \pm 0.5 \pm 0.3$		<sup>1</sup> AUBERT	07AE	BABR	Repl. by AUBERT 09AV
$4.2 \pm 0.4 \pm 0.2$		<sup>1</sup> CHANG	07B	BELL	Repl. by HOI 12
$5.1 \pm 0.6 \pm 0.3$		<sup>1</sup> AUBERT,B	05K	BABR	Repl. by AUBERT 07AE
$4.8 \pm 0.7 \pm 0.3$		<sup>1</sup> CHANG	05A	BELL	Repl. by CHANG 07B
$5.3 \pm 1.0 \pm 0.3$		<sup>1</sup> AUBERT	04H	BABR	Repl. by AUBERT,B 05K
< 15	90	BEHRENS	98	CLE2	Repl. by RICHICHI 00
<700	90	<sup>1</sup> ALBRECHT	90B	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(\eta\rho^+)/\Gamma_{\text{total}}$ $\Gamma_{487}/\Gamma$

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>7.0±2.9 OUR AVERAGE</b>		Error includes scale factor of 2.8.		
$9.9 \pm 1.2 \pm 0.8$		<sup>1</sup> AUBERT	08AH	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$4.1^{+1.4}_{-1.3} \pm 0.4$		<sup>1</sup> WANG	07B	BELL $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$8.4 \pm 1.9 \pm 1.1$		<sup>1</sup> AUBERT,B	05K	BABR	Repl. by AUBERT 08AH
<14	90	<sup>1</sup> AUBERT,B	04D	BABR	Repl. by AUBERT,B 05K
<15	90	<sup>1</sup> RICHICHI	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
<32	90	BEHRENS	98	CLE2	Repl. by RICHICHI 00

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(\eta' \pi^+)/\Gamma_{\text{total}}$ $\Gamma_{488}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>2.7 \pm 0.9</math></b>	<b>OUR AVERAGE</b>	Error includes scale factor of 1.9.		
$3.5 \pm 0.6 \pm 0.2$		<sup>1</sup> AUBERT	09AV	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$1.76^{+0.67+0.15}_{-0.62-0.14}$		<sup>1</sup> SCHUEMANN	06	BELL $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$3.9 \pm 0.7 \pm 0.3$		<sup>1</sup> AUBERT	07AE	BABR	Repl. by AUBERT 09AV
$4.0 \pm 0.8 \pm 0.4$		<sup>1</sup> AUBERT,B	05K	BABR	Repl. by AUBERT 07AE
< 4.5	90	<sup>1</sup> AUBERT	04H	BABR	Repl. by AUBERT,B 05K
< 7.0	90	<sup>1</sup> ABE	01M	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
<12	90	<sup>1</sup> AUBERT	01G	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
<12	90	<sup>1</sup> RICHICHI	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
<31	90	BEHRENS	98	CLE2	Repl. by RICHICHI 00

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(\eta' \rho^+)/\Gamma_{\text{total}}$ $\Gamma_{489}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>9.7^{+1.9}_{-1.8} \pm 1.1</math></b>		<sup>1</sup> DEL-AMO-SA..10A	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$8.7^{+3.1+2.3}_{-2.8-1.3}$		<sup>1</sup> AUBERT	07E	BABR	Repl. by DEL-AMO-SANCHEZ 10A
< 5.8	90	<sup>1</sup> SCHUEMANN	07	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
<22	90	<sup>1</sup> AUBERT,B	04D	BABR	Repl. by AUBERT 07E
<33	90	<sup>1</sup> RICHICHI	00	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
<47	90	BEHRENS	98	CLE2	Repl. by RICHICHI 00

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(\phi \pi^+)/\Gamma_{\text{total}}$ $\Gamma_{490}/\Gamma$

VALUE (units $10^{-8}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>3.2 \pm 1.5 \pm 0.3</math></b>		<sup>1</sup> AAIJ	19AL	LHCB $pp$ at 7, 8 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 15	90	<sup>2</sup> AAIJ	14A	LHCB	Repl. by AAIJ 19AL
< 33	90	<sup>3</sup> KIM	12A	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
< 24	90	<sup>3</sup> AUBERT,B	06C	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
< 41	90	<sup>3</sup> AUBERT	04A	BABR	Repl. by AUBERT,B 06C
< 140	90	<sup>3</sup> AUBERT	01D	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
<15300	90	<sup>4</sup> ABE	00C	SLD	$e^+e^- \rightarrow Z$
< 500	90	<sup>3</sup> BERGFELD	98	CLE2	



<sup>1</sup> AAIJ 19AL reports  $(0.3 \pm 0.1 \pm 0.1) \times 10^{-2}$  fit fraction for  $B^+ \rightarrow \phi(1020)\pi^+$  from the amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays. We use the PDG 19 value  $B(B^+ \rightarrow K^+ K^- \pi^+) = (5.2 \pm 0.4) \times 10^{-6}$  to obtain  $B(B^+ \rightarrow \phi(1020)\pi^+, \phi(1020) \rightarrow K^+ K^-)$ . We compute  $B(B^+ \rightarrow \phi(1020)\pi^+)$  using the PDG 19 value of  $B(\phi(1020) \rightarrow K^+ K^-) = (49.2 \pm 0.5)\%$ . Our first error is the experiment's error and the second error is systematic error from using our best value.

<sup>2</sup> Measures  $B(B^+ \rightarrow \phi\pi^+)/B(B^+ \rightarrow \phi K^+) < 0.018$  at 90% C.L. and assumes  $B(B^+ \rightarrow \phi K^+) = (8.8^{+0.7}_{-0.6}) \times 10^{-6}$ .

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>4</sup> ABE 00C assumes  $B(Z \rightarrow b\bar{b}) = (21.7 \pm 0.1)\%$  and the  $B$  fractions  $f_{B^0} = f_{B^+} = (39.7^{+1.8}_{-2.2})\%$  and  $f_{B_s} = (10.5^{+1.8}_{-2.2})\%$ .

$\Gamma(\phi\rho^+)/\Gamma_{\text{total}}$   $\Gamma_{491}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 3.0</b>	90	<sup>1</sup> AUBERT	08BK BABR	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<16		<sup>1</sup> BERGFELD	98 CLE2	

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(a_0(980)^0\pi^+, a_0^0 \rightarrow \eta\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{492}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;5.8</b>	90	<sup>1</sup> AUBERT, BE	04 BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of charged and neutral  $B$  mesons from  $\Upsilon(4S)$  decays.

$\Gamma(a_0(980)^+\pi^0, a_0^+ \rightarrow \eta\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{493}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;1.4</b>	90	<sup>1</sup> AUBERT	08A BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\pi^+\pi^+\pi^+\pi^-\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{494}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;8.6 <math>\times 10^{-4}</math></b>	90	<sup>1</sup> ALBRECHT	90B ARG	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> ALBRECHT 90B limit assumes equal production of  $B^0\bar{B}^0$  and  $B^+B^-$  at  $\Upsilon(4S)$ .

$\Gamma(\rho^0 a_1(1260)^+)/\Gamma_{\text{total}}$   $\Gamma_{495}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;6.2 <math>\times 10^{-4}</math></b>	90	<sup>1</sup> BORTOLETTO89	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<6.0 $\times 10^{-4}$	90	<sup>2</sup> ALBRECHT	90B ARG	$e^+e^- \rightarrow \Upsilon(4S)$
<3.2 $\times 10^{-3}$	90	<sup>1</sup> BEBEK	87 CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> BORTOLETTO 89 reports  $< 5.4 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0\bar{B}^0$ . We rescale to 50%.

<sup>2</sup> ALBRECHT 90B limit assumes equal production of  $B^0\bar{B}^0$  and  $B^+B^-$  at  $\Upsilon(4S)$ .

$\Gamma(\rho^0 a_2(1320)^+)/\Gamma_{\text{total}}$   $\Gamma_{496}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;7.2 <math>\times 10^{-4}</math></b>	90	<sup>1</sup> BORTOLETTO89	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<2.6 \times 10^{-3}$  90 <sup>2</sup> BEBEK 87 CLEO  $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> BORTOLETTO 89 reports  $<6.3 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0\bar{B}^0$ .  
We rescale to 50%.

<sup>2</sup> BEBEK 87 reports  $<2.3 \times 10^{-3}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0\bar{B}^0$ . We rescale to 50%.

$\Gamma(b_1^0 \pi^+, b_1^0 \rightarrow \omega \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{497}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$6.7 \pm 1.7 \pm 1.0$	90	<sup>1</sup> AUBERT	07BI BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(b_1^+ \pi^0, b_1^+ \rightarrow \omega \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{498}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$<3.3$	90	<sup>1</sup> AUBERT	08AG BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\pi^+ \pi^+ \pi^+ \pi^- \pi^- \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{499}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<6.3 \times 10^{-3}$	90	<sup>1</sup> ALBRECHT	90B ARG	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> ALBRECHT 90B limit assumes equal production of  $B^0\bar{B}^0$  and  $B^+B^-$  at  $\Upsilon(4S)$ .

$\Gamma(b_1^+ \rho^0, b_1^+ \rightarrow \omega \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{500}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<5.2 \times 10^{-6}$	90	<sup>1</sup> AUBERT	09AF BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(b_1^0 \rho^+, b_1^0 \rightarrow \omega \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{502}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.3 \times 10^{-6}$	90	<sup>1</sup> AUBERT	09AF BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(a_1(1260)^+ a_1(1260)^0)/\Gamma_{\text{total}}$   $\Gamma_{501}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.3 \times 10^{-2}$	90	<sup>1</sup> ALBRECHT	90B ARG	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> ALBRECHT 90B limit assumes equal production of  $B^0\bar{B}^0$  and  $B^+B^-$  at  $\Upsilon(4S)$ .

$\Gamma(h^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{503}/\Gamma$

$h^+ = K^+ \text{ or } \pi^+$

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
$16^{+6}_{-5} \pm 3.6$	GODANG	98 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\omega h^+)/\Gamma_{\text{total}}$ $h^+ = K^+ \text{ or } \pi^+$					$\Gamma_{504}/\Gamma$
<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	

**13.8<sup>+2.7</sup><sub>-2.4</sub> OUR AVERAGE**

13.4 <sup>+3.3</sup> <sub>-2.9</sub> ± 1.1	<sup>1</sup> LU	02	BELL	e <sup>+</sup> e <sup>-</sup> → $\Upsilon(4S)$
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14.3 <sup>+3.6</sup> <sub>-3.2</sub> ± 2.0	<sup>1</sup> JESSOP	00	CLE2	e <sup>+</sup> e <sup>-</sup> → $\Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

25 <sup>+8</sup> <sub>-7</sub> ± 3	<sup>1</sup> BERGFELD	98	CLE2	Repl. by JESSOP 00
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(h^+ X^0(\text{Familon}))/\Gamma_{\text{total}}$					$\Gamma_{505}/\Gamma$
<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	

<b>&lt;49</b>	90	<sup>1</sup> AMMAR	01B	CLE2 e <sup>+</sup> e <sup>-</sup> → $\Upsilon(4S)$
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<sup>1</sup> AMMAR 01B searched for the two-body decay of the  $B$  meson to a massless neutral feebly-interacting particle  $X^0$  such as the familon, the Nambu-Goldstone boson associated with a spontaneously broken global family symmetry.

$\Gamma(K^+ X^0, X^0 \rightarrow \mu^+ \mu^-)/\Gamma_{\text{total}}$ $X^0$ stands here for a long-lived scalar particle.					$\Gamma_{506}/\Gamma$
<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	

<b>&lt;1 × 10<sup>-7</sup></b>	95	<sup>1</sup> AAIJ	17AQ	LHCB $p\bar{p}$ at 7, 8 TeV
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<sup>1</sup> AAIJ 17AQ searched for a long-lived scalar particle  $X^0 \rightarrow \mu^+ \mu^-$  in the mass range 250–4700 MeV and lifetime range 0.1–1000 ps. The limit is between  $10^{-7}$  and  $2 \times 10^{-10}$  in these ranges except in vetoed mass regions around  $K_S^0$ ,  $J/\psi$ ,  $\psi(2S)$ , and  $\psi(3770)$ .

$\Gamma(\rho\bar{\rho}\pi^+)/\Gamma_{\text{total}}$					$\Gamma_{507}/\Gamma$
<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	

**1.62 ± 0.20 OUR AVERAGE**

1.60 <sup>+</sup> <sub>-</sub> 0.22 <sup>±</sup> 0.19 ± 0.12	1,2,3	WEI	08	BELL e <sup>+</sup> e <sup>-</sup> → $\Upsilon(4S)$
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1.69 ± 0.29 ± 0.26	<sup>1</sup>	AUBERT	07AV	BABR e <sup>+</sup> e <sup>-</sup> → $\Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

1.07 ± 0.11 ± 0.11	<sup>4</sup>	AAIJ	14AF	LHCB $p\bar{p}$ at 7, 8 TeV
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3.06 <sup>+</sup> <sub>-</sub> 0.73 <sup>±</sup> 0.62 ± 0.37	1,3	WANG	04	BELL Repl. by WEI 08
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< 3.7	90	<sup>1,2</sup> ABE	02K	BELL Repl. by WANG 04
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<500	90	<sup>5</sup> ABREU	95N	DLPH Repl. by ADAM 96D
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<160	90	<sup>6</sup> BEBEK	89	CLEO e <sup>+</sup> e <sup>-</sup> → $\Upsilon(4S)$
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570 ± 150 ± 210	<sup>7</sup>	ALBRECHT	88F	ARG e <sup>+</sup> e <sup>-</sup> → $\Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Explicitly vetoes resonant production of  $\rho\bar{\rho}$  from Charmonium states.

<sup>3</sup> Also provides results with  $m_{\rho\bar{\rho}} < 2.85 \text{ GeV}/c^2$  and angular asymmetry of  $\rho\bar{\rho}$  system.

<sup>4</sup> Requires  $m_{\rho\bar{\rho}} < 2.85 \text{ GeV}/c^2$ .

<sup>5</sup> Assumes a  $B^0$ ,  $B^-$  production fraction of 0.39 and a  $B_s$  production fraction of 0.12.

<sup>6</sup> BEBEK 89 reports  $< 1.4 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0\bar{B}^0$ . We rescale to 50%.

<sup>7</sup> ALBRECHT 88F reports  $(5.2 \pm 1.4 \pm 1.9) \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 45% to  $B^0\bar{B}^0$ . We rescale to 50%.

$\Gamma(\rho\bar{p}\pi^+ \text{ nonresonant})/\Gamma_{\text{total}}$   $\Gamma_{508}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;53</b>	90	BERGFELD	96B CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\rho\bar{p}\pi^+\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{509}/\Gamma$

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>4.58 \pm 1.17 \pm 0.67</math></b>	<sup>1</sup> CHU	20 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^0$  and  $B^+$  from  $\Upsilon(4S)$  decays. This measurement is quoted for  $M(\pi^+\pi^0) < 1.3$  GeV.

$\Gamma(\rho\bar{p}\pi^+\pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{510}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 5.2 \times 10^{-4}$	90	<sup>1</sup> ALBRECHT	88F ARG	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<sup>1</sup> ALBRECHT 88F reports  $< 4.7 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 45% to  $B^0\bar{B}^0$ . We rescale to 50%.

$\Gamma(\rho\bar{p}K^+)/\Gamma_{\text{total}}$   $\Gamma_{511}/\Gamma$

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>5.9 \pm 0.5</math> OUR AVERAGE</b>	Error includes scale factor of 1.5.		

$5.54^{+0.27}_{-0.25} \pm 0.36$	1,2,3 WEI	08 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
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$6.7 \pm 0.5 \pm 0.4$	1,3 AUBERT,B	05L BABR	$e^+e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$4.59^{+0.38}_{-0.34} \pm 0.50$	1,2,3 WANG	05A BELL	Repl. by WEI 08
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$5.66^{+0.67}_{-0.57} \pm 0.62$	1,2,3 WANG	04 BELL	Repl. by WANG 05A
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$4.3^{+1.1}_{-0.9} \pm 0.5$	1,2 ABE	02K BELL	Repl. by WANG 04
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Explicitly vetoes resonant production of  $\rho\bar{p}$  from Charmonium states.

<sup>3</sup> Provides also results with  $m_{\rho\bar{p}} < 2.85$  GeV/ $c^2$  and angular asymmetry of  $\rho\bar{p}$  system.

$\Gamma(\rho\bar{p}K^+)/\Gamma(J/\psi(1S)K^+)$   $\Gamma_{511}/\Gamma_{276}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.0104 \pm 0.0005 \pm 0.0001</math></b>	1,2 AAIJ	13S LHCb	$pp$ at 7 TeV

<sup>1</sup> AAIJ 13S reports  $[\Gamma(B^+ \rightarrow \rho\bar{p}K^+)/\Gamma(B^+ \rightarrow J/\psi(1S)K^+)] / [B(J/\psi(1S) \rightarrow \rho\bar{p})] = 4.91 \pm 0.19 \pm 0.14$  which we multiply by our best value  $B(J/\psi(1S) \rightarrow \rho\bar{p}) = (2.120 \pm 0.029) \times 10^{-3}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> Measurement includes contribution where  $\rho\bar{p}$  is produced in charmonia decays.

$\Gamma(\Theta(1710)^{++}\bar{p}, \Theta^{++} \rightarrow \rho K^+)/\Gamma_{\text{total}}$   $\Gamma_{512}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.091</b>	90	<sup>1</sup> WANG	05A BELL	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 0.1$	90	1,2 AUBERT,B	05L BABR	$e^+e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Provides upper limits depending on the pentaquark masses between 1.43 to 2.0 GeV/ $c^2$ .

$\Gamma(f_J(2220)K^+, f_J \rightarrow p\bar{p})/\Gamma_{\text{total}}$   $\Gamma_{513}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.41</b>	90	<sup>1</sup> WANG	05A BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(p\bar{\Lambda}(1520))/\Gamma_{\text{total}}$   $\Gamma_{514}/\Gamma$ 

VALUE (units $10^{-7}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>3.15 \pm 0.48 \pm 0.27</math></b>		<sup>1</sup> AAIJ	14AF LHCB	$pp$ at 7, 8 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$3.9^{+1.0}_{-0.9} \pm 0.3$		<sup>1</sup> AAIJ	13AU LHCB	Repl. by AAIJ 14AF
<15	90	<sup>2</sup> AUBERT,B	05L BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses  $B(B^+ \rightarrow J/\psi K^+) = (1.016 \pm 0.033) \times 10^{-3}$ ,  $B(J/\psi \rightarrow p\bar{p}) = (2.17 \pm 0.07) \times 10^{-3}$  and  $B(\Lambda(1520) \rightarrow K^- p) = 0.234 \pm 0.016$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(p\bar{p}K^+ \text{ nonresonant})/\Gamma_{\text{total}}$   $\Gamma_{515}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;89</b>	90	BERGFELD	96B CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

 $\Gamma(p\bar{p}K^*(892)^+)/\Gamma_{\text{total}}$   $\Gamma_{516}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>3.6^{+0.8}_{-0.7}</math> OUR AVERAGE</b>				

$3.38^{+0.73}_{-0.60} \pm 0.39$		<sup>1,2</sup> CHEN	08C BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$5.3 \pm 1.5 \pm 1.3$		<sup>2</sup> AUBERT	07AV BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$10.3^{+3.6}_{-2.8}^{+1.3}_{-1.7}$		<sup>2,3</sup> WANG	04 BELL	Repl. by CHEN 08C
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<sup>1</sup> Explicitly vetoes resonant production of  $p\bar{p}$  from charmonium states.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> Explicitly vetoes resonant production of  $p\bar{p}$  from charmonium states. The branching fraction for  $M_{p\bar{p}} < 2.85 \text{ GeV}/c^2$  is also reported.

 $\Gamma(f_J(2220)K^{*+}, f_J \rightarrow p\bar{p})/\Gamma_{\text{total}}$   $\Gamma_{517}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.77</b>	90	<sup>1</sup> AUBERT	07AV BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(p\bar{\Lambda})/\Gamma_{\text{total}}$   $\Gamma_{518}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>0.24^{+0.10}_{-0.08} \pm 0.03</math></b>		<sup>1</sup> AAIJ	17R LHCB	$pp$ at 7, 8 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 0.32	90	2	TSAI	07	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
< 0.49	90	2	CHANG	05	BELL	Repl. by TSAI 07
< 1.5	90	2	BORNHEIM	03	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
< 2.2	90	2	ABE	020	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
< 2.6	90	2	COAN	99	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
<60	90	3	AVERY	89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
<93	90	4	ALBRECHT	88F	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Statistical significance of the signal is 4.1 standard deviations where the the normalisation is based on  $B(B^+ \rightarrow K_S^0 \pi^+) = (11.895 \pm 0.375) \times 10^{-06}$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> AVERY 89B reports  $< 5 \times 10^{-5}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0 \bar{B}^0$ . We rescale to 50%.

<sup>4</sup> ALBRECHT 88F reports  $< 8.5 \times 10^{-5}$  assuming the  $\Upsilon(4S)$  decays 45% to  $B^0 \bar{B}^0$ . We rescale to 50%.

### $\Gamma(\rho \bar{\Lambda} \gamma) / \Gamma_{\text{total}}$ $\Gamma_{519} / \Gamma$

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>2.45^{+0.44}_{-0.38} \pm 0.22</math></b>		1 WANG	07C	BELL $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$2.16^{+0.58}_{-0.53} \pm 0.20$	1	LEE	05	BELL	Repl. by WANG 07C
<3.9	90	2	EDWARDS	03	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Corresponds to  $E_\gamma > 1.5$  GeV. The limit changes to  $3.3 \times 10^{-6}$  for  $E_\gamma > 2.0$  GeV.

### $\Gamma(\rho \bar{\Lambda} \pi^0) / \Gamma_{\text{total}}$ $\Gamma_{520} / \Gamma$

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>3.00^{+0.61}_{-0.53} \pm 0.33</math></b>	1 WANG	07C	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(\rho \bar{\Sigma}(1385)^0) / \Gamma_{\text{total}}$ $\Gamma_{521} / \Gamma$

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;0.47</b>	90	1 WANG	07C	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(\Delta^+ \bar{\Lambda}) / \Gamma_{\text{total}}$ $\Gamma_{522} / \Gamma$

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;0.82</b>	90	1 WANG	07C	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(\rho \bar{\Sigma} \gamma) / \Gamma_{\text{total}}$ $\Gamma_{523} / \Gamma$

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;4.6</b>	90	1 LEE	05	BELL $e^+e^- \rightarrow \Upsilon(4S)$



$\Gamma(\bar{p}\Lambda K^+ K^-)/\Gamma_{\text{total}}$   $\Gamma_{530}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$3.70^{+0.39}_{-0.37} \pm 0.44$		<sup>1</sup> LU	19	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\Lambda\bar{\Lambda}\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{531}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$< 0.94$	90	<sup>1,2</sup> CHANG	09	BELL Repl. by CHANG 09
$< 2.8$	90	<sup>2</sup> LEE	04	BELL $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<sup>1</sup> For  $m_{\Lambda\bar{\Lambda}} < 2.85 \text{ GeV}/c^2$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\Lambda\bar{\Lambda}K^+)/\Gamma_{\text{total}}$   $\Gamma_{532}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$3.38^{+0.41}_{-0.36} \pm 0.41$		<sup>1,2</sup> CHANG	09	BELL $e^+e^- \rightarrow \Upsilon(4S)$
$2.91^{+0.9}_{-0.70} \pm 0.38$		<sup>2</sup> LEE	04	BELL Repl. by CHANG 09

• • • We do not use the following data for averages, fits, limits, etc. • • •

<sup>1</sup> Excluding charmonium events in  $2.85 < m_{\Lambda\bar{\Lambda}} < 3.128 \text{ GeV}/c^2$  and  $3.315 < m_{\Lambda\bar{\Lambda}} < 3.735 \text{ GeV}/c^2$ . Measurements in various  $m_{\Lambda\bar{\Lambda}}$  bins are also reported.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\Lambda\bar{\Lambda}K^{*+})/\Gamma_{\text{total}}$   $\Gamma_{533}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$2.19^{+1.13}_{-0.88} \pm 0.33$		<sup>1,2</sup> CHANG	09	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> For  $m_{\Lambda\bar{\Lambda}} < 2.85 \text{ GeV}/c^2$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\Lambda(1520)\bar{\Lambda}K^+)/\Gamma_{\text{total}}$   $\Gamma_{534}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$2.23 \pm 0.63 \pm 0.25$		<sup>1</sup> LU	19	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\Lambda\bar{\Lambda}(1520)K^+)/\Gamma_{\text{total}}$   $\Gamma_{535}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 2.08 \times 10^{-6}$		<sup>1</sup> LU	19	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\bar{\Delta}^0 p)/\Gamma_{\text{total}}$   $\Gamma_{536}/\Gamma$ 

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.38$	90	<sup>1</sup> WEI	08	BELL $e^+e^- \rightarrow \Upsilon(4S)$



• • • We do not use the following data for averages, fits, limits, etc. • • •

<380 90 <sup>2</sup> BORTOLETTO89 CLEO  $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> BORTOLETTO 89 reports  $< 3.3 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0\bar{B}^0$ . We rescale to 50%.

$\Gamma(\Delta^{++}\bar{p})/\Gamma_{\text{total}}$   $\Gamma_{537}/\Gamma$

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
< 0.14	90	<sup>1</sup> WEI 08	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<150 90 <sup>2</sup> BORTOLETTO89 CLEO  $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> BORTOLETTO 89 reports  $< 1.3 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0\bar{B}^0$ . We rescale to 50%.

$\Gamma(D^+\rho\bar{p})/\Gamma_{\text{total}}$   $\Gamma_{538}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< $1.5 \times 10^{-5}$	90	<sup>1</sup> ABE 02W	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(D^*(2010)^+\rho\bar{p})/\Gamma_{\text{total}}$   $\Gamma_{539}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< $1.5 \times 10^{-5}$	90	<sup>1</sup> ABE 02W	BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\bar{D}^0\rho\bar{p}\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{540}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
$3.72 \pm 0.11 \pm 0.25$	<sup>1,2</sup> DEL-AMO-SA..12	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses the values of  $D$  and  $D^*$  branching fractions from PDG 08.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\bar{D}^{*0}\rho\bar{p}\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{541}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
$3.73 \pm 0.17 \pm 0.27$	<sup>1,2</sup> DEL-AMO-SA..12	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses the values of  $D$  and  $D^*$  branching fractions from PDG 08.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(D^-\rho\bar{p}\pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{542}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
$1.66 \pm 0.13 \pm 0.27$	<sup>1,2</sup> DEL-AMO-SA..12	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses the values of  $D$  and  $D^*$  branching fractions from PDG 08.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(D^{*-} p \bar{p} \pi^+ \pi^-) / \Gamma_{\text{total}}$   $\Gamma_{543} / \Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.86 ± 0.16 ± 0.19</b>	1,2 DEL-AMO-SA...12	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses the values of  $D$  and  $D^*$  branching fractions from PDG 08.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(p \bar{\Lambda}^0 \bar{D}^0) / \Gamma_{\text{total}}$   $\Gamma_{544} / \Gamma$

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.43<sup>+0.28</sup><sub>-0.25</sub> ± 0.18</b>	1,2 CHEN	11F BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses  $B(\Lambda \rightarrow p \pi^-) = 63.9 \pm 0.5\%$ ,  $B(D^0 \rightarrow K^- \pi^+) = 3.89 \pm 0.05\%$ , and  $B(D^0 \rightarrow K^- \pi^+ \pi^0) = 13.9 \pm 0.5\%$ .

<sup>2</sup> Assumes equal production of  $B^0$  and  $B^+$  from Upsilon(4S) decays.

$\Gamma(p \bar{\Lambda}^0 \bar{D}^*(2007)^0) / \Gamma_{\text{total}}$   $\Gamma_{545} / \Gamma$

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 5</b>	90	1,2,3 CHEN	11F BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> CHEN 11F reports  $< 4.8 \times 10^{-5}$  from a measurement of  $[\Gamma(B^+ \rightarrow p \bar{\Lambda}^0 \bar{D}^*(2007)^0) / \Gamma_{\text{total}}] / [B(D^*(2007)^0 \rightarrow D^0 \pi^0)]$  assuming  $B(D^*(2007)^0 \rightarrow D^0 \pi^0) = (61.9 \pm 2.9) \times 10^{-2}$ , which we rescale to our best value  $B(D^*(2007)^0 \rightarrow D^0 \pi^0) = 64.7 \times 10^{-2}$ .

<sup>2</sup> Uses  $B(\Lambda \rightarrow p \pi^-) = 63.9 \pm 0.5\%$  and  $B(D^0 \rightarrow K^- \pi^+) = 3.89 \pm 0.05\%$ .

<sup>3</sup> Assumes equal production of  $B^0$  and  $B^+$  from Upsilon(4S) decays.

$\Gamma(\bar{\Lambda}_c^- p \pi^+) / \Gamma_{\text{total}}$   $\Gamma_{546} / \Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>2.3 ± 0.4 OUR AVERAGE</b>	Error includes scale factor of 2.2. See the ideogram below.		
2.71 ± 0.16 ± 0.14	1,2 AUBERT	08BN BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
1.60 ± 0.20 ± 0.08	1,3 GABYSHEV	06A BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
1.9 ± 0.5 ± 0.1	1,4 DYTMAN	02 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
• • •	We do not use the following data for averages, fits, limits, etc. • • •		
1.5 ± 0.4 ± 0.1	1,5 GABYSHEV	02 BELL	Repl. by GABYSHEV 06A
6.2 <sup>+2.3</sup> <sub>-2.0</sub> ± 1.6	1,6 FU	97 CLE2	Repl. by DYTMAN 02

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> AUBERT 08BN reports  $(3.4 \pm 0.1 \pm 0.9) \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{\Lambda}_c^- p \pi^+) / \Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow p K^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (5.0 \pm 1.3) \times 10^{-2}$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

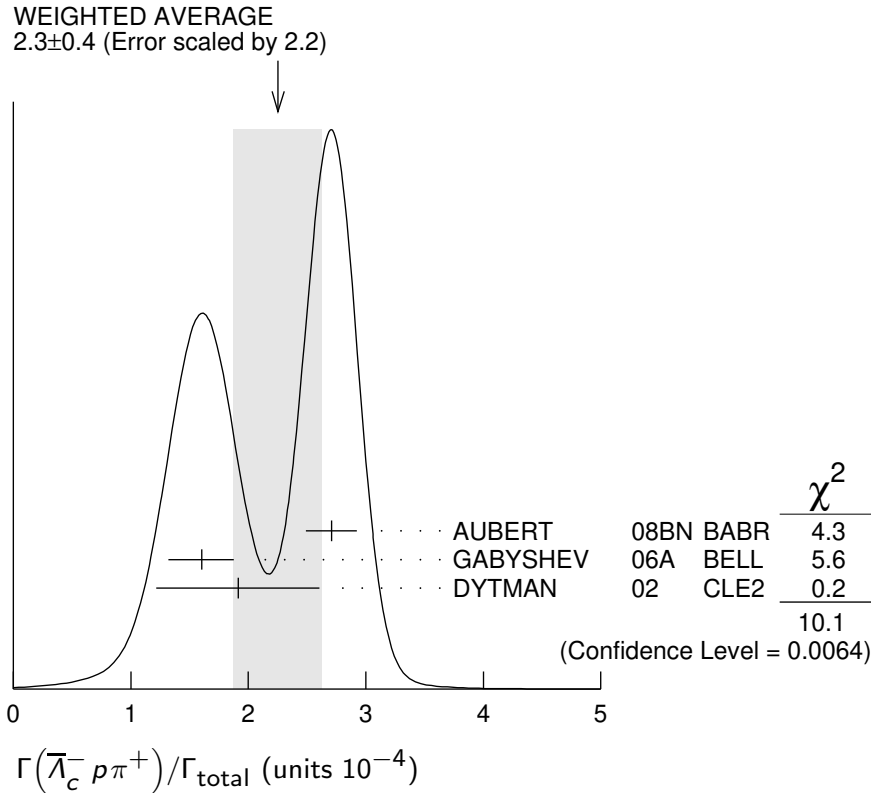
<sup>3</sup> GABYSHEV 06A reports  $(2.01 \pm 0.15 \pm 0.20) \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{\Lambda}_c^- p \pi^+) / \Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow p K^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = 0.05$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>4</sup> DYTMAN 02 reports  $(2.4<sup>+0.63</sup><sub>-0.62</sub>) \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{\Lambda}_c^- p \pi^+) / \Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow p K^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = 0.05$ , which we rescale

to our best value  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>5</sup> GABYSHEV 02 reports  $(1.87^{+0.51}_{-0.49}) \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{\Lambda}_c^- p \pi^+)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = 0.05$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>6</sup> FU 97 uses PDG 96 values of  $\Lambda_c$  branching fraction.



$\Gamma(\bar{\Lambda}_c^- \Delta(1232)^{++})/\Gamma_{\text{total}}$					$\Gamma_{547}/\Gamma$
VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT	
<b>&lt;1.9</b>	90	GABYSHEV 06A	BELL	$e^+ e^- \rightarrow \gamma(4S)$	

$\Gamma(\bar{\Lambda}_c^- \Delta_X(1600)^{++})/\Gamma_{\text{total}}$					$\Gamma_{548}/\Gamma$
VALUE (units $10^{-5}$ )		DOCUMENT ID	TECN	COMMENT	
<b>4.7±0.9±0.2</b>		<sup>1</sup> GABYSHEV 06A	BELL	$e^+ e^- \rightarrow \gamma(4S)$	

<sup>1</sup> GABYSHEV 06A reports  $(5.9 \pm 1.0 \pm 0.6) \times 10^{-5}$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{\Lambda}_c^- \Delta_X(1600)^{++})/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = 0.05$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\bar{\Lambda}_c^- \Delta_X(2420)^{++})/\Gamma_{\text{total}}$   $\Gamma_{549}/\Gamma$

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
$3.7^{+0.9}_{-0.8} \pm 0.2$	<sup>1</sup> GABYSHEV	06A	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> GABYSHEV 06A reports  $(4.7^{+1.0}_{-0.9} \pm 0.4) \times 10^{-5}$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{\Lambda}_c^- \Delta_X(2420)^{++})/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = 0.05$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma((\bar{\Lambda}_c^- p)_s \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{550}/\Gamma$

$(\bar{\Lambda}_c^- p)_s$  denotes a low-mass enhancement near  $3.35 \text{ GeV}/c^2$ .

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
$3.1^{+0.7}_{-0.6} \pm 0.2$	<sup>1</sup> GABYSHEV	06A	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> GABYSHEV 06A reports  $(3.9^{+0.8}_{-0.7} \pm 0.4) \times 10^{-5}$  from a measurement of  $[\Gamma(B^+ \rightarrow (\bar{\Lambda}_c^- p)_s \pi^+)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = 0.05$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\bar{\Sigma}_c(2520)^0 p)/\Gamma_{\text{total}}$   $\Gamma_{551}/\Gamma$

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.3</b>	90	<sup>1,2</sup> AUBERT	08BN BABR	$e^+e^- \rightarrow \Upsilon(4S)$
<2.7	90	<sup>1,2</sup> GABYSHEV	06A	BELL $e^+e^- \rightarrow \Upsilon(4S)$
<4.6	90	<sup>1,2</sup> GABYSHEV	02	BELL Repl. by GABYSHEV 06A

• • • We do not use the following data for averages, fits, limits, etc. • • •

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Uses the value for  $\Lambda_c \rightarrow pK^- \pi^+$  branching ratio  $(5.0 \pm 1.3)\%$ .

$\Gamma(\bar{\Sigma}_c(2520)^0 p)/\Gamma(\bar{\Lambda}_c^- p \pi^+)$   $\Gamma_{551}/\Gamma_{546}$

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;9</b>	90	AUBERT	08BN BABR	$e^+e^- \rightarrow \Upsilon(4S)$

$\Gamma(\bar{\Sigma}_c(2800)^0 p)/\Gamma_{\text{total}}$   $\Gamma_{552}/\Gamma$

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
$2.6 \pm 0.7 \pm 0.4$	<sup>1</sup> AUBERT	08BN BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> AUBERT 08BN reports  $[\Gamma(B^+ \rightarrow \bar{\Sigma}_c(2800)^0 p)/\Gamma_{\text{total}}] / [B(B^+ \rightarrow \bar{\Lambda}_c^- p \pi^+)] = 0.117 \pm 0.023 \pm 0.024$  which we multiply by our best value  $B(B^+ \rightarrow \bar{\Lambda}_c^- p \pi^+) = (2.3 \pm 0.4) \times 10^{-4}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(\bar{\Lambda}_c^- p \pi^+ \pi^0)/\Gamma_{\text{total}} \qquad \Gamma_{553}/\Gamma$$

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>1.81 \pm 0.29^{+0.52}_{-0.50}</math></b>		1,2 DYTMAN	02	CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<3.12                      90                      <sup>3</sup>FU                      97                      CLE2                       $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> DYTMAN 02 measurement uses  $B(\Lambda_c^- \rightarrow \bar{p} K^+ \pi^-) = 5.0 \pm 1.3\%$ . The second error includes the systematic and the uncertainty of the branching ratio.

<sup>3</sup> FU 97 uses PDG 96 values of  $\Lambda_c$  branching ratio.

$$\Gamma(\bar{\Lambda}_c^- p \pi^+ \pi^+ \pi^-)/\Gamma_{\text{total}} \qquad \Gamma_{554}/\Gamma$$

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>2.25 \pm 0.25^{+0.63}_{-0.61}</math></b>		1,2 DYTMAN	02	CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<1.46                      90                      <sup>3</sup>FU                      97                      CLE2                       $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> DYTMAN 02 measurement uses  $B(\Lambda_c^- \rightarrow \bar{p} K^+ \pi^-) = 5.0 \pm 1.3\%$ . The second error includes the systematic and the uncertainty of the branching ratio.

<sup>3</sup> FU 97 uses PDG 96 values of  $\Lambda_c$  branching ratio.

$$\Gamma(\bar{\Lambda}_c^- p \pi^+ \pi^+ \pi^- \pi^0)/\Gamma_{\text{total}} \qquad \Gamma_{555}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;1.34 \times 10^{-2}</math></b>	90	<sup>1</sup> FU	97	CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> FU 97 uses PDG 96 values of  $\Lambda_c$  branching ratio.

$$\Gamma(\Lambda_c^+ \Lambda_c^- K^+)/\Gamma_{\text{total}} \qquad \Gamma_{556}/\Gamma$$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>4.9 ± 0.7 OUR AVERAGE</b>			

4.80 ± 0.43 ± 0.60                      LI                      18A                      BELL                       $e^+ e^- \rightarrow \Upsilon(4S)$

9.1 ± 4.5 ± 0.5                      1,2 AUBERT                      08H                      BABR                       $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

6.3 ± 2.5 ± 0.3                      2,3 GABYSHEV                      06                      BELL                      Repl. by LI 18A.

<sup>1</sup> AUBERT 08H reports  $(1.14 \pm 0.15 \pm 0.62) \times 10^{-3}$  from a measurement of  $[\Gamma(B^+ \rightarrow \Lambda_c^+ \Lambda_c^- K^+)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow p K^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (5.0 \pm 1.3) \times 10^{-2}$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> GABYSHEV 06 reports  $(7.9^{+1.0}_{-0.9} \pm 3.6) \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow \Lambda_c^+ \Lambda_c^- K^+)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow p K^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (5.0 \pm 1.3) \times 10^{-2}$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Xi_c(2930)\Lambda_c^+, \Xi_c \rightarrow K^+\Lambda_c^-)/\Gamma_{\text{total}}$   $\Gamma_{557}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>1.73 \pm 0.45 \pm 0.21</math></b>	<sup>1</sup> LI	18A	BELL $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> The  $\Xi_c(2930)$  is found in its decay to  $K^-\Lambda_c^+$  in  $B^- \rightarrow K^-\Lambda_c^-\Lambda_c^+$  with a significance more than 5 sigma.

$\Gamma(\overline{\Sigma}_c(2455)^0 p)/\Gamma_{\text{total}}$   $\Gamma_{558}/\Gamma$

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>2.9 \pm 0.6^{+0.2}_{-0.1}</math></b>		<sup>1,2</sup> GABYSHEV	06A	BELL $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<8	90	<sup>1,3</sup> DYTMAN	02	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
<9.3	90	<sup>1,4</sup> GABYSHEV	02	BELL Repl. by GABYSHEV 06A

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> GABYSHEV 06A reports  $(3.7 \pm 0.7 \pm 0.4) \times 10^{-5}$  from a measurement of  $[\Gamma(B^+ \rightarrow \overline{\Sigma}_c(2455)^0 p)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^-\pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = 0.05$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup> DYTMAN 02 measurement uses  $B(\Lambda_c^- \rightarrow \overline{p}K^+\pi^-) = 5.0 \pm 1.3\%$ . The second error includes the systematic and the uncertainty of the branching ratio.

<sup>4</sup> Uses the value for  $\Lambda_c \rightarrow pK^-\pi^+$  branching ratio  $(5.0 \pm 1.3)\%$ .

$\Gamma(\overline{\Sigma}_c(2455)^0 p)/\Gamma(\overline{\Lambda}_c^- p\pi^+)$   $\Gamma_{558}/\Gamma_{546}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.123 \pm 0.012 \pm 0.008</math></b>	<sup>1</sup> AUBERT	08BN	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\overline{\Sigma}_c(2455)^0 p\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{559}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>3.5 \pm 1.1 \pm 0.2</math></b>	<sup>1,2</sup> DYTMAN	02	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> DYTMAN 02 reports  $(4.4 \pm 1.4) \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow \overline{\Sigma}_c(2455)^0 p\pi^0)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^-\pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = 0.05$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\overline{\Sigma}_c(2455)^0 p\pi^-\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{560}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>3.5 \pm 1.0 \pm 0.2</math></b>	<sup>1,2</sup> DYTMAN	02	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> DYTMAN 02 reports  $(4.4 \pm 1.3) \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow \overline{\Sigma}_c(2455)^0 p\pi^-\pi^+)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^-\pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = 0.05$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow pK^-\pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(\overline{\Sigma}_c(2455)^{--} p \pi^+ \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{561}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
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**2.37 ± 0.20 OUR AVERAGE**

2.37 ± 0.16 <sup>+0.13</sup> <sub>-0.12</sub>	1,2 LEES	12Z BABR	$e^+ e^- \rightarrow \gamma(4S)$
2.2 ± 0.8 ± 0.1	1,3 DYTMAN	02 CLE2	$e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

<sup>2</sup> LEES 12Z reports  $(2.98 \pm 0.16 \pm 0.15 \pm 0.77) \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow \overline{\Sigma}_c(2455)^{--} p \pi^+ \pi^+)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow p K^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (5.0 \pm 1.3) \times 10^{-2}$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup> DYTMAN 02 reports  $(2.8 \pm 0.9 \pm 0.5 \pm 0.7) \times 10^{-4}$  from a measurement of  $[\Gamma(B^+ \rightarrow \overline{\Sigma}_c(2455)^{--} p \pi^+ \pi^+)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow p K^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (5.0 \pm 1.3) \times 10^{-2}$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{\Lambda}_c(2593)^- / \overline{\Lambda}_c(2625)^- p \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{562}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt; 1.9 × 10<sup>-4</sup></b>	90	1,2 DYTMAN	02 CLE2	$e^+ e^- \rightarrow \gamma(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

<sup>2</sup> DYTMAN 02 measurement uses  $B(\Lambda_c^- \rightarrow \overline{p} K^+ \pi^-) = 5.0 \pm 1.3\%$ . The second error includes the systematic and the uncertainty of the branching ratio.

$\Gamma(\Xi_c^0 \Lambda_c^+)/\Gamma_{\text{total}}$   $\Gamma_{563}/\Gamma$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
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<b>9.51 ± 2.10 ± 0.88</b>	1 LI	19A BELL	$e^+ e^- \rightarrow \gamma(4S)$
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<sup>1</sup> First measured the absolute branching fraction using a missing-mass technique.

$\Gamma(\Xi_c^0 \Lambda_c^+, \Xi_c^0 \rightarrow \Xi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{564}/\Gamma$

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
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**1.76 ± 0.29 OUR AVERAGE**

1.71 ± 0.28 ± 0.15	1 LI	19A BELL	$e^+ e^- \rightarrow \gamma(4S)$
2.0 ± 0.7 ± 0.1	2,3 AUBERT	08H BABR	$e^+ e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

4.5 <sup>+1.8</sup> <sub>-1.5</sub> ± 0.2	3,4 CHISTOV	06A BELL	Repl. by LI 19A
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<sup>1</sup> Using a hadronic  $B$ -tagging method based on a full reconstruction.

<sup>2</sup> AUBERT 08H reports  $(2.51 \pm 0.89 \pm 0.61) \times 10^{-5}$  from a measurement of  $[\Gamma(B^+ \rightarrow \Xi_c^0 \Lambda_c^+, \Xi_c^0 \rightarrow \Xi^+ \pi^-)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow p K^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (5.0 \pm 1.3) \times 10^{-2}$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

<sup>4</sup> CHISTOV 06A reports  $(5.6<sup>+1.9</sup><sub>-1.5</sub> ± 1.9) \times 10^{-5}$  from a measurement of  $[\Gamma(B^+ \rightarrow \Xi_c^0 \Lambda_c^+, \Xi_c^0 \rightarrow \Xi^+ \pi^-)/\Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow p K^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow p K^- \pi^+) =$

$= (5.0 \pm 1.3) \times 10^{-2}$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Xi_c^0 \Lambda_c^+, \Xi_c^0 \rightarrow \Lambda K^+ \pi^-) / \Gamma_{\text{total}} \quad \Gamma_{565} / \Gamma$

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.14 ± 0.26 OUR AVERAGE</b>			
1.11 ± 0.26 ± 0.10	<sup>1</sup> LI	19A	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
1.4 ± 0.8 ± 0.1	<sup>2,3</sup> AUBERT	08H	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
3.2 $^{+1.1}_{-0.9}$ ± 0.2	<sup>3,4</sup> CHISTOV	06A	BELL Repl. by LI 19A

<sup>1</sup> Using a hadronic  $B$ -tagging method based on a full reconstruction.

<sup>2</sup> AUBERT 08H reports  $(1.70 \pm 0.93 \pm 0.53) \times 10^{-5}$  from a measurement of  $[\Gamma(B^+ \rightarrow \Xi_c^0 \Lambda_c^+, \Xi_c^0 \rightarrow \Lambda K^+ \pi^-) / \Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = (5.0 \pm 1.3) \times 10^{-2}$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>4</sup> CHISTOV 06A reports  $(4.0 \mathrel{+}_{-0.9}^{1.1} \pm 1.3) \times 10^{-5}$  from a measurement of  $[\Gamma(B^+ \rightarrow \Xi_c^0 \Lambda_c^+, \Xi_c^0 \rightarrow \Lambda K^+ \pi^-) / \Gamma_{\text{total}}] \times [B(\Lambda_c^+ \rightarrow pK^- \pi^+)]$  assuming  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = (5.0 \pm 1.3) \times 10^{-2}$ , which we rescale to our best value  $B(\Lambda_c^+ \rightarrow pK^- \pi^+) = (6.28 \pm 0.32) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Xi_c^0 \Lambda_c^+, \Xi_c^0 \rightarrow pK^- K^- \pi^+) / \Gamma_{\text{total}} \quad \Gamma_{566} / \Gamma$

VALUE (units $10^{-6}$ )	DOCUMENT ID	TECN	COMMENT
<b>5.47 ± 1.78 ± 0.57</b>	<sup>1</sup> LI	19A	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Using a hadronic  $B$ -tagging method based on a full reconstruction.

$\Gamma(\Lambda_c^+ \Xi_c^0) / \Gamma_{\text{total}} \quad \Gamma_{567} / \Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 6.5 × 10<sup>-4</sup></b>	90	<sup>1</sup> LI	19G	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses fully reconstructed  $B^+$  meson on tag side and recoil against  $\Lambda_c^+$  on signal side.

$\Gamma(\Lambda_c^+ \Xi_c(2645)^0) / \Gamma_{\text{total}} \quad \Gamma_{568} / \Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 7.9 × 10<sup>-4</sup></b>	90	<sup>1</sup> LI	19G	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses fully reconstructed  $B^+$  meson on tag side and recoil against  $\Lambda_c^+$  on signal side.

$\Gamma(\Lambda_c^+ \Xi_c(2790)^0) / \Gamma_{\text{total}} \quad \Gamma_{569} / \Gamma$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.1 ± 0.4 ± 0.2</b>	<sup>1</sup> LI	19G	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses fully reconstructed  $B^+$  meson on tag side and recoil against  $\Lambda_c^+$  on signal side.



$\Gamma(\pi^+ \ell^+ \ell^-)/\Gamma_{\text{total}}$   $\Gamma_{570}/\Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;4.9 \times 10^{-8}</math></b>	90	<sup>1</sup> WEI	08A BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$<6.6 \times 10^{-8}$	90	<sup>1</sup> LEES	13M BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$<1.2 \times 10^{-7}$	90	<sup>1</sup> AUBERT	07AG BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\pi^+ e^+ e^-)/\Gamma_{\text{total}}$   $\Gamma_{571}/\Gamma$ 

Test for  $\Delta B=1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;8.0 \times 10^{-8}</math></b>	90	<sup>1</sup> WEI	08A BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$<12.5 \times 10^{-8}$	90	<sup>1</sup> LEES	13M BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$<18 \times 10^{-8}$	90	<sup>1</sup> AUBERT	07AG BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$<3.9 \times 10^{-3}$	90	<sup>2</sup> WEIR	90B MRK2	$e^+e^-$ 29 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> WEIR 90B assumes  $B^+$  production cross section from LUND.

 $\Gamma(\pi^+ \mu^+ \mu^-)/\Gamma_{\text{total}}$   $\Gamma_{572}/\Gamma$ 

Test for  $\Delta B=1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units $10^{-8}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>1.78 \pm 0.22 \pm 0.03</math></b>		<sup>1</sup> AAIJ	15AR LHCB	$pp$ at 7, 8 TeV
$<5.5$	90	<sup>2</sup> LEES	13M BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$2.3 \pm 0.6 \pm 0.1$		AAIJ	12AY LHCB	Repl. by AAIJ 15AR
$<6.9$	90	<sup>2</sup> WEI	08A BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$<28$	90	<sup>2</sup> AUBERT	07AG BABR	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<sup>1</sup> AAIJ 15AR reports  $(1.83 \pm 0.24 \pm 0.05) \times 10^{-8}$  from a measurement of  $[\Gamma(B^+ \rightarrow \pi^+ \mu^+ \mu^-)/\Gamma_{\text{total}}] / [B(B^+ \rightarrow J/\psi(1S) K^+)] / [B(J/\psi(1S) \rightarrow \mu^+ \mu^-)]$  assuming  $B(B^+ \rightarrow J/\psi(1S) K^+) = (1.05 \pm 0.05) \times 10^{-3}$ ,  $B(J/\psi(1S) \rightarrow \mu^+ \mu^-) = (5.961 \pm 0.033) \times 10^{-2}$ , which we rescale to our best values  $B(B^+ \rightarrow J/\psi(1S) K^+) = (1.020 \pm 0.019) \times 10^{-3}$ ,  $B(J/\psi(1S) \rightarrow \mu^+ \mu^-) = (5.961 \pm 0.033) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best values.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

 $\Gamma(\pi^+ \mu^+ \mu^-)/\Gamma(K^+ \mu^+ \mu^-)$   $\Gamma_{572}/\Gamma_{576}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
$0.053 \pm 0.014 \pm 0.001$	AAIJ	12AY LHCB	Repl. by AAIJ 15AR

 $\Gamma(\pi^+ \nu \bar{\nu})/\Gamma_{\text{total}}$   $\Gamma_{573}/\Gamma$ 

Test for  $\Delta B=1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;1.4 \times 10^{-5}</math></b>	90	<sup>1</sup> GRYGIER	17 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<9.8 \times 10^{-5}$	90	<sup>1</sup> LUTZ	13	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$<1.7 \times 10^{-4}$	90	<sup>1</sup> CHEN	07D	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$<1.0 \times 10^{-4}$	90	<sup>1</sup> AUBERT	05H	BABR	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(K^+ \ell^+ \ell^-) / \Gamma_{\text{total}}$   $\Gamma_{574} / \Gamma$

Test for  $\Delta B=1$  weak neutral current. Allowed by higher-order electroweak interactions.

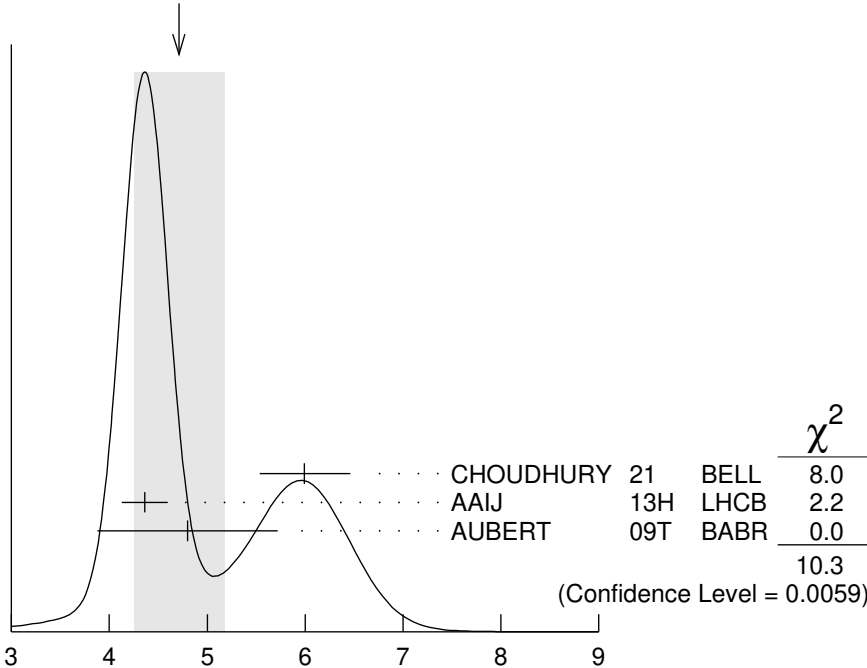
VALUE (units  $10^{-7}$ )                      DOCUMENT ID                      TECN                      COMMENT  
**4.7 ± 0.5 OUR AVERAGE** Error includes scale factor of 2.3. See the ideogram below.

$5.99^{+0.45}_{-0.43} \pm 0.14$		CHOUDHURY 21	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$4.36 \pm 0.15 \pm 0.18$	<sup>1</sup>	AAIJ	13H	LHCB $pp$ at 7 TeV
$4.8 \pm 0.9 \pm 0.2$	<sup>2</sup>	AUBERT	09T	BABR $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$5.3^{+0.6}_{-0.5} \pm 0.3$	<sup>2,3</sup>	WEI	09A	BELL $e^+e^- \rightarrow \Upsilon(4S)$
$3.8^{+0.9}_{-0.8} \pm 0.2$	<sup>2</sup>	AUBERT,B	06J	BABR Repl. by AUBERT 09T
$5.3^{+1.1}_{-1.0} \pm 0.3$	<sup>2</sup>	ISHIKAWA	03	BELL Repl. by WEI 09A

WEIGHTED AVERAGE  
 $4.7 \pm 0.5$  (Error scaled by 2.3)



<sup>1</sup> Uses  $B(B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+ \mu^- K^+) = (6.01 \pm 0.21) \times 10^{-5}$ .

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> Superseded by CHOUDHURY 21.

$\Gamma(K^+ \ell^+ \ell^-) / \Gamma_{\text{total}}$  (units  $10^{-7}$ )

$\Gamma(K^+ e^+ e^-)/\Gamma_{\text{total}}$   $\Gamma_{575}/\Gamma$ Test for  $\Delta B=1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units $10^{-7}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>5.6 <math>\pm</math> 0.6 OUR AVERAGE</b>				
5.75 <sup>+0.64</sup> <sub>-0.61</sub> $\pm$ 0.15		CHOUDHURY 21	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
5.1 <sup>+1.2</sup> <sub>-1.1</sub> $\pm$ 0.2		<sup>1</sup> AUBERT	09T BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
5.7 <sup>+0.9</sup> <sub>-0.8</sub> $\pm$ 0.3		<sup>1,2</sup> WEI	09A BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
4.2 <sup>+1.2</sup> <sub>-1.1</sub> $\pm$ 0.2		<sup>1</sup> AUBERT,B	06J BABR	Repl. by AUBERT 09T
10.5 <sup>+2.5</sup> <sub>-2.2</sub> $\pm$ 0.7		<sup>1</sup> AUBERT	03U BABR	Repl. by AUBERT,B 06J
6.3 <sup>+1.9</sup> <sub>-1.7</sub> $\pm$ 0.3		<sup>3</sup> ISHIKAWA	03 BELL	Repl. by WEI 09A
<14	90	<sup>1</sup> ABE	02 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
< 9	90	<sup>1</sup> AUBERT	02L BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
<24	90	<sup>4</sup> ANDERSON	01B CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>2</sup> Superseded by CHOUDHURY 21.<sup>3</sup> Assumes equal production of  $B^0$  and  $B^+$  at  $\Upsilon(4S)$ . The second error is a total of systematic uncertainties including model dependence.<sup>4</sup> The result is for di-lepton masses above 0.5 GeV. $\Gamma(K^+ \mu^+ \mu^-)/\Gamma_{\text{total}}$   $\Gamma_{576}/\Gamma$ Test for  $\Delta B=1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units $10^{-7}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>4.53 <math>\pm</math> 0.35 OUR FIT</b> Error includes scale factor of 1.8.				
<b>4.5 <math>\pm</math> 0.6 OUR AVERAGE</b> Error includes scale factor of 2.9.				
6.24 <sup>+0.65</sup> <sub>-0.61</sub> $\pm$ 0.16		CHOUDHURY 21	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
4.29 $\pm$ 0.07 $\pm$ 0.21		<sup>1</sup> AAIJ	14M LHCB	$p\bar{p}$ at 7, 8 TeV
4.1 <sup>+1.6</sup> <sub>-1.5</sub> $\pm$ 0.2		<sup>2</sup> AUBERT	09T BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
4.36 $\pm$ 0.15 $\pm$ 0.18		<sup>3</sup> AAIJ	13H LHCB	Repl. by AAIJ 14M
5.3 <sup>+0.8</sup> <sub>-0.7</sub> $\pm$ 0.3		<sup>2,4</sup> WEI	09A BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
3.1 <sup>+1.5</sup> <sub>-1.2</sub> $\pm$ 0.3		<sup>2</sup> AUBERT,B	06J BABR	Repl. by AUBERT 09T
0.7 <sup>+1.9</sup> <sub>-1.1</sub> $\pm$ 0.2		<sup>2</sup> AUBERT	03U BABR	Repl. by AUBERT,B 06J
4.5 <sup>+1.4</sup> <sub>-1.2</sub> $\pm$ 0.3		<sup>5</sup> ISHIKAWA	03 BELL	Repl. by WEI 09A
9.8 <sup>+4.6</sup> <sub>-3.6</sub> $\pm$ 1.6		<sup>2</sup> ABE	02 BELL	Repl. by ISHIKAWA 03
< 12	90	<sup>2</sup> AUBERT	02L BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
< 36.8	90	<sup>6</sup> ANDERSON	01B CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
< 52	90	<sup>7</sup> AFFOLDER	99B CDF	$p\bar{p}$ at 1.8 TeV

< 100	90	<sup>8</sup> ABE	96L	CDF	Repl. by AFFOLDER 99B
< 2400	90	<sup>9</sup> ALBRECHT	91E	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
<64000	90	<sup>10</sup> WEIR	90B	MRK2	$e^+e^-$ 29 GeV
< 1700	90	<sup>11</sup> AVERY	89B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
< 3800	90	<sup>12</sup> AVERY	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses  $B(B^+ \rightarrow J/\psi(1S)K^+) = (0.998 \pm 0.014 \pm 0.040) \times 10^{-3}$  for normalization.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> Uses  $B(B^+ \rightarrow J/\psi K^+ \rightarrow \mu^+ \mu^- K^+) = (6.01 \pm 0.21) \times 10^{-5}$ .

<sup>4</sup> Superseded by CHOUDHURY 21.

<sup>5</sup> Assumes equal production of  $B^0$  and  $B^+$  at  $\Upsilon(4S)$ . The second error is a total of systematic uncertainties including model dependence.

<sup>6</sup> The result is for di-lepton masses above 0.5 GeV.

<sup>7</sup> AFFOLDER 99B measured relative to  $B^+ \rightarrow J/\psi(1S)K^+$ .

<sup>8</sup> ABE 96L measured relative to  $B^+ \rightarrow J/\psi(1S)K^+$  using PDG 94 branching ratios.

<sup>9</sup> ALBRECHT 91E reports  $< 2.2 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 45% to  $B^0\bar{B}^0$ . We rescale to 50%.

<sup>10</sup> WEIR 90B assumes  $B^+$  production cross section from LUND.

<sup>11</sup> AVERY 89B reports  $< 1.5 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 43% to  $B^0\bar{B}^0$ . We rescale to 50%.

<sup>12</sup> AVERY 87 reports  $< 3.2 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 40% to  $B^0\bar{B}^0$ . We rescale to 50%.

### $\Gamma(K^+ \mu^+ \mu^- \text{ nonresonant})/\Gamma_{\text{total}}$ $\Gamma_{577}/\Gamma$

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>4.37 \pm 0.15 \pm 0.23</math></b>	<sup>1</sup> AAIJ	17Y	LHCB $pp$ at 7, 8 TeV

<sup>1</sup> Measured in amplitude analysis using model including short-distance  $K^+ \mu^+ \mu^-$  and  $\rho(770)$ ,  $\omega(782)$ ,  $\phi(1020)$ ,  $J/\psi$ ,  $\psi(2S)$ ,  $\psi(3770)$ ,  $\psi(4040)$ ,  $\psi(4160)$ , and  $\psi(4415)$  contributions.

### $\Gamma(K^+ \tau^+ \tau^-)/\Gamma_{\text{total}}$ $\Gamma_{578}/\Gamma$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt; 2.25 \times 10^{-3}</math></b>	90	<sup>1,2</sup> LEES	17	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses only leptonic decays of  $\tau$  and the quoted limit combines the final states  $K^+ e^+ e^-$ ,  $K^+ \mu^+ \mu^-$ , and  $K^+ e^\pm \mu^\mp$ .

<sup>2</sup> If observed events are interpreted as a signal the branching fraction measurement becomes  $(1.31^{+0.66+0.35}_{-0.61-0.25}) \times 10^{-3}$ .

### $\Gamma(K^+ \mu^+ \mu^-)/\Gamma(J/\psi(1S)K^+)$ $\Gamma_{576}/\Gamma_{276}$

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.444 \pm 0.034</math> OUR FIT</b>	Error includes scale factor of 1.7.		
<b><math>0.46 \pm 0.04 \pm 0.02</math></b>	AALTONEN	11A1	CDF $p\bar{p}$ at 1.96 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.38 \pm 0.05 \pm 0.02$	AALTONEN	11L	CDF Repl. by AALTONEN 11A1
$0.59 \pm 0.15 \pm 0.03$	AALTONEN	09B	CDF Repl. by AALTONEN 11L

$\Gamma(K^+\bar{\nu})/\Gamma_{\text{total}}$  $\Gamma_{579}/\Gamma$ Test for  $\Delta B=1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.6 \times 10^{-5}$	90	<sup>1,2</sup> LEES	13I BABR	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<4.1 \times 10^{-5}$	90	<sup>3</sup> ABUDINEN	21 BEL2	$e^+e^- \rightarrow \Upsilon(4S)$
$<1.9 \times 10^{-5}$	90	<sup>1,4</sup> GRYGIER	17 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$<5.5 \times 10^{-5}$	90	<sup>1</sup> LUTZ	13 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$<1.3 \times 10^{-5}$	90	<sup>1</sup> DEL-AMO-SAI0Q	BABR	Repl. by LEES 13I
$<1.4 \times 10^{-5}$	90	<sup>1</sup> CHEN	07D BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$<5.2 \times 10^{-5}$	90	<sup>1</sup> AUBERT	05H BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$<2.4 \times 10^{-4}$	90	<sup>1</sup> BROWDER	01 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>2</sup> Also reported a limit  $< 3.7 \times 10^{-5}$  at 90% CL obtained using a fully reconstructed hadronic  $B$ -tag events.<sup>3</sup> Using an inclusive tagging method that exploits not only the properties of the  $B^+ \rightarrow K^+ \nu \bar{\nu}$  decay, but also the inclusive properties of the other  $B$  meson in the event.<sup>4</sup> The result was reported in arXiv:1702.03224, but missing from the publication by mistake. $\Gamma(\rho^+ \nu \bar{\nu})/\Gamma_{\text{total}}$  $\Gamma_{580}/\Gamma$ Test for  $\Delta B = 1$  weak neutral current. Allowed by higher-order electroweak interaction.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.0 \times 10^{-5}$	90	<sup>1</sup> GRYGIER	17 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<2.13 \times 10^{-4}$	90	<sup>1</sup> LUTZ	13 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$<1.5 \times 10^{-4}$	90	<sup>1</sup> CHEN	07D BELL	Repl. by LUTZ 13

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(K^*(892)^+ \ell^+ \ell^-)/\Gamma_{\text{total}}$  $\Gamma_{581}/\Gamma$ Test for  $\Delta B=1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units $10^{-7}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>10.1 ± 1.1 OUR AVERAGE</b>		Error includes scale factor of 1.1.		
$9.24 \pm 0.93 \pm 0.67$		AAIJ	14M LHCB	$pp$ at 7, 8 TeV
$14.0^{+4.0}_{-3.7} \pm 0.9$		<sup>1</sup> AUBERT	09T BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$12.4^{+2.3}_{-2.1} \pm 1.3$		<sup>1</sup> WEI	09A BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$11.6 \pm 1.9$		<sup>2</sup> AAIJ	12AH LHCB	Repl. by AAIJ 14M
$7.3^{+5.0}_{-4.2} \pm 2.1$		<sup>1</sup> AUBERT,B	06J BABR	Repl. by AUBERT 09T
$<22$	90	<sup>1</sup> ISHIKAWA	03 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Measured in  $B^+ \rightarrow K^*(892)^+ \mu^+ \mu^-$  decays.

### $\Gamma(K^*(892)^+ e^+ e^-)/\Gamma_{\text{total}}$ $\Gamma_{582}/\Gamma$

Test for  $\Delta B=1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units $10^{-7}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**15.5<sup>+4.0</sup><sub>-3.1</sub> OUR AVERAGE**

13.8 <sup>+4.7</sup> <sub>-4.2</sub> ± 0.8		<sup>1</sup> AUBERT	09T BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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17.3 <sup>+5.0</sup> <sub>-4.2</sub> ± 2.0		<sup>1</sup> WEI	09A BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

7.5 <sup>+7.6</sup> <sub>-6.5</sub> ± 3.8		<sup>1</sup> AUBERT,B	06J BABR	Repl. by AUBERT 09T
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2.0 <sup>+13.4</sup> <sub>-8.7</sub> ± 2.8		<sup>1</sup> AUBERT	03U BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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< 46	90	<sup>2</sup> ISHIKAWA	03 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
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< 89	90	<sup>1</sup> ABE	02 BELL	Repl. by ISHIKAWA 03
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< 95	90	<sup>1</sup> AUBERT	02L BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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< 6900	90	<sup>3</sup> ALBRECHT	91E ARG	$e^+ e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> Assumes equal production of  $B^0$  and  $B^+$  at  $\Upsilon(4S)$ . The second error is a total of systematic uncertainties including model dependence.

<sup>3</sup> ALBRECHT 91E reports  $< 6.3 \times 10^{-4}$  assuming the  $\Upsilon(4S)$  decays 45% to  $B^0 \bar{B}^0$ . We rescale to 50%.

### $\Gamma(K^*(892)^+ \mu^+ \mu^-)/\Gamma_{\text{total}}$ $\Gamma_{583}/\Gamma$

Test for  $\Delta B=1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units $10^{-7}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**9.6 ± 1.0 OUR FIT**

**9.6 ± 1.1 OUR AVERAGE**

9.24 ± 0.93 ± 0.67		<sup>1</sup> AAIJ	14M LHCB	$pp$ at 7, 8 TeV
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14.6 <sup>+7.9</sup> <sub>-7.5</sub> ± 1.2		<sup>2</sup> AUBERT	09T BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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11.1 <sup>+3.2</sup> <sub>-2.7</sub> ± 1.0		<sup>2</sup> WEI	09A BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

11.6 ± 1.9		AAIJ	12AH LHCB	Repl. by AAIJ 14M
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9.7 <sup>+9.4</sup> <sub>-6.9</sub> ± 1.4		<sup>2</sup> AUBERT,B	06J BABR	Repl. by AUBERT 09T
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30.7 <sup>+25.8</sup> <sub>-17.8</sub> ± 4.2		<sup>2</sup> AUBERT	03U BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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6.5 <sup>+6.9</sup> <sub>-5.3</sub> +1.5 -1.6		<sup>3</sup> ISHIKAWA	03 BELL	Repl. by WEI 09A
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< 39	90	<sup>2</sup> ABE	02 BELL	Repl. by ISHIKAWA 03
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< 170	90	<sup>2</sup> AUBERT	02L BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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<sup>1</sup> Uses  $B(B^+ \rightarrow J/\psi(1S) K^*(892)^+) = (1.431 \pm 0.027 \pm 0.090) \times 10^{-3}$  for normalization.

<sup>2</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>3</sup> Assumes equal production of  $B^0$  and  $B^+$  at  $\Upsilon(4S)$ . The second error is a total of systematic uncertainties including model dependence. The 90% C.L. upper limit is  $2.2 \times 10^{-6}$ .

$\Gamma(K^*(892)^+ \mu^+ \mu^-) / \Gamma(J/\psi(1S) K^*(892)^+)$   $\Gamma_{583} / \Gamma_{281}$ 

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>0.67 \pm 0.08</math> OUR FIT</b>				
<b><math>0.67 \pm 0.22 \pm 0.04</math></b>		AALTONEN	11A1 CDF	$p\bar{p}$ at 1.96 TeV

 $\Gamma(K^*(892)^+ \nu \bar{\nu}) / \Gamma_{\text{total}}$   $\Gamma_{584} / \Gamma$ Test for  $\Delta B = 1$  weak neutral current. Allowed by higher-order electroweak interaction.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 4.0 \times 10^{-5}</math></b>	90	<sup>1</sup> LUTZ	13 BELL	$e^+ e^- \rightarrow \gamma(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$< 6.1 \times 10^{-5}$	90	<sup>1</sup> GRYGIER	17 BELL	$e^+ e^- \rightarrow \gamma(4S)$
$< 6.4 \times 10^{-5}$	90	<sup>1,2</sup> LEES	131 BABR	$e^+ e^- \rightarrow \gamma(4S)$
$< 8 \times 10^{-5}$	90	AUBERT	08BC BABR	Repl. by LEES 131
$< 1.4 \times 10^{-4}$	90	<sup>1</sup> CHEN	07D BELL	$e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .<sup>2</sup> Also reported a limit  $< 11.6 \times 10^{-5}$  at 90% CL obtained using a fully reconstructed hadronic  $B$ -tag events. $\Gamma(K^+ \pi^+ \pi^- \mu^+ \mu^-) / \Gamma(\psi(2S) K^+)$   $\Gamma_{585} / \Gamma_{311}$ 

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>6.95^{+0.46}_{-0.43} \pm 0.34</math></b>	AAIJ	14AZ LHCB	$pp$ at 7, 8 TeV

 $\Gamma(\phi K^+ \mu^+ \mu^-) / \Gamma(J/\psi(1S) \phi K^+)$   $\Gamma_{586} / \Gamma_{288}$ 

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>1.58^{+0.36+0.19}_{-0.32-0.07}</math></b>	AAIJ	14AZ LHCB	$pp$ at 7, 8 TeV

 $\Gamma(\bar{\Lambda} p \nu \bar{\nu}) / \Gamma_{\text{total}}$   $\Gamma_{587} / \Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 3.0 \times 10^{-5}</math></b>	90	<sup>1</sup> LEES	19C BABR	$e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Signal candidates are identified by first fully reconstructing  $B^+$  in one of many possible exclusive decays to hadronic final states. $\Gamma(\pi^+ e^+ \mu^-) / \Gamma_{\text{total}}$   $\Gamma_{588} / \Gamma$ 

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 0.0064</math></b>	90	<sup>1</sup> WEIR	90B MRK2	$e^+ e^-$ 29 GeV

<sup>1</sup> WEIR 90B assumes  $B^+$  production cross section from LUND. $\Gamma(\pi^+ e^- \mu^+) / \Gamma_{\text{total}}$   $\Gamma_{589} / \Gamma$ 

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 0.0064</math></b>	90	<sup>1</sup> WEIR	90B MRK2	$e^+ e^-$ 29 GeV

<sup>1</sup> WEIR 90B assumes  $B^+$  production cross section from LUND. $\Gamma(\pi^+ e^\pm \mu^\mp) / \Gamma_{\text{total}}$   $\Gamma_{590} / \Gamma$ 

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 1.7 \times 10^{-7}</math></b>	90	<sup>1</sup> AUBERT	07AG BABR	$e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

$\Gamma(\pi^+ e^+ \tau^-)/\Gamma_{\text{total}}$   $\Gamma_{591}/\Gamma$ 

Test of lepton family number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<74	90	<sup>1</sup> LEES	12P BABR	$e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Uses a fully reconstructed hadronic  $B$  decay as a tag on the recoil side. $\Gamma(\pi^+ e^- \tau^+)/\Gamma_{\text{total}}$   $\Gamma_{592}/\Gamma$ 

Test of lepton family number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<20	90	<sup>1</sup> LEES	12P BABR	$e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Uses a fully reconstructed hadronic  $B$  decay as a tag on the recoil side. $\Gamma(\pi^+ e^\pm \tau^\mp)/\Gamma_{\text{total}}$   $\Gamma_{593}/\Gamma$ 

Test of lepton family number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<75	90	<sup>1,2</sup> LEES	12P BABR	$e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Assumes  $B(B^+ \rightarrow h^+ \ell^+ \tau^-) = B(B^+ \rightarrow h^+ \ell^- \tau^+)$ .<sup>2</sup> Uses a fully reconstructed hadronic  $B$  decay as a tag on the recoil side. $\Gamma(\pi^+ \mu^+ \tau^-)/\Gamma_{\text{total}}$   $\Gamma_{594}/\Gamma$ 

Test of lepton family number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<62	90	<sup>1</sup> LEES	12P BABR	$e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Uses a fully reconstructed hadronic  $B$  decay as a tag on the recoil side. $\Gamma(\pi^+ \mu^- \tau^+)/\Gamma_{\text{total}}$   $\Gamma_{595}/\Gamma$ 

Test of lepton family number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<45	90	<sup>1</sup> LEES	12P BABR	$e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Uses a fully reconstructed hadronic  $B$  decay as a tag on the recoil side. $\Gamma(\pi^+ \mu^\pm \tau^\mp)/\Gamma_{\text{total}}$   $\Gamma_{596}/\Gamma$ 

Test of lepton family number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<72	90	<sup>1,2</sup> LEES	12P BABR	$e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Assumes  $B(B^+ \rightarrow h^+ \ell^+ \tau^-) = B(B^+ \rightarrow h^+ \ell^- \tau^+)$ .<sup>2</sup> Uses a fully reconstructed hadronic  $B$  decay as a tag on the recoil side. $\Gamma(K^+ e^+ \mu^-)/\Gamma_{\text{total}}$   $\Gamma_{597}/\Gamma$ 

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<7.0 $\times 10^{-9}$	90	AAIJ	19AMLHCB	$pp$ at 7, 8 TeV

● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

<3.0 $\times 10^{-8}$	90	CHOUDHURY 21	BELL	$e^+ e^- \rightarrow \gamma(4S)$
<0.91 $\times 10^{-7}$	90	<sup>1</sup> AUBERT,B	06J BABR	$e^+ e^- \rightarrow \gamma(4S)$
<8 $\times 10^{-7}$	90	<sup>1</sup> AUBERT	02L BABR	Repl. by AUBERT,B 06J
<6.4 $\times 10^{-3}$	90	<sup>2</sup> WEIR	90B MRK2	$e^+ e^-$ 29 GeV

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .<sup>2</sup> WEIR 90B assumes  $B^+$  production cross section from LUND.



$\Gamma(K^+ e^- \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{598}/\Gamma$ 

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<6.4 \times 10^{-9}$	90	AAIJ	19AMLHCB	$pp$ at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<8.5 \times 10^{-8}$	90	CHOUHURY 21	BELL	$e^+e^- \rightarrow \gamma(4S)$
$<1.3 \times 10^{-7}$	90	<sup>1</sup> AUBERT,B	06J BABR	$e^+e^- \rightarrow \gamma(4S)$
$<6.4 \times 10^{-3}$	90	<sup>2</sup> WEIR	90B MRK2	$e^+e^-$ 29 GeV

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .<sup>2</sup> WEIR 90B assumes  $B^+$  production cross section from LUND. $\Gamma(K^+ e^\pm \mu^\mp)/\Gamma_{\text{total}}$   $\Gamma_{599}/\Gamma$ 

VALUE (units $10^{-7}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.91</b>	90	<sup>1</sup> AUBERT,B	06J BABR	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ . $\Gamma(K^+ e^+ \tau^-)/\Gamma_{\text{total}}$   $\Gamma_{600}/\Gamma$ 

Test of lepton family number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;43</b>	90	<sup>1</sup> LEES	12P BABR	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> Uses a fully reconstructed hadronic  $B$  decay as a tag on the recoil side. $\Gamma(K^+ e^- \tau^+)/\Gamma_{\text{total}}$   $\Gamma_{601}/\Gamma$ 

Test of lepton family number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;15</b>	90	<sup>1</sup> LEES	12P BABR	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> Uses a fully reconstructed hadronic  $B$  decay as a tag on the recoil side. $\Gamma(K^+ e^\pm \tau^\mp)/\Gamma_{\text{total}}$   $\Gamma_{602}/\Gamma$ 

Test of lepton family number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;30</b>	90	<sup>1,2</sup> LEES	12P BABR	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> Assumes  $B(B^+ \rightarrow h^+ \ell^+ \tau^-) = B(B^+ \rightarrow h^+ \ell^- \tau^+)$ .<sup>2</sup> Uses a fully reconstructed hadronic  $B$  decay as a tag on the recoil side. $\Gamma(K^+ \mu^+ \tau^-)/\Gamma_{\text{total}}$   $\Gamma_{603}/\Gamma$ 

Test of lepton family number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;45</b>	90	<sup>1</sup> LEES	12P BABR	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> Uses a fully reconstructed hadronic  $B$  decay as a tag on the recoil side. $\Gamma(K^+ \mu^- \tau^+)/\Gamma_{\text{total}}$   $\Gamma_{604}/\Gamma$ 

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;2.8 <math>\times 10^{-5}</math></b>	90	<sup>1</sup> LEES	12P BABR	$e^+e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<3.9 \times 10^{-5}$	90	<sup>2</sup> AAIJ	20P LHCB	$pp$ at 7, 8, 13 TeV
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<sup>1</sup> Uses a fully reconstructed hadronic  $B$  decay as a tag on the recoil side.<sup>2</sup> Uses the  $B_{s2}^{*0} \rightarrow B^+ K^-$  decays for kinematic constraints.

$\Gamma(K^+ \mu^\pm \tau^\mp)/\Gamma_{\text{total}}$   $\Gamma_{605}/\Gamma$ 

Test of lepton family number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<48	90	1,2 LEES	12P BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<77	90	<sup>1</sup> AUBERT	07AZ BABR	Repl. by LEES 12P
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<sup>1</sup> Uses a fully reconstructed hadronic  $B$  decay as a tag on the recoil side.<sup>2</sup> Assumes  $B(B^+ \rightarrow h^+ \ell^+ \tau^-) = B(B^+ \rightarrow h^+ \ell^- \tau^+)$ . $\Gamma(K^*(892)^+ e^+ \mu^-)/\Gamma_{\text{total}}$   $\Gamma_{606}/\Gamma$ 

VALUE (units $10^{-7}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<13	90	<sup>1</sup> AUBERT,B	06J BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(K^*(892)^+ e^- \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{607}/\Gamma$ 

VALUE (units $10^{-7}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<9.9	90	<sup>1</sup> AUBERT,B	06J BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(K^*(892)^+ e^\pm \mu^\mp)/\Gamma_{\text{total}}$   $\Gamma_{608}/\Gamma$ 

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< $1.4 \times 10^{-6}$	90	<sup>1</sup> AUBERT,B	06J BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< $7.9 \times 10^{-6}$	90	<sup>1</sup> AUBERT	02L BABR	Repl. by AUBERT,B 06J
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma(\pi^- e^+ e^+)/\Gamma_{\text{total}}$   $\Gamma_{609}/\Gamma$ 

Test of total lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< $2.3 \times 10^{-8}$	90	<sup>1</sup> LEES	12J BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< $1.6 \times 10^{-6}$	90	<sup>1</sup> EDWARDS	02B CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
<0.0039	90	<sup>2</sup> WEIR	90B MRK2	$e^+ e^-$ 29 GeV

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .<sup>2</sup> WEIR 90B assumes  $B^+$  production cross section from LUND. $\Gamma(\pi^- \mu^+ \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{610}/\Gamma$ 

Test of total lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< $4.0 \times 10^{-9}$	95	<sup>1</sup> AAIJ	14AC LHCB	$pp$ at 7, 8 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

< $1.3 \times 10^{-8}$	95	<sup>2</sup> AAIJ	12AD LHCB	Repl. by AAIJ 14AC
< $4.4 \times 10^{-8}$	90	AAIJ	12C LHCB	$pp$ at 7 TeV
< $10.7 \times 10^{-8}$	90	<sup>3</sup> LEES	12J BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
< $1.4 \times 10^{-6}$	90	<sup>3</sup> EDWARDS	02B CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
< $9.1 \times 10^{-3}$	90	<sup>4</sup> WEIR	90B MRK2	$e^+ e^-$ 29 GeV

<sup>1</sup> Uses  $B^+ \rightarrow J/\psi K^+$ ,  $J/\psi \rightarrow \mu^+ \mu^-$  mode for normalization. Obtains neutrino-mass-dependent upper limits in the range  $0.4\text{--}4.0 \times 10^{-9}$ . This limit is applicable for Majorana neutrino lifetime  $< 1$  ps.

<sup>2</sup> Uses  $B^+ \rightarrow J/\psi K^+$ ,  $J/\psi \rightarrow \mu^+ \mu^-$  mode for normalization. Obtains neutrino-mass-dependent upper limits in the range  $0.4\text{--}1.0 \times 10^{-8}$ .

<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>4</sup> WEIR 90B assumes  $B^+$  production cross section from LUND.

### $\Gamma(\pi^- e^+ \mu^+)/\Gamma_{\text{total}}$ $\Gamma_{611}/\Gamma$

Test of total lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;1.5 <math>\times 10^{-7}</math></b>	90	<sup>1</sup> LEES	14A	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<1.3 $\times 10^{-6}$	90	<sup>1</sup> EDWARDS	02B	CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$
<0.0064	90	<sup>2</sup> WEIR	90B	MRK2 $e^+ e^- 29$ GeV

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

<sup>2</sup> WEIR 90B assumes  $B^+$  production cross section from LUND.

### $\Gamma(\rho^- e^+ e^+)/\Gamma_{\text{total}}$ $\Gamma_{612}/\Gamma$

Test of total lepton number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.17</b>	90	<sup>1</sup> LEES	14A	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<2.6	90	<sup>1</sup> EDWARDS	02B	CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(\rho^- \mu^+ \mu^+)/\Gamma_{\text{total}}$ $\Gamma_{613}/\Gamma$

Test of total lepton number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.42</b>	90	LEES	14A	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<5.0	90	<sup>1</sup> EDWARDS	02B	CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(\rho^- e^+ \mu^+)/\Gamma_{\text{total}}$ $\Gamma_{614}/\Gamma$

Test of total lepton number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.47</b>	90	<sup>1</sup> LEES	14A	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<3.3	90	<sup>1</sup> EDWARDS	02B	CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

### $\Gamma(K^- e^+ e^+)/\Gamma_{\text{total}}$ $\Gamma_{615}/\Gamma$

Test of total lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;3.0 <math>\times 10^{-8}</math></b>	90	<sup>1</sup> LEES	12J	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<1.0 \times 10^{-6}$	90	<sup>1</sup> EDWARDS	02B	CLE2	$e^+e^- \rightarrow \gamma(4S)$
$<0.0039$	90	<sup>2</sup> WEIR	90B	MRK2	$e^+e^-$ 29 GeV

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

<sup>2</sup> WEIR 90B assumes  $B^+$  production cross section from LUND.

### $\Gamma(K^-\mu^+\mu^+)/\Gamma_{\text{total}}$ $\Gamma_{616}/\Gamma$

Test of total lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;4.1 \times 10^{-8}</math></b>	90	AAIJ	12C	LHCB $pp$ at 7 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<6.7 \times 10^{-8}$	90	<sup>1</sup> LEES	12J	BABR	$e^+e^- \rightarrow \gamma(4S)$
$<1.8 \times 10^{-6}$	90	<sup>1</sup> EDWARDS	02B	CLE2	$e^+e^- \rightarrow \gamma(4S)$
$<9.1 \times 10^{-3}$	90	<sup>2</sup> WEIR	90B	MRK2	$e^+e^-$ 29 GeV

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

<sup>2</sup> WEIR 90B assumes  $B^+$  production cross section from LUND.

### $\Gamma(K^-e^+\mu^+)/\Gamma_{\text{total}}$ $\Gamma_{617}/\Gamma$

Test of total lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;1.6 \times 10^{-7}</math></b>	90	<sup>1</sup> LEES	14A	BABR $e^+e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<2.0 \times 10^{-6}$	90	<sup>1</sup> EDWARDS	02B	CLE2	$e^+e^- \rightarrow \gamma(4S)$
$<0.0064$	90	<sup>2</sup> WEIR	90B	MRK2	$e^+e^-$ 29 GeV

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

<sup>2</sup> WEIR 90B assumes  $B^+$  production cross section from LUND.

### $\Gamma(K^*(892)^-e^+e^+)/\Gamma_{\text{total}}$ $\Gamma_{618}/\Gamma$

Test of total lepton number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;0.40</math></b>	90	<sup>1</sup> LEES	14A	BABR $e^+e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<2.8$	90	<sup>1</sup> EDWARDS	02B	CLE2	$e^+e^- \rightarrow \gamma(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

### $\Gamma(K^*(892)^-\mu^+\mu^+)/\Gamma_{\text{total}}$ $\Gamma_{619}/\Gamma$

Test of total lepton number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;0.59</math></b>	90	<sup>1</sup> LEES	14A	BABR $e^+e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<8.3$	90	<sup>1</sup> EDWARDS	02B	CLE2	$e^+e^- \rightarrow \gamma(4S)$
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<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\gamma(4S)$ .

### $\Gamma(K^*(892)^-e^+\mu^+)/\Gamma_{\text{total}}$ $\Gamma_{620}/\Gamma$

Test of total lepton number conservation.

VALUE (units $10^{-6}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;0.30</math></b>	90	<sup>1</sup> LEES	14A	BABR $e^+e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<4.4                      90            <sup>1</sup> EDWARDS    02B   CLE2    $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ .

$\Gamma(D^- e^+ e^+)/\Gamma_{\text{total}}$   $\Gamma_{621}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<2.6 × 10 <sup>-6</sup>	90	<sup>1</sup> LEES	14A BABR	$e^+e^- \rightarrow \Upsilon(4S)$
<2.6 × 10 <sup>-6</sup>	90	<sup>1,2</sup> SEON	11 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^0$  and  $B^+$  from Upsilon(4S) decays.

<sup>2</sup> Uses  $D^- \rightarrow K^+ \pi^- \pi^-$  mode and 3-body phase-space hypothesis for the signal decays.

$\Gamma(D^- e^+ \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{622}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<1.8 × 10 <sup>-6</sup>	90	<sup>1,2</sup> SEON	11 BELL	$e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<2.1 × 10<sup>-6</sup>            90            <sup>1</sup> LEES            14A BABR    $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes equal production of  $B^0$  and  $B^+$  from Upsilon(4S) decays.

<sup>2</sup> Uses  $D^- \rightarrow K^+ \pi^- \pi^-$  mode and 3-body phase-space hypothesis for the signal decays.

$\Gamma(D^- \mu^+ \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{623}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 6.9 × 10 <sup>-7</sup>	95	<sup>1</sup> AAIJ	12AD LHCB	$pp$ at 7 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

<17 × 10<sup>-7</sup>            90            <sup>2</sup> LEES            14A BABR    $e^+e^- \rightarrow \Upsilon(4S)$

< 1.1 × 10<sup>-6</sup>            90            <sup>2,3</sup> SEON            11 BELL    $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses  $B^+ \rightarrow \psi(2S)K^+$ ,  $\psi(2S) \rightarrow J/\psi \pi^+ \pi^-$  mode for normalization.

<sup>2</sup> Assumes equal production of  $B^0$  and  $B^+$  from Upsilon(4S) decays.

<sup>3</sup> Uses  $D^- \rightarrow K^+ \pi^- \pi^-$  mode and 3-body phase-space hypothesis for the signal decays.

$\Gamma(D^{*-} \mu^+ \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{624}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<2.4 × 10 <sup>-6</sup>	95	<sup>1</sup> AAIJ	12AD LHCB	$pp$ at 7 TeV

<sup>1</sup> Uses  $B^+ \rightarrow \psi(2S)K^+$ ,  $\psi(2S) \rightarrow J/\psi \pi^+ \pi^-$  mode for normalization.

$\Gamma(D_s^- \mu^+ \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{625}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<5.8 × 10 <sup>-7</sup>	95	<sup>1</sup> AAIJ	12AD LHCB	$pp$ at 7 TeV

<sup>1</sup> Uses  $B^+ \rightarrow \psi(2S)K^+$ ,  $\psi(2S) \rightarrow J/\psi \pi^+ \pi^-$  mode for normalization. Obtains neutrino-mass-dependent upper limits in the range  $1.5\text{--}8.0 \times 10^{-7}$ .

$\Gamma(\bar{D}^0 \pi^- \mu^+ \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{626}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<1.5 × 10 <sup>-6</sup>	95	<sup>1</sup> AAIJ	12AD LHCB	$pp$ at 7 TeV

<sup>1</sup> Uses  $B^+ \rightarrow \psi(2S)K^+$ ,  $\psi(2S) \rightarrow J/\psi \pi^+ \pi^-$  mode for normalization. Obtains neutrino-mass-dependent upper limits in the range  $0.3\text{--}1.5 \times 10^{-6}$ .

$\Gamma(\Lambda^0 \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{627}/\Gamma$ 

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<6 \times 10^{-8}$	90	1,2 DEL-AMO-SA..11k	BABR	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> DEL-AMO-SANCHEZ 11k reports  $< 6.1 \times 10^{-8}$  from a measurement of  $[\Gamma(B^+ \rightarrow \Lambda^0 \mu^+)/\Gamma_{\text{total}}] \times [B(\Lambda \rightarrow p\pi^-)]$  assuming  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5) \times 10^{-2}$ .

<sup>2</sup> Uses  $B(\gamma(4S) \rightarrow B^0 \bar{B}^0) = (51.6 \pm 0.6)\%$  and  $B(\gamma(4S) \rightarrow B^+ B^-) = (48.4 \pm 0.6)\%$ .

 $\Gamma(\Lambda^0 e^+)/\Gamma_{\text{total}}$   $\Gamma_{628}/\Gamma$ 

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<3.2 \times 10^{-8}$	90	1,2 DEL-AMO-SA..11k	BABR	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> DEL-AMO-SANCHEZ 11k reports  $< 3.2 \times 10^{-8}$  from a measurement of  $[\Gamma(B^+ \rightarrow \Lambda^0 e^+)/\Gamma_{\text{total}}] \times [B(\Lambda \rightarrow p\pi^-)]$  assuming  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5) \times 10^{-2}$ .

<sup>2</sup> Uses  $B(\gamma(4S) \rightarrow B^0 \bar{B}^0) = (51.6 \pm 0.6)\%$  and  $B(\gamma(4S) \rightarrow B^+ B^-) = (48.4 \pm 0.6)\%$ .

 $\Gamma(\bar{\Lambda}^0 \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{629}/\Gamma$ 

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<6 \times 10^{-8}$	90	1,2 DEL-AMO-SA..11k	BABR	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> DEL-AMO-SANCHEZ 11k reports  $< 6.2 \times 10^{-8}$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{\Lambda}^0 \mu^+)/\Gamma_{\text{total}}] \times [B(\Lambda \rightarrow p\pi^-)]$  assuming  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5) \times 10^{-2}$ .

<sup>2</sup> Uses  $B(\gamma(4S) \rightarrow B^0 \bar{B}^0) = (51.6 \pm 0.6)\%$  and  $B(\gamma(4S) \rightarrow B^+ B^-) = (48.4 \pm 0.6)\%$ .

 $\Gamma(\bar{\Lambda}^0 e^+)/\Gamma_{\text{total}}$   $\Gamma_{630}/\Gamma$ 

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<8 \times 10^{-8}$	90	1,2 DEL-AMO-SA..11k	BABR	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> DEL-AMO-SANCHEZ 11k reports  $< 8.1 \times 10^{-8}$  from a measurement of  $[\Gamma(B^+ \rightarrow \bar{\Lambda}^0 e^+)/\Gamma_{\text{total}}] \times [B(\Lambda \rightarrow p\pi^-)]$  assuming  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5) \times 10^{-2}$ .

<sup>2</sup> Uses  $B(\gamma(4S) \rightarrow B^0 \bar{B}^0) = (51.6 \pm 0.6)\%$  and  $B(\gamma(4S) \rightarrow B^+ B^-) = (48.4 \pm 0.6)\%$ .

**POLARIZATION IN  $B^+$  DECAY**

In decays involving two vector mesons, one can distinguish among the states in which meson polarizations are both longitudinal ( $L$ ) or both are transverse and parallel ( $\parallel$ ) or perpendicular ( $\perp$ ) to each other with the parameters  $\Gamma_L/\Gamma$ ,  $\Gamma_{\perp}/\Gamma$ , and the relative phases  $\phi_{\parallel}$  and  $\phi_{\perp}$ . See the definitions in the note on “Polarization in  $B$  Decays” review in the  $B^0$  Particle Listings.

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \bar{D}^{*0} \rho^+$ 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.892 \pm 0.018 \pm 0.016$	CSORNA 03	CLE2	$e^+e^- \rightarrow \gamma(4S)$

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \bar{D}^{*0} K^{*+}$ 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.86 \pm 0.06 \pm 0.03$	AUBERT 04k	BABR	$e^+e^- \rightarrow \gamma(4S)$

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow J/\psi K^{*+}$ 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.604 \pm 0.015 \pm 0.018$	ITOH 05	BELL	$e^+e^- \rightarrow \gamma(4S)$

$\Gamma_{\perp}/\Gamma$  in  $B^+ \rightarrow J/\psi K^{*+}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.180 \pm 0.014 \pm 0.010</math></b>	ITOH	05	BELL $e^+e^- \rightarrow \Upsilon(4S)$

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \omega K^{*+}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.41 \pm 0.18 \pm 0.05</math></b>	AUBERT	09H	BABR $e^+e^- \rightarrow \Upsilon(4S)$

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \omega K_2^*(1430)^+$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.56 \pm 0.10 \pm 0.04</math></b>	AUBERT	09H	BABR $e^+e^- \rightarrow \Upsilon(4S)$

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow K^{*+} \bar{K}^{*0}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.82^{+0.15}_{-0.21}</math> OUR AVERAGE</b>			
$1.06 \pm 0.30 \pm 0.14$	<sup>1</sup> GOH	15	BELL $e^+e^- \rightarrow \Upsilon(4S)$
$0.75^{+0.16}_{-0.26} \pm 0.03$	<sup>2,3</sup> AUBERT	09F	BABR $e^+e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Signal significance 2.7 standard deviations.<sup>2</sup> Signal significance 3.7 standard deviations.<sup>3</sup> Assumes equal production of  $B^+$  and  $B^0$  at the  $\Upsilon(4S)$ . $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \phi K^{*+}(892)^+$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.50 \pm 0.05</math> OUR AVERAGE</b>			
$0.49 \pm 0.05 \pm 0.03$	AUBERT	07BA	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$0.52 \pm 0.08 \pm 0.03$	CHEN	05A	BELL $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.46 \pm 0.12 \pm 0.03$	AUBERT	03V	BABR Repl. by AUBERT 07BA

 $\Gamma_{\perp}/\Gamma$  in  $B^+ \rightarrow \phi K^{*+}$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.20 \pm 0.05</math> OUR AVERAGE</b>			
$0.21 \pm 0.05 \pm 0.02$	AUBERT	07BA	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$0.19 \pm 0.08 \pm 0.02$	CHEN	05A	BELL $e^+e^- \rightarrow \Upsilon(4S)$

 $\phi_{\parallel}$  in  $B^+ \rightarrow \phi K^{*+}$ 

VALUE (°)	DOCUMENT ID	TECN	COMMENT
<b><math>2.34 \pm 0.18</math> OUR AVERAGE</b>			
$2.47 \pm 0.20 \pm 0.07$	AUBERT	07BA	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$2.10 \pm 0.28 \pm 0.04$	CHEN	05A	BELL $e^+e^- \rightarrow \Upsilon(4S)$

 $\phi_{\perp}$  in  $B^+ \rightarrow \phi K^{*+}$ 

VALUE (°)	DOCUMENT ID	TECN	COMMENT
<b><math>2.58 \pm 0.17</math> OUR AVERAGE</b>			
$2.69 \pm 0.20 \pm 0.03$	AUBERT	07BA	BABR $e^+e^- \rightarrow \Upsilon(4S)$
$2.31 \pm 0.30 \pm 0.07$	CHEN	05A	BELL $e^+e^- \rightarrow \Upsilon(4S)$

$\delta_0(B^+ \rightarrow \phi K^{*+})$ 

VALUE (rad)	DOCUMENT ID	TECN	COMMENT
<b><math>3.07 \pm 0.18 \pm 0.06</math></b>	AUBERT	07BA BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 $A_{CP}^0(B^+ \rightarrow \phi K^{*+})$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.17 \pm 0.11 \pm 0.02</math></b>	AUBERT	07BA BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 $A_{CP}^\perp(B^+ \rightarrow \phi K^{*+})$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.22 \pm 0.24 \pm 0.08</math></b>	AUBERT	07BA BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 $\Delta\phi_{\parallel}(B^+ \rightarrow \phi K^{*+})$ 

VALUE (rad)	DOCUMENT ID	TECN	COMMENT
<b><math>0.07 \pm 0.20 \pm 0.05</math></b>	AUBERT	07BA BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 $\Delta\phi_\perp(B^+ \rightarrow \phi K^{*+})$ 

VALUE (rad)	DOCUMENT ID	TECN	COMMENT
<b><math>0.19 \pm 0.20 \pm 0.07</math></b>	AUBERT	07BA BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 $\Delta\delta_0(B^+ \rightarrow \phi K^{*+})$ 

VALUE (rad)	DOCUMENT ID	TECN	COMMENT
<b><math>0.20 \pm 0.18 \pm 0.03</math></b>	AUBERT	07BA BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \phi K_1(1270)^+$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.46^{+0.12+0.06}_{-0.13-0.07}</math></b>	AUBERT	08BI BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \phi K_2^*(1430)^+$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.80^{+0.09}_{-0.10} \pm 0.03</math></b>	AUBERT	08BI BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 $\delta_0(B^+ \rightarrow \phi K_2^*(1430)^+)$ 

VALUE (rad)	DOCUMENT ID	TECN	COMMENT
<b><math>3.59 \pm 0.19 \pm 0.12</math></b>	AUBERT	08BI BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 $\Delta\delta_0(B^+ \rightarrow \phi K_2^*(1430)^+)$ 

VALUE (rad)	DOCUMENT ID	TECN	COMMENT
<b><math>-0.05 \pm 0.19 \pm 0.06</math></b>	AUBERT	08BI BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \rho^0 K^*(892)^+$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.78 \pm 0.12 \pm 0.03</math></b>	DEL-AMO-SA..11D	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.96^{+0.04}_{-0.15} \pm 0.04$	AUBERT	03V BABR	Repl. by DEL-AMO-SANCHEZ 11D
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$\Gamma_L/\Gamma(B^+ \rightarrow K^*(892)^0 \rho^+)$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.48 \pm 0.08</math> OUR AVERAGE</b>			
$0.52 \pm 0.10 \pm 0.04$	AUBERT,B	06G BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.43 \pm 0.11^{+0.05}_{-0.02}$	ZHANG	05D BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \mu^+ \mu^- K^*(892)^+$  ( $1.0 < q^2 < 8.68 \text{ GeV}^2/c^4$ )

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.60^{+0.31}_{-0.25} \pm 0.13</math></b>	<sup>1</sup> SIRUNYAN	21AC CMS	$pp$ at 8 TeV

<sup>1</sup> SIRUNYAN 21AC measurement is performed in  $1.0 < q^2 < 8.68 \text{ GeV}^2/c^4$ . Reports also measurements in several other  $q^2$  intervals.

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \mu^+ \mu^- K^*(892)^+$  ( $1.1 < q^2 < 6.0 \text{ GeV}^2/c^4$ )

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.59 \pm 0.09 \pm 0.03</math></b>	<sup>1</sup> AAIJ	21J LHCb	$pp$ at 7, 8, 13 TeV

<sup>1</sup> The full set of CP-averaged angular observables is measured as a function of the  $q^2$ . The measured  $\Gamma_L$  is related to the polarisation of the  $K^*(892)^+$ .

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \mu^+ \mu^- K^*(892)^+$  ( $10.09 < q^2 < 12.86 \text{ GeV}^2/c^4$ )

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.88^{+0.10}_{-0.13} \pm 0.05</math></b>	<sup>1</sup> SIRUNYAN	21AC CMS	$pp$ at 8 TeV

<sup>1</sup> SIRUNYAN 21AC measurement is performed in  $10.09 < q^2 < 12.86 \text{ GeV}^2/c^4$ . Reports also measurements in several other  $q^2$  intervals.

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \mu^+ \mu^- K^*(892)^+$  ( $14.18 < q^2 < 19.0 \text{ GeV}^2/c^4$ )

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.55^{+0.13}_{-0.10} \pm 0.06</math></b>	<sup>1</sup> SIRUNYAN	21AC CMS	$pp$ at 8 TeV

<sup>1</sup> SIRUNYAN 21AC measurement is performed in  $14.18 < q^2 < 19.0 \text{ GeV}^2/c^4$ . Reports also measurements in several other  $q^2$  intervals.

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \mu^+ \mu^- K^*(892)^+$  ( $15.0 < q^2 < 19.0 \text{ GeV}^2/c^4$ )

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.40^{+0.13}_{-0.11} \pm 0.03</math></b>	<sup>1</sup> AAIJ	21J LHCb	$pp$ at 7, 8, 13 TeV

<sup>1</sup> The full set of CP-averaged angular observables is measured as a function of the  $q^2$ . The measured  $\Gamma_L$  is related to the polarisation of the  $K^*(892)^+$ .

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \rho^+ \rho^0$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.950 \pm 0.016</math> OUR AVERAGE</b>			
$0.950 \pm 0.015 \pm 0.006$	AUBERT	09G BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.948 \pm 0.106 \pm 0.021$	ZHANG	03B BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.905 \pm 0.042^{+0.023}_{-0.027}$	AUBERT,BE	06G BABR	Repl. by AUBERT 09G
$0.97^{+0.03}_{-0.07} \pm 0.04$	AUBERT	03V BABR	Repl. by AUBERT,BE 06G

$\Gamma_L/\Gamma$  in  $B^+ \rightarrow \omega\rho^+$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.90±0.05±0.03</b>	AUBERT	09H	BABR $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.82±0.11±0.02	AUBERT,B	06T	BABR Repl. by AUBERT 09H
0.88 <sup>+0.12</sup> <sub>-0.15</sub> ±0.03	AUBERT	05O	BABR Repl. by AUBERT,B 06T

 $\Gamma_L/\Gamma$  in  $B^+ \rightarrow \rho\bar{p}K^*(892)^+$ 

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.32±0.17±0.09</b>	CHEN	08C	BELL $e^+e^- \rightarrow \Upsilon(4S)$

**CP VIOLATION**

$A_{CP}$  is defined as

$$\frac{B(B^- \rightarrow \bar{f}) - B(B^+ \rightarrow f)}{B(B^- \rightarrow \bar{f}) + B(B^+ \rightarrow f)},$$

the CP-violation charge asymmetry of exclusive  $B^-$  and  $B^+$  decay.

 $A_{CP}(B^+ \rightarrow J/\psi(1S)K^+)$ 

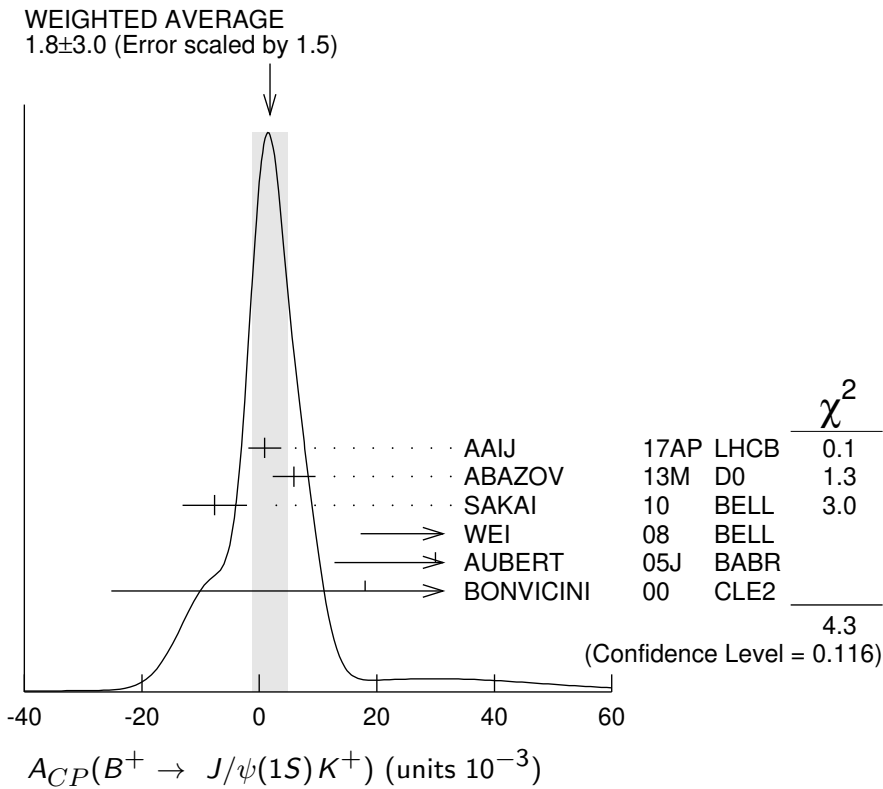
VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.8± 3.0 OUR AVERAGE</b>	Error includes scale factor of 1.5. See the ideogram below.		
0.9± 2.7± 0.7	AAIJ	17AP	LHCB $p\bar{p}$ at 7, 8 TeV
5.9± 3.6± 0.7	ABAZOV	13M	D0 $\rho\bar{p}$ at 1.96 TeV
- 7.6± 5.0± 2.2	SAKAI	10	BELL $e^+e^- \rightarrow \Upsilon(4S)$
90 ±70 ±20	<sup>1</sup> WEI	08	BELL $e^+e^- \rightarrow \Upsilon(4S)$
30 ±14 ±10	<sup>2</sup> AUBERT	05J	BABR $e^+e^- \rightarrow \Upsilon(4S)$
18 ±43 ± 4	<sup>3</sup> BONVICINI	00	CLE2 $e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
7.5± 6.1± 3.0	<sup>4</sup> ABAZOV	08O	D0 Repl. by ABAZOV 13M
30 ±15 ± 6	AUBERT	04P	BABR Repl. by AUBERT 05J
-26 ±22 ±17	ABE	03B	BELL Repl. by SAKAI 10
3 ±30 ± 4	AUBERT	02F	BABR Repl. by AUBERT 04P

<sup>1</sup> Uses  $B^+ \rightarrow J/\psi K^+$ , where  $J/\psi \rightarrow p\bar{p}$ .

<sup>2</sup> The result reported corresponds to  $-A_{CP}$ .

<sup>3</sup> A +0.3% correction is applied due to a slightly higher reconstruction efficiency for the positive kaons.

<sup>4</sup> Uses  $J/\psi \rightarrow \mu^+\mu^-$  decay.



### $A_{CP}(B^+ \rightarrow J/\psi(1S)\pi^+)$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>1.8 \pm 1.2</math> OUR AVERAGE</b>	Error includes scale factor of 1.3.		
$1.91 \pm 0.89 \pm 0.16$	<sup>1</sup> AAIJ	170 LHCb	$pp$ at 7, 8 TeV
$-4.2 \pm 4.4 \pm 0.9$	ABAZOV	13M D0	$p\bar{p}$ at 1.96 TeV
$12.3 \pm 8.5 \pm 0.4$	AUBERT	04P BABR	$e^+e^- \rightarrow \gamma(4S)$
$-2.3 \pm 16.4 \pm 1.5$	ABE	03B BELL	$e^+e^- \rightarrow \gamma(4S)$
●●● We do not use the following data for averages, fits, limits, etc. ●●●			
$0.5 \pm 2.7 \pm 1.1$	<sup>2</sup> AAIJ	12AC LHCb	Repl. by AAIJ 170
$-9 \pm 8 \pm 3$	<sup>3</sup> ABAZOV	08O D0	Repl. by ABAZOV 13M
$1 \pm 22 \pm 1$	AUBERT	02F BABR	Repl. by AUBERT 04P

<sup>1</sup> Obtained by using LHCb measurement of  $A_{CP}(B^+ \rightarrow J/\psi K^+) = (0.09 \pm 0.27 \pm 0.07) \times 10^{-2}$  of AAIJ 17AP.

<sup>2</sup> Uses  $A_{CP}(B^+ \rightarrow J/\psi K^+) = 0.001 \pm 0.007$  to extract production asymmetry.

<sup>3</sup> Uses  $J/\psi \rightarrow \mu^+\mu^-$  decay.

### $A_{CP}(B^+ \rightarrow J/\psi\rho^+)$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.05 \pm 0.05</math> OUR AVERAGE</b>			
$-0.045^{+0.056}_{-0.057} \pm 0.008$	AAIJ	190 LHCb	$pp$ at 7 and 8 TeV
$-0.11 \pm 0.12 \pm 0.08$	AUBERT	07AC BABR	$e^+e^- \rightarrow \gamma(4S)$

### $A_{CP}(B^+ \rightarrow J/\psi K^*(892)^+)$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.048 \pm 0.029 \pm 0.016</math></b>	<sup>1</sup> AUBERT	05J BABR	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> The result reported corresponds to  $-A_{CP}$ .

### $A_{CP}(B^+ \rightarrow \eta_c K^+)$

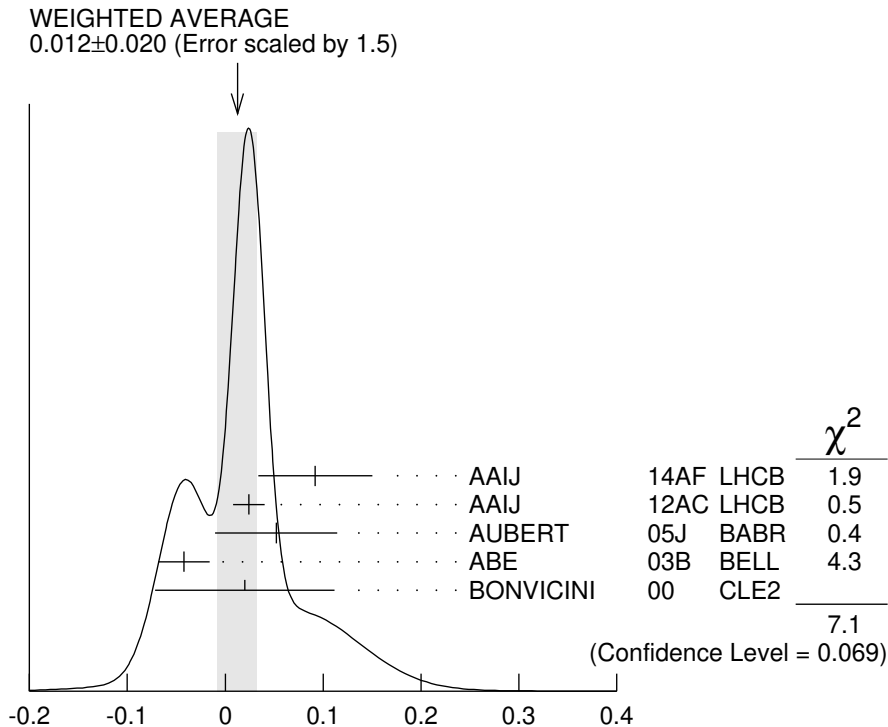
VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.01 ± 0.07 OUR AVERAGE</b>	Error includes scale factor of 2.2.		
0.040 ± 0.034 ± 0.004	<sup>1</sup> AAIJ	14AF LHCB	$pp$ at 7, 8 TeV
-0.16 ± 0.08 ± 0.02	<sup>1</sup> WEI	08 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.046 ± 0.057 ± 0.007	<sup>1</sup> AAIJ	13AU LHCB	Repl. by AAIJ 14AF
<sup>1</sup> Uses $B^+ \rightarrow \eta_c K^+$ , where $\eta_c \rightarrow p\bar{p}$ .			

### $A_{CP}(B^+ \rightarrow \psi(2S)\pi^+)$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.03 ± 0.06 OUR AVERAGE</b>			
0.048 ± 0.090 ± 0.011	<sup>1</sup> AAIJ	12AC LHCB	$pp$ at 7 TeV
0.022 ± 0.085 ± 0.016	BHARDWAJ	08 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> Uses $A_{CP}(B^+ \rightarrow J/\psi K^+) = 0.001 \pm 0.007$ to extract production asymmetry.			

### $A_{CP}(B^+ \rightarrow \psi(2S)K^+)$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.012 ± 0.020 OUR AVERAGE</b>	Error includes scale factor of 1.5. See the ideogram below.		
0.092 ± 0.058 ± 0.004	<sup>1</sup> AAIJ	14AF LHCB	$pp$ at 7, 8 TeV
0.024 ± 0.014 ± 0.008	<sup>2</sup> AAIJ	12AC LHCB	$pp$ at 7 TeV
0.052 ± 0.059 ± 0.020	AUBERT	05J BABR	$e^+e^- \rightarrow \Upsilon(4S)$
-0.042 ± 0.020 ± 0.017	ABE	03B BELL	$e^+e^- \rightarrow \Upsilon(4S)$
0.02 ± 0.091 ± 0.01	<sup>3</sup> BONVICINI	00 CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
-0.002 ± 0.123 ± 0.012	<sup>1,2</sup> AAIJ	13AU LHCB	Repl. by AAIJ 14AF



<sup>1</sup> Uses  $\psi(2S) \rightarrow p\bar{p}$  decays.

<sup>2</sup> Uses  $A_{CP}(B^+ \rightarrow J/\psi K^+) = 0.001 \pm 0.007$  to extract production asymmetry.

<sup>3</sup> A +0.3% correction is applied due to a slightly higher reconstruction efficiency for the positive kaons.

$$A_{CP}(B^+ \rightarrow \psi(2S)K^+)$$

### $A_{CP}(B^+ \rightarrow \psi(2S)K^*(892)^+)$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.077 ± 0.207 ± 0.051</b>	<sup>1</sup> AUBERT	05J	BABR $e^+e^- \rightarrow \Upsilon(4S)$

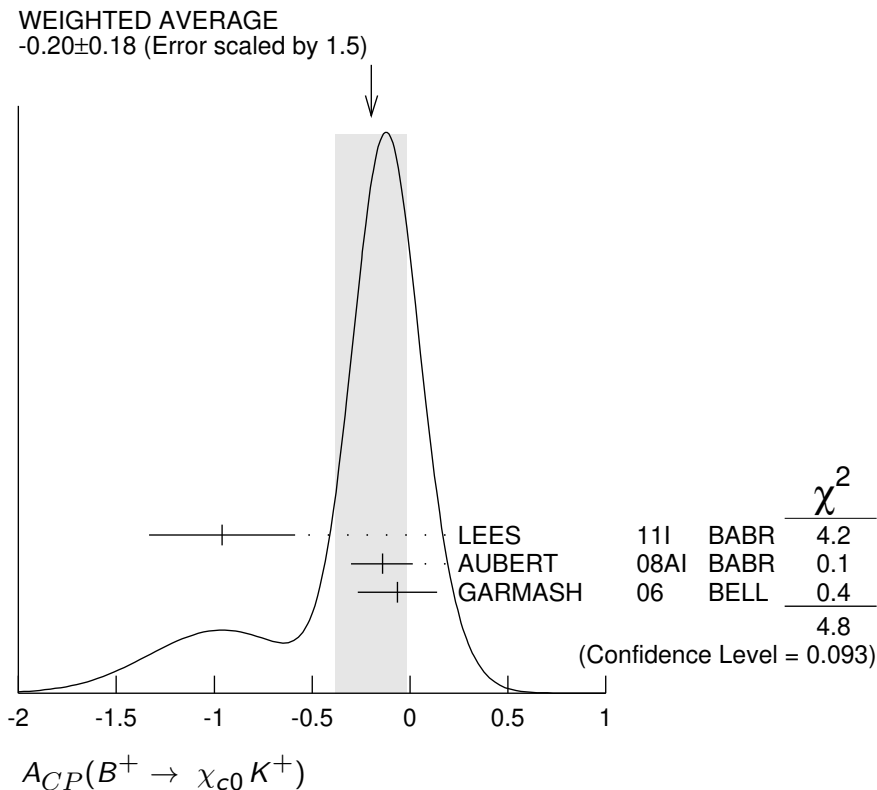
<sup>1</sup> The result reported corresponds to  $-A_{CP}$ .

### $A_{CP}(B^+ \rightarrow \chi_{c1}(1P)\pi^+)$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.07 ± 0.18 ± 0.02</b>	KUMAR	06	BELL $e^+e^- \rightarrow \Upsilon(4S)$

### $A_{CP}(B^+ \rightarrow \chi_{c0}K^+)$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>-0.20 ± 0.18 OUR AVERAGE</b>	Error includes scale factor of 1.5. See the ideogram below.		
-0.96 ± 0.37 ± 0.04	LEES	11I	BABR $e^+e^- \rightarrow \Upsilon(4S)$
-0.14 ± 0.15 <sup>+0.03</sup> <sub>-0.06</sub>	AUBERT	08AI	BABR $e^+e^- \rightarrow \Upsilon(4S)$
-0.065 ± 0.20 <sup>+0.035</sup> <sub>-0.024</sub>	GARMASH	06	BELL $e^+e^- \rightarrow \Upsilon(4S)$



**$A_{CP}(B^+ \rightarrow \chi_{c1} K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.009 \pm 0.033</math> OUR AVERAGE</b>			
$-0.01 \pm 0.03 \pm 0.02$	KUMAR	06	BELL $e^+ e^- \rightarrow \gamma(4S)$
$-0.003 \pm 0.076 \pm 0.017$	<sup>1</sup> AUBERT	05J	BABR $e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> The result reported corresponds to  $-A_{CP}$ .

 **$A_{CP}(B^+ \rightarrow \chi_{c1} K^*(892)^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.471 \pm 0.378 \pm 0.268</math></b>	<sup>1</sup> AUBERT	05J	BABR $e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> The result reported corresponds to  $-A_{CP}$ .

 **$A_{CP}(B^+ \rightarrow D^0 \ell^+ \nu_\ell)$** 

<u>VALUE (units <math>10^{-2}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.14 \pm 0.14 \pm 0.14</math></b>	<sup>1</sup> ABAZOV	17A	D0 $p\bar{p}$ at 1.96 TeV

<sup>1</sup> Uses  $D^0 \rightarrow K^- \pi^+$  decays and  $f(B^+) = 0.56 \pm 0.01$  from  $10.4 \text{ fb}^{-1}$  of Run II data.

 **$A_{CP}(B^+ \rightarrow \bar{D}^0 \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.007 \pm 0.007</math> OUR AVERAGE</b>			
$-0.006 \pm 0.005 \pm 0.010$	<sup>1</sup> AAIJ	13AE	LHCB $pp$ at 7 TeV
$-0.008 \pm 0.008$	ABE	06	BELL $e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Uses  $B^\pm \rightarrow [K^\pm \pi^\mp \pi^+ \pi^-]_D h^\pm$  mode.

 **$A_{CP}(B^+ \rightarrow D_{CP(+1)} \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.0080 \pm 0.0024</math> OUR AVERAGE</b>			
$-0.008 \pm 0.002 \pm 0.002$	<sup>1</sup> AAIJ	21Q	LHCB $pp$ at 7, 8, 13 TeV
$-0.0098 \pm 0.0043 \pm 0.0021$	AAIJ	16L	LHCB $pp$ at 7, 8 TeV
$0.035 \pm 0.024$	ABE	06	BELL $e^+ e^- \rightarrow \gamma(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$-0.008 \pm 0.003 \pm 0.002$	<sup>2,3</sup> AAIJ	18A	LHCB $pp$ at 7, 8, 13 TeV
$-0.008 \pm 0.006 \pm 0.002$	<sup>3,4</sup> AAIJ	18A	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> Uses  $D \rightarrow K^+ K^-$  and  $D \rightarrow \pi^+ \pi^-$  decay modes.

<sup>2</sup> Uses  $D \rightarrow K^+ K^-$  decay mode.

<sup>3</sup> Superseded by AAIJ 21Q.

<sup>4</sup> Uses  $D \rightarrow \pi^+ \pi^-$  decay mode.

 **$A_{CP}(B^+ \rightarrow D_{CP(-1)} \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.017 \pm 0.026</math></b>	ABE	06	BELL $e^+ e^- \rightarrow \gamma(4S)$

 **$A_{CP}([K^\mp \pi^\pm \pi^+ \pi^-]_D \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.023 \pm 0.048 \pm 0.005</math></b>	AAIJ	16L	LHCB $pp$ at 7, 8 TeV

● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

$0.13 \pm 0.10$  AAIJ 13AE LHCB Repl. by AAIJ 16L

**$A_{CP}(B^+ \rightarrow [\pi^+\pi^+\pi^-\pi^-]_D K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.100 \pm 0.034 \pm 0.018</math></b>	AAIJ	16L LHCB	$pp$ at 7, 8 TeV

 **$A_{CP}(B^+ \rightarrow [\pi^+\pi^-\pi^+\pi^-]_D K^*(892)^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.02 \pm 0.11 \pm 0.01</math></b>	AAIJ	17BO LHCB	$pp$ at 7, 8, 13 TeV

 **$A_{CP}(B^+ \rightarrow \bar{D}^0 K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.017 \pm 0.005</math> OUR AVERAGE</b>			

$-0.019 \pm 0.005 \pm 0.002$  <sup>1</sup> AAIJ 18A LHCB  $pp$  at 7, 8, 13 TeV

$-0.0194 \pm 0.0072 \pm 0.0060$  AAIJ 16L LHCB  $pp$  at 7, 8 TeV

$0.010 \pm 0.026 \pm 0.005$  <sup>2</sup> AAIJ 15W LHCB  $pp$  at 7, 8 TeV

$0.066 \pm 0.036$  ABE 06 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.000 \pm 0.012 \pm 0.002$  <sup>3</sup> AAIJ 16L LHCB  $pp$  at 7, 8 TeV

$-0.029 \pm 0.020 \pm 0.018$  <sup>3</sup> AAIJ 13AE LHCB Repl. by AAIJ 16L

$0.003 \pm 0.080 \pm 0.037$  <sup>4</sup> ABE 03D BELL Repl. by SWAIN 03

$0.04 \pm 0.06 \pm 0.03$  <sup>5</sup> SWAIN 03 BELL Repl. by ABE 06

<sup>1</sup> Supersedes AAIJ 16L.

<sup>2</sup> Uses  $D^0 \rightarrow K^- \pi^+ \pi^0$  for the favored mode, and  $D^0 \rightarrow K^+ \pi^- \pi^0$  for the suppressed mode.

<sup>3</sup> Uses  $B^\pm \rightarrow [K^\pm \pi^\mp \pi^+ \pi^-]_D h^\pm$  mode.

<sup>4</sup> Corresponds to 90% confidence range  $-0.15 < A_{CP} < 0.16$ .

<sup>5</sup> Corresponds to 90% confidence range  $-0.07 < A_{CP} < 0.15$ .

 **$A_{CP}([K^\mp \pi^\pm \pi^+ \pi^-]_D K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.313 \pm 0.102 \pm 0.038</math></b>	AAIJ	16L LHCB	$pp$ at 7, 8 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.42 \pm 0.22$  AAIJ 13AE LHCB Repl. by AAIJ 16L

 **$A_{CP}(B^+ \rightarrow [\pi^+\pi^+\pi^-\pi^-]_D \pi^+)$** 

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-4.1 \pm 7.9 \pm 2.4</math></b>	AAIJ	16L LHCB	$pp$ at 7, 8 TeV

 **$A_{CP}(B^+ \rightarrow [K^- \pi^+]_D K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.58 \pm 0.21</math> OUR AVERAGE</b>			

$-0.82 \pm 0.44 \pm 0.09$  AALTONEN 11AJ CDF  $p\bar{p}$  at 1.96 TeV

$-0.39^{+0.26+0.04}_{-0.28-0.03}$  HORII 11 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

$-0.86 \pm 0.47^{+0.12}_{-0.16}$  DEL-AMO-SA..10H BABR  $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.1^{+0.8}_{-1.0} \pm 0.4$  HORII 08 BELL Repl. by HORII 11

$+0.88^{+0.77}_{-0.62} \pm 0.06$  SAIGO 05 BELL Repl. by HORII 08

**$A_{CP}(B^+ \rightarrow [K^- \pi^+ \pi^0]_D K^+)$** 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.07 \pm 0.30</math> OUR AVERAGE</b>			Error includes scale factor of 1.5.
$-0.20 \pm 0.27 \pm 0.04$	<sup>1</sup> AAIJ	15W	LHCB $pp$ at 7, 8 TeV
$0.41 \pm 0.30 \pm 0.05$	NAYAK	13	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
<sup>1</sup> Uses $D^0 \rightarrow K^- \pi^+ \pi^0$ for the favored mode, and $D^0 \rightarrow K^+ \pi^- \pi^0$ for the suppressed mode.			

 **$A_{CP}(B^+ \rightarrow [K^+ K^- \pi^0]_D K^+)$** 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.30 \pm 0.20 \pm 0.02</math></b>	<sup>1</sup> AAIJ	15W	LHCB $pp$ at 7, 8 TeV
<sup>1</sup> Uses $D \rightarrow K^+ K^- \pi^0$ mode.			

 **$A_{CP}(B^+ \rightarrow [\pi^+ \pi^- \pi^0]_D K^+)$** 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.054 \pm 0.091 \pm 0.011</math></b>	<sup>1</sup> AAIJ	15W	LHCB $pp$ at 7, 8 TeV
<sup>1</sup> Uses $D \rightarrow \pi^+ \pi^- \pi^0$ mode.			

 **$A_{CP}(B^+ \rightarrow \bar{D}^0 K^*(892)^+)$** 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.007 \pm 0.019</math> OUR AVERAGE</b>			
$-0.004 \pm 0.023 \pm 0.008$	<sup>1</sup> AAIJ	17BO	LHCB $pp$ at 7, 8, 13 TeV
$-0.013 \pm 0.031 \pm 0.009$	<sup>2</sup> AAIJ	17BO	LHCB $pp$ at 7, 8, 13 TeV
<sup>1</sup> Uses $B^\pm \rightarrow [K^\pm \pi^\mp]_D K^*(892)^\pm$ decay mode .			
<sup>2</sup> Uses $B^\pm \rightarrow [K^\pm \pi^\mp \pi^+ \pi^-]_D K^*(892)^\pm$ decay mode .			

 **$A_{CP}(B^+ \rightarrow [K^- \pi^+]_{\bar{D}} K^*(892)^+)$** 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.75 \pm 0.16</math> OUR AVERAGE</b>			
$-0.81 \pm 0.17 \pm 0.04$	AAIJ	17BO	LHCB $pp$ at 7, 8, 13 TeV
$-0.34 \pm 0.43 \pm 0.16$	AUBERT	09AJ	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-0.22 \pm 0.61 \pm 0.17$	AUBERT,B	05V	BABR Repl. by AUBERT 09AJ

 **$A_{CP}(B^+ \rightarrow [K^- \pi^+ \pi^- \pi^+]_{\bar{D}} K^*(892)^+)$** 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.45 \pm 0.21 \pm 0.14</math></b>	AAIJ	17BO	LHCB $pp$ at 7, 8, 13 TeV

 **$A_{CP}(B^+ \rightarrow [K^- \pi^+]_D \pi^+)$** 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.00 \pm 0.09</math> OUR AVERAGE</b>			
$0.13 \pm 0.25 \pm 0.02$	AALTONEN	11AJ	CDF $p\bar{p}$ at 1.96 TeV
$-0.04 \pm 0.11^{+0.02}_{-0.01}$	HORII	11	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
$0.03 \pm 0.17 \pm 0.04$	DEL-AMO-SA...	10H	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-0.02^{+0.15}_{-0.16} \pm 0.04$	HORII	08	BELL Repl. by HORII 11
$+0.30^{+0.29}_{-0.25} \pm 0.06$	SAIGO	05	BELL Repl. by HORII 08



**$A_{CP}(B^+ \rightarrow [K^- \pi^+ \pi^0]_D \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.35 \pm 0.16</math></b> OUR AVERAGE			
$0.438 \pm 0.190 \pm 0.011$	<sup>1</sup> AAIJ	15W LHCB	$pp$ at 7, 8 TeV
$0.16 \pm 0.27 \begin{smallmatrix} +0.03 \\ -0.04 \end{smallmatrix}$	NAYAK	13 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses  $D^0 \rightarrow K^- \pi^+ \pi^0$  for the favored mode, and  $D^0 \rightarrow K^+ \pi^- \pi^0$  for the suppressed mode.

 **$A_{CP}(B^+ \rightarrow [K^+ K^- \pi^0]_D \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.030 \pm 0.040 \pm 0.005</math></b>	<sup>1</sup> AAIJ	15W LHCB	$pp$ at 7, 8 TeV

<sup>1</sup> Uses  $D \rightarrow K^+ K^-$  mode.

 **$A_{CP}(B^+ \rightarrow [\pi^+ \pi^- \pi^0]_D \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.016 \pm 0.020 \pm 0.004</math></b>	<sup>1</sup> AAIJ	15W LHCB	$pp$ at 7, 8 TeV

<sup>1</sup> Uses  $D \rightarrow \pi^+ \pi^-$  mode.

 **$A_{CP}(B^+ \rightarrow [K^- \pi^+]_{(D\pi)} \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.09 \pm 0.27 \pm 0.05</math></b>	DEL-AMO-SA..10H	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow [K^- \pi^+]_{(D\gamma)} \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.65 \pm 0.55 \pm 0.22</math></b>	DEL-AMO-SA..10H	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow [K^- \pi^+]_{(D\pi)} K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.77 \pm 0.35 \pm 0.12</math></b>	DEL-AMO-SA..10H	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow [K^- \pi^+]_{(D\gamma)} K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.36 \pm 0.94 \begin{smallmatrix} +0.25 \\ -0.41 \end{smallmatrix}</math></b>	DEL-AMO-SA..10H	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow [\pi^+ \pi^- \pi^0]_D K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.02 \pm 0.15 \pm 0.03</math></b>	<sup>1</sup> AUBERT	07BJ BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.02 \pm 0.16 \pm 0.03$  AUBERT,B 05T BABR Repl. by AUBERT 07BJ

<sup>1</sup> Uses a Dalitz plot analysis of  $D^0 \rightarrow \pi^+ \pi^- \pi^0$ . Also reports the one-sigma regions:  $0.06 < r_B < 0.78$ ,  $-30^\circ < \gamma < 76^\circ$ , and  $-27^\circ < \delta < 78^\circ$ .

**$A_{CP}(B^+ \rightarrow [K_S^0 K^+ \pi^-]_D K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.095 \pm 0.089 \pm 0.018</math></b>	<sup>1</sup> AAIJ	20N	LHCB $pp$ at 7, 8, 13 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.040 \pm 0.091 \pm 0.018$	<sup>2</sup> AAIJ	14V	LHCB Repl. by AAIJ 20N
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<sup>1</sup> The analysis uses  $D \rightarrow K_S^0 K \pi$  Dalitz decays with  $K^{*-} K^+$  region excluded.

<sup>2</sup> The analysis uses all of  $D \rightarrow K_S^0 K \pi$  Dalitz decays.

 **$A_{CP}(B^+ \rightarrow [K_S^0 K^- \pi^+]_D K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.038 \pm 0.075 \pm 0.011</math></b>	<sup>1</sup> AAIJ	20N	LHCB $pp$ at 7, 8, 13 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.233 \pm 0.129 \pm 0.024$	<sup>2</sup> AAIJ	14V	LHCB Repl. by AAIJ 20N
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<sup>1</sup> The analysis uses  $D \rightarrow K_S^0 K \pi$  Dalitz decays with  $K^{*-} K^+$  region excluded.

<sup>2</sup> The analysis uses all of  $D \rightarrow K_S^0 K \pi$  Dalitz decays.

 **$A_{CP}(B^+ \rightarrow [K_S^0 K^- \pi^+]_D \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.003 \pm 0.015 \pm 0.003</math></b>	<sup>1</sup> AAIJ	20N	LHCB $pp$ at 7, 8, 13 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.052 \pm 0.029 \pm 0.017$	<sup>2</sup> AAIJ	14V	LHCB Repl. by AAIJ 20N
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<sup>1</sup> The analysis uses  $D \rightarrow K_S^0 K \pi$  Dalitz decays with  $K^{*-} K^+$  region excluded.

<sup>2</sup> The analysis uses all of  $D \rightarrow K_S^0 K \pi$  Dalitz decays.

 **$A_{CP}(B^+ \rightarrow [K_S^0 K^+ \pi^-]_D \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.034 \pm 0.020 \pm 0.003</math></b>	<sup>1</sup> AAIJ	20N	LHCB $pp$ at 7, 8, 13 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.025 \pm 0.024 \pm 0.010$	<sup>2</sup> AAIJ	14V	LHCB Repl. by AAIJ 20N
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<sup>1</sup> The analysis uses  $D \rightarrow K_S^0 K \pi$  Dalitz decays with  $K^{*-} K^+$  region excluded.

<sup>2</sup> The analysis uses all of  $D \rightarrow K_S^0 K \pi$  Dalitz decays.

 **$A_{CP}(B^+ \rightarrow [K^*(892)^- K^+]_D K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.084 \pm 0.049 \pm 0.008</math></b>	<sup>1</sup> AAIJ	20N	LHCB $pp$ at 7, 8, 13 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.026 \pm 0.109 \pm 0.029$	<sup>1</sup> AAIJ	14V	LHCB Repl. by AAIJ 20N
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<sup>1</sup> The Analysis uses  $D \rightarrow K^*(892) K \rightarrow K_S^0 K \pi$  decays.

 **$A_{CP}(B^+ \rightarrow [K^*(892)^+ K^-]_D K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.021 \pm 0.094 \pm 0.017</math></b>	<sup>1</sup> AAIJ	20N	LHCB $pp$ at 7, 8, 13 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.336 \pm 0.208 \pm 0.026$	<sup>1</sup> AAIJ	14V	LHCB Repl. by AAIJ 20N
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<sup>1</sup> The Analysis uses  $D \rightarrow K^*(892) K \rightarrow K_S^0 K \pi$  decays.

**$A_{CP}(B^+ \rightarrow [K^*(892)^+ K^-]_D \pi^+)$** 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.007 \pm 0.017 \pm 0.003</math></b>	<sup>1</sup> AAIJ	20N LHCb	$pp$ at 7, 8, 13 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.054 \pm 0.043 \pm 0.017$	<sup>1</sup> AAIJ	14V LHCb	Repl. by AAIJ 20N
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<sup>1</sup> The Analysis uses  $D \rightarrow K^*(892) K \rightarrow K_S^0 K \pi$  decays.

 **$A_{CP}(B^+ \rightarrow [K^*(892)^- K^+]_D \pi^+)$** 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.020 \pm 0.011 \pm 0.003</math></b>	<sup>1</sup> AAIJ	20N LHCb	$pp$ at 7, 8, 13 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.012 \pm 0.028 \pm 0.010$	<sup>1</sup> AAIJ	14V LHCb	Repl. by AAIJ 20N
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<sup>1</sup> The Analysis uses  $D \rightarrow K^*(892) K \rightarrow K_S^0 K \pi$  decays.

 **$A_{CP}(B^+ \rightarrow D_{CP(+1)} K^+)$** 

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.132 \pm 0.015</math> OUR AVERAGE</b>	Error includes scale factor of 1.8.		

$0.136 \pm 0.009 \pm 0.001$	<sup>1</sup> AAIJ	21Q LHCb	$pp$ at 7, 8, 13 TeV
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$0.097 \pm 0.018 \pm 0.009$	AAIJ	16L LHCb	$pp$ at 7, 8 TeV
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$0.39 \pm 0.17 \pm 0.04$	AALTONEN	10A CDF	$p\bar{p}$ at 1.96 TeV
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$0.25 \pm 0.06 \pm 0.02$	<sup>2</sup> DEL-AMO-SA..10G	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
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$0.06 \pm 0.14 \pm 0.05$	ABE	06 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.126 \pm 0.014 \pm 0.002$	<sup>3,4</sup> AAIJ	18A LHCb	$pp$ at 7, 8, 13 TeV
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$0.115 \pm 0.025 \pm 0.007$	<sup>4,5</sup> AAIJ	18A LHCb	$pp$ at 7, 8, 13 TeV
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$0.145 \pm 0.032 \pm 0.010$	<sup>6</sup> AAIJ	12M LHCb	Repl. by AAIJ 16L
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$0.27 \pm 0.09 \pm 0.04$	AUBERT	08AA BABR	Repl. by DEL-AMO-SANCHEZ 10G
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$0.35 \pm 0.13 \pm 0.04$	AUBERT	06J BABR	Repl. by AUBERT 08AA
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$0.07 \pm 0.17 \pm 0.06$	AUBERT	04N BABR	Repl. by AUBERT 06J
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$0.29 \pm 0.26 \pm 0.05$	<sup>7</sup> ABE	03D BELL	Repl. by SWAIN 03
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$0.06 \pm 0.19 \pm 0.04$	<sup>8</sup> SWAIN	03 BELL	Repl. by ABE 06
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<sup>1</sup> Uses  $D \rightarrow K^+ K^-$  and  $D \rightarrow \pi^+ \pi^-$  decay modes.

<sup>2</sup> Reports the first evidence for direct  $CP$  violation in  $B \rightarrow DK$  decays with 3.6 standard deviations.

<sup>3</sup> Uses  $D \rightarrow K^+ K^-$  decay mode.

<sup>4</sup> Superseded by AAIJ 21Q.

<sup>5</sup> Uses  $D \rightarrow \pi^+ \pi^-$  decay mode.

<sup>6</sup> AAIJ 12M reports an evidence of direct  $CP$  violation in  $B^\pm \rightarrow DK^\pm$  decays with a total significance of  $5.8 \sigma$ .

<sup>7</sup> Corresponds to 90% confidence range  $-0.14 < A_{CP} < 0.73$ .

<sup>8</sup> Corresponds to 90% confidence range  $-0.26 < A_{CP} < 0.38$ .

### $A_{ADS}(B^+ \rightarrow DK^+)$

$$A_{ADS}(B^+ \rightarrow DK^+) = \frac{(R_K^- - R_K^+)}{(R_K^- + R_K^+)} \text{ where}$$

$$R_K^- = \Gamma(B^- \rightarrow [K^+ \pi^-]_D K^-) / \Gamma(B^- \rightarrow [K^- \pi^+]_D K^-) \text{ and}$$

$$R_K^+ = \Gamma(B^+ \rightarrow [K^- \pi^+]_D K^+) / \Gamma(B^+ \rightarrow [K^+ \pi^-]_D K^+)$$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.451 \pm 0.026</math></b>	<sup>1</sup> AAIJ	21Q	LHCB $pp$ at 7, 8, 13 TeV
$-0.403 \pm 0.056 \pm 0.011$	<sup>2</sup> AAIJ	16L	LHCB $pp$ at 7, 8 TeV
$-0.52 \pm 0.15 \pm 0.02$	AAIJ	12M	LHCB Repl. by AAIJ 16L

• • • We do not use the following data for averages, fits, limits, etc. • • •

<sup>1</sup> The statistical and systematic uncertainties have been combined according to the correlations between the  $R_K^-$  and  $R_K^+$  observables.

<sup>2</sup> Superseded by AAIJ 21Q.

### $A_{ADS}(B^+ \rightarrow D\pi^+)$

$$A_{ADS}(B^+ \rightarrow D\pi^+) = \frac{(R_\pi^- - R_\pi^+)}{(R_\pi^- + R_\pi^+)} \text{ where}$$

$$R_\pi^- = \Gamma(B^- \rightarrow [K^+ \pi^-]_D \pi^-) / \Gamma(B^- \rightarrow [K^- \pi^+]_D \pi^-) \text{ and}$$

$$R_\pi^+ = \Gamma(B^+ \rightarrow [K^- \pi^+]_D \pi^+) / \Gamma(B^+ \rightarrow [K^+ \pi^-]_D \pi^+)$$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.129 \pm 0.014</math></b>	<sup>1</sup> AAIJ	21Q	LHCB $pp$ at 7, 8, 13 TeV
$0.100 \pm 0.031 \pm 0.009$	<sup>2</sup> AAIJ	16L	LHCB $pp$ at 7, 8 TeV
$0.143 \pm 0.062 \pm 0.011$	AAIJ	12M	LHCB Repl. by AAIJ 16L

• • • We do not use the following data for averages, fits, limits, etc. • • •

<sup>1</sup> The statistical and systematic uncertainties have been combined according to the correlations between the  $R_\pi^-$  and  $R_\pi^+$  observables.

<sup>2</sup> Superseded by AAIJ 21Q.

### $A_{ADS}(B^+ \rightarrow D^*(D\gamma)K^+)$

$$A_{ADS}(B^+ \rightarrow D^*(D\gamma)K^+) = (R_K^- - R_K^+) / (R_K^- + R_K^+), \text{ where}$$

$$R_K^- = \Gamma(B^- \rightarrow (\gamma[K^+ \pi^-]_D)_{D^*} K^-) / \Gamma(B^- \rightarrow (\gamma[K^- \pi^+]_D)_{D^*} K^-) \text{ and}$$

$$R_K^+ = \Gamma(B^+ \rightarrow (\gamma[K^- \pi^+]_D)_{D^*} K^+) / \Gamma(B^+ \rightarrow (\gamma[K^+ \pi^-]_D)_{D^*} K^+)$$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.558 \pm 1.349</math></b>	<sup>1</sup> AAIJ	21Q	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> The statistical and systematic uncertainties have been combined according to the correlations between the  $R_K^-$  and  $R_K^+$  observables.

### $A_{ADS}(B^+ \rightarrow D^*(D\pi^0)K^+)$

$$A_{ADS}(B^+ \rightarrow D^*(D\pi^0)K^+) = (R_K^- - R_K^+) / (R_K^- + R_K^+), \text{ where}$$

$$R_K^- = \Gamma(B^- \rightarrow ([K^+ \pi^-]_D \pi^0)_{D^*} K^-) / \Gamma(B^- \rightarrow ([K^- \pi^+]_D \pi^0)_{D^*} K^-) \text{ and}$$

$$R_K^+ = \Gamma(B^+ \rightarrow ([K^- \pi^+]_D \pi^0)_{D^*} K^+) / \Gamma(B^+ \rightarrow ([K^+ \pi^-]_D \pi^0)_{D^*} K^+)$$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.717 \pm 0.286</math></b>	<sup>1</sup> AAIJ	21Q	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> The statistical and systematic uncertainties have been combined according to the correlations between the  $R_K^-$  and  $R_K^+$  observables.

### $A_{ADS}(B^+ \rightarrow D^*(D\gamma)\pi^+)$

$A_{ADS}(B^+ \rightarrow D^*(D\gamma)\pi^+) = (R_\pi^- - R_\pi^+) / (R_\pi^- + R_\pi^+)$ , where

$R_\pi^- = \Gamma(B^- \rightarrow (\gamma[K^+\pi^-]_D)_{D^*}\pi^-) / \Gamma(B^- \rightarrow (\gamma[K^-\pi^+]_D)_{D^*}\pi^-)$  and

$R_\pi^+ = \Gamma(B^+ \rightarrow (\gamma[K^-\pi^+]_D)_{D^*}\pi^+) / \Gamma(B^+ \rightarrow (\gamma[K^+\pi^-]_D)_{D^*}\pi^+)$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.079 \pm 0.128</math></b>	<sup>1</sup> AAIJ	21Q	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> The statistical and systematic uncertainties have been combined according to the correlations between the  $R_\pi^-$  and  $R_\pi^+$  observables.

### $A_{ADS}(B^+ \rightarrow D^*(D\pi^0)\pi^+)$

$A_{ADS}(B^+ \rightarrow D^*(D\pi^0)\pi^+) = (R_\pi^- - R_\pi^+) / (R_\pi^- + R_\pi^+)$ , where

$R_\pi^- = \Gamma(B^- \rightarrow ([K^+\pi^-]_D\pi^0)_{D^*}\pi^-) / \Gamma(B^- \rightarrow ([K^-\pi^+]_D\pi^0)_{D^*}\pi^-)$  and

$R_\pi^+ = \Gamma(B^+ \rightarrow ([K^-\pi^+]_D\pi^0)_{D^*}\pi^+) / \Gamma(B^+ \rightarrow ([K^+\pi^-]_D\pi^0)_{D^*}\pi^+)$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.140 \pm 0.059</math></b>	<sup>1</sup> AAIJ	21Q	LHCB $pp$ at 7, 8, 13 TeV

<sup>1</sup> The statistical and systematic uncertainties have been combined according to the correlations between the  $R_\pi^-$  and  $R_\pi^+$  observables.

### $A_{ADS}(B^+ \rightarrow [K^-\pi^+]_D K^+ \pi^- \pi^+)$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.33^{+0.36}_{-0.34}</math></b>	AAIJ	15BC	LHCB $pp$ at 7, 8 TeV

### $A_{ADS}(B^+ \rightarrow [K^-\pi^+]_D \pi^+ \pi^- \pi^+)$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.013 \pm 0.087</math></b>	AAIJ	15BC	LHCB $pp$ at 7, 8 TeV

### $A_{CP}(B^+ \rightarrow D_{CP(-1)} K^+)$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.10 \pm 0.07</math> OUR AVERAGE</b>			

$-0.09 \pm 0.07 \pm 0.02$  DEL-AMO-SA..10G BABR  $e^+e^- \rightarrow \Upsilon(4S)$

$-0.12 \pm 0.14 \pm 0.05$  ABE 06 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.09 \pm 0.09 \pm 0.02$  AUBERT 08AA BABR Repl. by DEL-AMO-SANCHEZ 10G

$-0.06 \pm 0.13 \pm 0.04$  AUBERT 06J BABR Repl. by AUBERT 08AA

$-0.22 \pm 0.24 \pm 0.04$  <sup>1</sup> ABE 03D BELL Repl. by SWAIN 03

$-0.19 \pm 0.17 \pm 0.05$  <sup>2</sup> SWAIN 03 BELL Repl. by ABE 06

<sup>1</sup> Corresponds to 90% confidence range  $-0.62 < A_{CP} < 0.18$ .

<sup>2</sup> Corresponds to 90% confidence range  $-0.47 < A_{CP} < 0.11$ .

### $A_{CP}(B^+ \rightarrow [K^+K^-]_D K^+ \pi^- \pi^+)$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.045 \pm 0.064 \pm 0.011</math></b>	AAIJ	15BC	LHCB $pp$ at 7, 8 TeV

$A_{CP}(B^+ \rightarrow [\pi^+\pi^-]_D K^+\pi^-\pi^+)$ 

VALUE	DOCUMENT ID	TECN	COMMENT
$-0.054 \pm 0.101 \pm 0.011$	AAIJ	15BC LHCB	$pp$ at 7, 8 TeV

 $A_{CP}(B^+ \rightarrow [K^-\pi^+]_D K^+\pi^-\pi^+)$ 

VALUE	DOCUMENT ID	TECN	COMMENT
$0.013 \pm 0.019 \pm 0.013$	AAIJ	15BC LHCB	$pp$ at 7, 8 TeV

 $A_{CP}(B^+ \rightarrow [K^+K^-]_D \pi^+\pi^-\pi^+)$ 

VALUE	DOCUMENT ID	TECN	COMMENT
$-0.019 \pm 0.011 \pm 0.010$	AAIJ	15BC LHCB	$pp$ at 7, 8 TeV

 $A_{CP}(B^+ \rightarrow [\pi^+\pi^-]_D \pi^+\pi^-\pi^+)$ 

VALUE	DOCUMENT ID	TECN	COMMENT
$-0.013 \pm 0.016 \pm 0.010$	AAIJ	15BC LHCB	$pp$ at 7, 8 TeV

 $A_{CP}(B^+ \rightarrow [K^-\pi^+]_D \pi^+\pi^-\pi^+)$ 

VALUE	DOCUMENT ID	TECN	COMMENT
$-0.002 \pm 0.003 \pm 0.011$	AAIJ	15BC LHCB	$pp$ at 7, 8 TeV

 $A_{CP}(B^+ \rightarrow \bar{D}^{*0}\pi^+)$ 

VALUE	DOCUMENT ID	TECN	COMMENT
$-0.0004 \pm 0.0021$ <b>OUR AVERAGE</b>	Error includes scale factor of 1.1.		
$-0.004 \pm 0.004 \pm 0.001$	<sup>1</sup> AAIJ	21Q LHCB	$pp$ at 7, 8, 13 TeV
$0.001 \pm 0.002 \pm 0.001$	<sup>2</sup> AAIJ	21Q LHCB	$pp$ at 7, 8, 13 TeV
$-0.014 \pm 0.015$	ABE	06 BELL	$e^+e^- \rightarrow \gamma(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$0.000 \pm 0.006 \pm 0.001$	<sup>1,3</sup> AAIJ	18A LHCB	$pp$ at 7, 8, 13 TeV
$0.002 \pm 0.003 \pm 0.001$	<sup>2,3</sup> AAIJ	18A LHCB	$pp$ at 7, 8, 13 TeV

<sup>1</sup> Uses  $D^{*0} \rightarrow D^0\gamma$  decay mode.<sup>2</sup> Uses  $D^{*0} \rightarrow D^0\pi^0$  decay mode.<sup>3</sup> Superseded by AAIJ 21Q. $A_{CP}(B^+ \rightarrow (D_{CP(+1)}^*)^0\pi^+)$ 

VALUE	DOCUMENT ID	TECN	COMMENT
$0.010 \pm 0.007$ <b>OUR AVERAGE</b>			
$0.000 \pm 0.014 \pm 0.006$	<sup>1</sup> AAIJ	21Q LHCB	$pp$ at 7, 8, 13 TeV
$0.013 \pm 0.007 \pm 0.003$	<sup>2</sup> AAIJ	21Q LHCB	$pp$ at 7, 8, 13 TeV
$-0.021 \pm 0.045$	ABE	06 BELL	$e^+e^- \rightarrow \gamma(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$-0.003 \pm 0.017 \pm 0.002$	<sup>1,3</sup> AAIJ	18A LHCB	$pp$ at 7, 8, 13 TeV
$0.025 \pm 0.010 \pm 0.003$	<sup>2,3</sup> AAIJ	18A LHCB	$pp$ at 7, 8, 13 TeV

<sup>1</sup> Uses  $D^{*0} \rightarrow D^0\gamma$  decay mode.<sup>2</sup> Uses  $D^{*0} \rightarrow D^0\pi^0$  decay mode.<sup>3</sup> Superseded by AAIJ 21Q. $A_{CP}(B^+ \rightarrow (D_{CP(-1)}^*)^0\pi^+)$ 

VALUE	DOCUMENT ID	TECN	COMMENT
$-0.090 \pm 0.051$	ABE	06 BELL	$e^+e^- \rightarrow \gamma(4S)$

**$A_{CP}(B^+ \rightarrow D^{*0} K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.012 \pm 0.010</math> OUR AVERAGE</b>	Error includes scale factor of 1.5.		
$-0.004 \pm 0.014 \pm 0.003$	<sup>1</sup> AAIJ	21Q LHCb	$pp$ at 7, 8, 13 TeV
$0.020 \pm 0.007 \pm 0.003$	<sup>2</sup> AAIJ	21Q LHCb	$pp$ at 7, 8, 13 TeV
$-0.06 \pm 0.04 \pm 0.01$	AUBERT	08BF BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$-0.089 \pm 0.086$	ABE	06 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$0.001 \pm 0.021 \pm 0.007$	<sup>1,3</sup> AAIJ	18A LHCb	$pp$ at 7, 8, 13 TeV
$0.006 \pm 0.012 \pm 0.004$	<sup>2,3</sup> AAIJ	18A LHCb	$pp$ at 7, 8, 13 TeV
<sup>1</sup> Uses $D^{*0} \rightarrow D^0 \gamma$ decay mode.			
<sup>2</sup> Uses $D^{*0} \rightarrow D^0 \pi^0$ decay mode.			
<sup>3</sup> Superseded by AAIJ 21Q.			

 **$A_{CP}(B^+ \rightarrow D_{CP(+1)}^{*0} K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.09 \pm 0.05</math> OUR AVERAGE</b>	Error includes scale factor of 2.6. See the ideogram below.		
$0.123 \pm 0.054 \pm 0.031$	<sup>1</sup> AAIJ	21Q LHCb	$pp$ at 7, 8, 13 TeV
$-0.115 \pm 0.019 \pm 0.009$	<sup>2</sup> AAIJ	21Q LHCb	$pp$ at 7, 8, 13 TeV
$-0.11 \pm 0.09 \pm 0.01$	AUBERT	08BF BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$-0.20 \pm 0.22 \pm 0.04$	ABE	06 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$0.276 \pm 0.094 \pm 0.047$	<sup>1,3</sup> AAIJ	18A LHCb	$pp$ at 7, 8, 13 TeV
$-0.151 \pm 0.033 \pm 0.011$	<sup>2,3</sup> AAIJ	18A LHCb	$pp$ at 7, 8, 13 TeV
$-0.10 \pm 0.23 \begin{smallmatrix} +0.03 \\ -0.04 \end{smallmatrix}$	AUBERT	05N BABR	Repl. by AUBERT 08BF

 **$A_{CP}(B^+ \rightarrow D_{CP(+1)}^{*0} K^+)$**  **$A_{CP}(B^+ \rightarrow D_{CP(-1)}^{*0} K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.07 \pm 0.10</math> OUR AVERAGE</b>			
$+0.06 \pm 0.10 \pm 0.02$	AUBERT	08BF BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$+0.13 \pm 0.30 \pm 0.08$	ABE	06 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow D_{CP(+1)}^{*0} K^*(892)^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.08 \pm 0.06</math> OUR AVERAGE</b>			
$0.08 \pm 0.06 \pm 0.01$	<sup>1</sup> AAIJ	17B0 LHCb	$pp$ at 7, 8, 13 TeV
$0.09 \pm 0.13 \pm 0.06$	AUBERT	09AJ BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$-0.08 \pm 0.19 \pm 0.08$	AUBERT,B	05U BABR	Repl. by AUBERT 09AJ
<sup>1</sup> Measures the asymmetry separately for $K^+ K^-$ and $\pi^+ \pi^-$ final states, $A(KK) = 0.06 \pm 0.07 \pm 0.01$ and $A(\pi\pi) = 0.15 \pm 0.13 \pm 0.01$ , and combines the two results. The value of $A(\pi\pi)$ was updated in AAIJ 18X.			

**$A_{CP}(B^+ \rightarrow D_{CP(-1)} K^*(892)^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.23 \pm 0.21 \pm 0.07$	AUBERT	09AJ	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$-0.26 \pm 0.40 \pm 0.12$	AUBERT,B	05U	BABR Repl. by AUBERT 09AJ

 **$A_{CP}(B^+ \rightarrow D_s^+ \phi)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.01 \pm 0.41 \pm 0.03$	AAIJ	13R	LHCB $pp$ at 7 TeV

 **$A_{CP}(B^+ \rightarrow D_s^+ \bar{D}^0)$** 

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.4 \pm 0.5 \pm 0.5$	AAIJ	18W	LHCB $pp$ at 7, 8 TeV

 **$A_{CP}(B^+ \rightarrow D^{*+} \bar{D}^{*0})$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.15 \pm 0.11 \pm 0.02$	AUBERT,B	06A	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow D^{*+} \bar{D}^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.06 \pm 0.13 \pm 0.02$	AUBERT,B	06A	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow D^+ \bar{D}^{*0})$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.13 \pm 0.18 \pm 0.04$	AUBERT,B	06A	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow D^+ \bar{D}^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.016 \pm 0.025</math> OUR AVERAGE</b>			
$0.023 \pm 0.027 \pm 0.004$	AAIJ	18W	LHCB $pp$ at 7, 8 TeV
$0.00 \pm 0.08 \pm 0.02$	ADACHI	08	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
$-0.13 \pm 0.14 \pm 0.02$	AUBERT,B	06A	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow K_S^0 \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.017 \pm 0.016</math> OUR AVERAGE</b>			
$-0.022 \pm 0.025 \pm 0.010$	AAIJ	13BS	LHCB $pp$ at 7 TeV
$-0.011 \pm 0.021 \pm 0.006$	DUH	13	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
$-0.029 \pm 0.039 \pm 0.010$	<sup>1</sup> AUBERT,BE	06C	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
$0.18 \pm 0.24$	<sup>2</sup> CHEN	00	CLE2 $e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$0.03 \pm 0.03 \pm 0.01$	LIN	07	BELL Repl. by DUH 13
$-0.09 \pm 0.05 \pm 0.01$	<sup>3</sup> AUBERT,BE	05E	BABR Repl. by AUBERT,BE 06C
$0.05 \pm 0.05 \pm 0.01$	<sup>4</sup> CHAO	05A	BELL Repl. by LIN 07
$-0.05 \pm 0.08 \pm 0.01$	<sup>5</sup> AUBERT	04M	BABR Repl. by AUBERT,BE 05E
$0.07 \begin{smallmatrix} +0.09 \\ -0.08 \end{smallmatrix} \begin{smallmatrix} +0.01 \\ -0.03 \end{smallmatrix}$	<sup>6</sup> UNNO	03	BELL Repl. by CHAO 05A
$0.46 \pm 0.15 \pm 0.02$	<sup>7</sup> CASEY	02	BELL Repl. by UNNO 03



$0.098^{+0.430+0.020}_{-0.343-0.063}$	<sup>8</sup> ABE	01K BELL	Repl. by CASEY 02
$-0.21 \pm 0.18 \pm 0.03$	<sup>9</sup> AUBERT	01E BABR	Repl. by AUBERT 04M
<sup>1</sup> Corresponds to 90% confidence range $-0.092 < A_{CP} < 0.036$ .			
<sup>2</sup> Corresponds to 90% confidence range $-0.22 < A_{CP} < 0.56$ .			
<sup>3</sup> Corresponds to 90% confidence range $-0.16 < A_{CP} < -0.02$ .			
<sup>4</sup> Corresponds to 90% confidence range $-0.04 < A_{CP} < 0.13$ .			
<sup>5</sup> Corresponds to 90% confidence range $-0.18 < A_{CP} < 0.08$ .			
<sup>6</sup> Corresponds to 90% confidence range $-0.10 < A_{CP} < +0.22$ .			
<sup>7</sup> Corresponds to 90% confidence range $+0.19 < A_{CP} < +0.72$ .			
<sup>8</sup> Corresponds to 90% confidence range $-0.53 < A_{CP} < 0.82$ .			
<sup>9</sup> Corresponds to 90% confidence range $-0.51 < A_{CP} < 0.09$ .			

 **$A_{CP}(B^+ \rightarrow K^+ \pi^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.030±0.013 OUR AVERAGE</b>			
$0.025 \pm 0.015 \pm 0.007$	AAIJ	21H LHCb	$pp$ at 13 TeV
$0.043 \pm 0.024 \pm 0.002$	DUH	13 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.030 \pm 0.039 \pm 0.010$	AUBERT	07BC BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$-0.29 \pm 0.23$	<sup>1</sup> CHEN	00 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$0.07 \pm 0.03 \pm 0.01$	LIN	08 BELL	Repl. by DUH 13
$0.06 \pm 0.06 \pm 0.01$	<sup>2</sup> AUBERT	05L BABR	Repl. by AUBERT 07BC
$0.06 \pm 0.06 \pm 0.02$	<sup>2</sup> CHAO	05A BELL	Repl. by CHAO 04B
$0.04 \pm 0.05 \pm 0.02$	<sup>3</sup> CHAO	04B BELL	Repl. by LIN 08
$-0.09 \pm 0.09 \pm 0.01$	<sup>4</sup> AUBERT	03L BABR	Repl. by AUBERT 05L
$-0.02 \pm 0.19 \pm 0.02$	<sup>5</sup> CASEY	02 BELL	Repl. by CHAO 04B
$-0.059^{+0.222+0.055}_{-0.196-0.017}$	<sup>6</sup> ABE	01K BELL	Repl. by CASEY 02
$0.00 \pm 0.18 \pm 0.04$	<sup>7</sup> AUBERT	01E BABR	Repl. by AUBERT 03L
<sup>1</sup> Corresponds to 90% confidence range $-0.67 < A_{CP} < 0.09$ .			
<sup>2</sup> Corresponds to a 90% CL interval of $-0.06 < A_{CP} < 0.18$ .			
<sup>3</sup> Corresponds to 90% CL interval of $-0.05 < A_{CP} < 0.13$ .			
<sup>4</sup> Corresponds to 90% confidence range $-0.24 < A_{CP} < 0.06$ .			
<sup>5</sup> Corresponds to 90% confidence range $-0.35 < A_{CP} < +0.30$ .			
<sup>6</sup> Corresponds to 90% confidence range $-0.40 < A_{CP} < 0.36$ .			
<sup>7</sup> Corresponds to 90% confidence range $-0.30 < A_{CP} < +0.30$ .			

 **$A_{CP}(B^+ \rightarrow \eta' K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.004±0.011 OUR AVERAGE</b>			
$-0.002 \pm 0.012 \pm 0.006$	<sup>1</sup> AAIJ	150 LHCb	$pp$ at 7, 8 TeV
$0.008^{+0.017}_{-0.018} \pm 0.009$	AUBERT	09AV BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.028 \pm 0.028 \pm 0.021$	SCHUEMANN	06 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.03 \pm 0.12$	<sup>2</sup> CHEN	00 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$

- • • We do not use the following data for averages, fits, limits, etc. • • •

$0.010 \pm 0.022 \pm 0.006$	AUBERT	07AE	BABR	Repl. by AUBERT 09AV
$0.033 \pm 0.028 \pm 0.005$	<sup>3</sup> AUBERT	05M	BABR	Repl. by AUBERT 07AE
$0.037 \pm 0.045 \pm 0.011$	<sup>4</sup> AUBERT	03W	BABR	Repl. by AUBERT 05M
$-0.11 \pm 0.11 \pm 0.02$	<sup>5</sup> AUBERT	02E	BABR	Repl. by AUBERT 05M
$-0.015 \pm 0.070 \pm 0.009$	<sup>6</sup> CHEN	02B	BELL	Repl. by SCHUEMANN 06
$0.06 \pm 0.15 \pm 0.01$	<sup>7</sup> ABE	01M	BELL	Repl. by CHEN 02B

<sup>1</sup> Obtained using  $A_{CP}(B^\pm \rightarrow J/\psi K^\pm) = (0.3 \pm 0.6) \times 10^{-2}$ .

<sup>2</sup> Corresponds to 90% confidence range  $-0.17 < A_{CP} < 0.23$ .

<sup>3</sup> Corresponds to 90% confidence range  $-0.012 < A_{CP} < 0.078$ .

<sup>4</sup> Corresponds to 90% confidence range  $-0.04 < A_{CP} < 0.11$ .

<sup>5</sup> Corresponds to 90% confidence range  $-0.28 < A_{CP} < 0.07$ .

<sup>6</sup> Corresponds to 90% confidence range  $-0.13 < A_{CP} < 0.10$ .

<sup>7</sup> Corresponds to 90% confidence range  $-0.20 < A_{CP} < 0.32$ .

### $A_{CP}(B^+ \rightarrow \eta' K^*(892)^+)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.26 \pm 0.27 \pm 0.02</math></b>	DEL-AMO-SA...10A	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

- • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.30^{+0.33}_{-0.37} \pm 0.02$	<sup>1</sup> AUBERT	07E	BABR	Repl. by DEL-AMO-SANCHEZ 10A
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<sup>1</sup> Reports  $A_{CP}$  with the opposite sign convention.

### $A_{CP}(B^+ \rightarrow \eta' K_0^*(1430)^+)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.06 \pm 0.20 \pm 0.02</math></b>	DEL-AMO-SA...10A	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

### $A_{CP}(B^+ \rightarrow \eta' K_2^*(1430)^+)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.15 \pm 0.13 \pm 0.02</math></b>	DEL-AMO-SA...10A	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

### $A_{CP}(B^+ \rightarrow \eta K^+)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.37 \pm 0.08</math> OUR AVERAGE</b>			
$-0.38 \pm 0.11 \pm 0.01$	HOI	12	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
$-0.36 \pm 0.11 \pm 0.03$	AUBERT	09AV	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

- • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.22 \pm 0.11 \pm 0.01$	AUBERT	07AE	BABR	Repl. by AUBERT 09AV
$-0.39 \pm 0.16 \pm 0.03$	CHANG	07B	BELL	Repl. by HOI 12
$-0.20 \pm 0.15 \pm 0.01$	AUBERT,B	05K	BABR	Repl. by AUBERT 07AE
$-0.49 \pm 0.31 \pm 0.07$	CHANG	05A	BELL	Repl. by CHANG 07B
$-0.52 \pm 0.24 \pm 0.01$	AUBERT	04H	BABR	Repl. by AUBERT,B 05K

### $A_{CP}(B^+ \rightarrow \eta K^*(892)^+)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.02 \pm 0.06</math> OUR AVERAGE</b>			
$0.03 \pm 0.10 \pm 0.01$	WANG	07B	BELL $e^+ e^- \rightarrow \Upsilon(4S)$
$0.01 \pm 0.08 \pm 0.02$	AUBERT,B	06H	BABR $e^+ e^- \rightarrow \Upsilon(4S)$

- • • We do not use the following data for averages, fits, limits, etc. • • •

$0.13 \pm 0.14 \pm 0.02$	AUBERT,B	04D	BABR	Repl. by AUBERT,B 06H
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**$A_{CP}(B^+ \rightarrow \eta K_0^*(1430)^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.05 \pm 0.13 \pm 0.02</math></b>	AUBERT,B	06H	BABR $e^+e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow \eta K_2^*(1430)^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.45 \pm 0.30 \pm 0.02</math></b>	AUBERT,B	06H	BABR $e^+e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow \omega K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.02 \pm 0.04</math> OUR AVERAGE</b>			

$-0.03 \pm 0.04 \pm 0.01$  CHOBANOVA 14 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

$-0.01 \pm 0.07 \pm 0.01$  AUBERT 07AE BABR  $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.05 \pm 0.09 \pm 0.01$  AUBERT,B 06E BABR Repl. by AUBERT 07AE

$0.05^{+0.08}_{-0.07} \pm 0.01$  JEN 06 BELL Repl. by CHOBANOVA 14

$-0.09 \pm 0.17 \pm 0.01$  AUBERT 04H BABR Repl. by AUBERT,B 06E

$0.06^{+0.21}_{-0.18} \pm 0.01$  <sup>1</sup> WANG 04A BELL Repl. by JEN 06

$-0.21 \pm 0.28 \pm 0.03$  <sup>2</sup> LU 02 BELL Repl. by WANG 04A

<sup>1</sup> Corresponds to 90% CL interval  $0.15 < A_{CP} < 0.90$

<sup>2</sup> Corresponds to 90% confidence range  $-0.70 < A_{CP} < +0.38$ .

 **$A_{CP}(B^+ \rightarrow \omega K^{*+})$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>+0.29 \pm 0.35 \pm 0.02</math></b>	AUBERT	09H	BABR $e^+e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow \omega(K\pi)_0^{*+})$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.10 \pm 0.09 \pm 0.02</math></b>	AUBERT	09H	BABR $e^+e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow \omega K_2^*(1430)^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>+0.14 \pm 0.15 \pm 0.02</math></b>	AUBERT	09H	BABR $e^+e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow K^{*0}\pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.04 \pm 0.09</math> OUR AVERAGE</b>			Error includes scale factor of 2.1.

$-0.12 \pm 0.21^{+0.08}_{-0.14}$  <sup>1</sup> LEES 17G BABR  $e^+e^- \rightarrow \Upsilon(4S)$

$0.032 \pm 0.052^{+0.016}_{-0.013}$  AUBERT 08AI BABR  $e^+e^- \rightarrow \Upsilon(4S)$

$-0.149 \pm 0.064 \pm 0.022$  GARMASH 06 BELL  $e^+e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.068 \pm 0.078^{+0.070}_{-0.067}$  AUBERT,B 05N BABR Repl. by AUBERT 08AI

<sup>1</sup> Obtains the result from a Dalitz analysis of  $B^+ \rightarrow K_S^0 \pi^+ \pi^0$  decays. The first error is statistical, the second combines all the systematic uncertainties reported in the paper, including signal modelling.

**$A_{CP}(B^+ \rightarrow K^*(892)^+ \pi^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.39 \pm 0.21</math> OUR AVERAGE</b>	Error includes scale factor of 1.6.		
$-0.52 \pm 0.14^{+0.06}_{-0.05}$	<sup>1</sup> LEES	17G BABR	$e^+ e^- \rightarrow \gamma(4S)$
$-0.06 \pm 0.24 \pm 0.04$	LEES	11I BABR	$e^+ e^- \rightarrow \gamma(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$0.04 \pm 0.29 \pm 0.05$	AUBERT	05X BABR	Repl. by LEES 11I

<sup>1</sup> Obtains the result from a Dalitz analysis of  $B^+ \rightarrow K_S^0 \pi^+ \pi^0$  decays. The first error is statistical, the second combines all the systematic uncertainties reported in the paper, including signal modelling.

 **$A_{CP}(B^+ \rightarrow K^+ \pi^- \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.027 \pm 0.008</math> OUR AVERAGE</b>			
$0.025 \pm 0.004 \pm 0.008$	<sup>1</sup> AAIJ	14B0 LHCb	$pp$ at 7, 8 TeV
$0.028 \pm 0.020 \pm 0.023$	AUBERT	08AI BABR	$e^+ e^- \rightarrow \gamma(4S)$
$0.049 \pm 0.026 \pm 0.020$	GARMASH	06 BELL	$e^+ e^- \rightarrow \gamma(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$0.032 \pm 0.008 \pm 0.008$	AAIJ	13AZ LHCb	Repl. by AAIJ 14B0
$-0.013 \pm 0.037 \pm 0.011$	AUBERT,B	05N BABR	Repl. by AUBERT 08AI
$0.01 \pm 0.07 \pm 0.03$	AUBERT	03M BABR	Repl. by AUBERT,B 05N

<sup>1</sup> AAIJ 14B0 reports also  $CP$  asymmetries in restricted regions of phase space.

 **$A_{CP}(B^+ \rightarrow K^+ K^- K^+ \text{ nonresonant})$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.060 \pm 0.044 \pm 0.019</math></b>	LEES	12O BABR	$e^+ e^- \rightarrow \gamma(4S)$

 **$A_{CP}(B^+ \rightarrow f(980)^0 K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.08 \pm 0.08 \pm 0.04</math></b>	<sup>1</sup> LEES	12O BABR	$e^+ e^- \rightarrow \gamma(4S)$

<sup>1</sup> Measured in the  $B^+ \rightarrow K^+ K^- K^+$  decay.

 **$A_{CP}(B^+ \rightarrow f_2(1270) K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.68^{+0.19}_{-0.17}</math> OUR AVERAGE</b>			
$-0.85 \pm 0.22^{+0.26}_{-0.13}$	AUBERT	08AI BABR	$e^+ e^- \rightarrow \gamma(4S)$
$-0.59 \pm 0.22 \pm 0.036$	GARMASH	06 BELL	$e^+ e^- \rightarrow \gamma(4S)$

 **$A_{CP}(B^+ \rightarrow f_0(1500) K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.28 \pm 0.26^{+0.15}_{-0.14}</math></b>	AUBERT	08AI BABR	$e^+ e^- \rightarrow \gamma(4S)$

**$A_{CP}(B^+ \rightarrow f'_2(1525)^0 K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**-0.08<sup>+0.05</sup><sub>-0.04</sub> OUR AVERAGE**

0.18 ± 0.18 ± 0.04	<sup>1</sup> LEES	11I	BABR $e^+e^- \rightarrow \Upsilon(4S)$
-0.106 ± 0.050 <sup>+0.036</sup> <sub>-0.015</sub>	AUBERT	08AI	BABR $e^+e^- \rightarrow \Upsilon(4S)$
-0.077 ± 0.065 <sup>+0.046</sup> <sub>-0.026</sub>	GARMASH	06	BELL $e^+e^- \rightarrow \Upsilon(4S)$

● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

0.14 ± 0.10 ± 0.04	<sup>2</sup> LEES	12O	BABR $e^+e^- \rightarrow \Upsilon(4S)$
-0.31 ± 0.25 ± 0.08	<sup>3</sup> AUBERT	06O	BABR Repl. by LEES 12O
0.088 ± 0.095 <sup>+0.097</sup> <sub>-0.056</sub>	AUBERT,B	05N	BABR Repl. by AUBERT 08AI

<sup>1</sup> Measured in  $B^+ \rightarrow f_0 K^+$  with  $f_0 \rightarrow \pi^0 \pi^0$  decay.<sup>2</sup> Measured in the  $B^+ \rightarrow K^+ K^- K^+$  decay assuming  $A_{CP}(B^+ \rightarrow f'_2(1525)^0 K^+) = A_{CP}(B^+ \rightarrow f_0(1500)^0 K^+) = A_{CP}(B^+ \rightarrow f_0(1710)^0 K^+)$ <sup>3</sup> Measured in the  $B^+ \rightarrow K^+ K^- K^+$  decay. **$A_{CP}(B^+ \rightarrow \rho^0 K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**0.37 ± 0.10 OUR AVERAGE**

0.44 ± 0.10 <sup>+0.06</sup> <sub>-0.14</sub>	AUBERT	08AI	BABR $e^+e^- \rightarrow \Upsilon(4S)$
0.30 ± 0.11 <sup>+0.11</sup> <sub>-0.04</sub>	GARMASH	06	BELL $e^+e^- \rightarrow \Upsilon(4S)$

● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

0.32 ± 0.13 <sup>+0.10</sup> <sub>-0.08</sub>	AUBERT,B	05N	BABR Repl. by AUBERT 08AI
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 **$A_{CP}(B^+ \rightarrow K^0 \pi^+ \pi^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**0.07 ± 0.05 ± 0.04** <sup>1</sup> LEES 17G BABR  $e^+e^- \rightarrow \Upsilon(4S)$ <sup>1</sup> Obtains the result from a Dalitz analysis of  $B^+ \rightarrow K_S^0 \pi^+ \pi^0$  decays. The first error is statistical, the second combines all the systematic uncertainties reported in the paper, including signal modelling. **$A_{CP}(B^+ \rightarrow K_S^*(1430)^0 \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**0.061 ± 0.032 OUR AVERAGE**

0.14 ± 0.10 <sup>+0.14</sup> <sub>-0.06</sub>	<sup>1</sup> LEES	17G	BABR $e^+e^- \rightarrow \Upsilon(4S)$
0.032 ± 0.035 <sup>+0.034</sup> <sub>-0.028</sub>	AUBERT	08AI	BABR $e^+e^- \rightarrow \Upsilon(4S)$
0.076 ± 0.038 <sup>+0.028</sup> <sub>-0.022</sub>	GARMASH	06	BELL $e^+e^- \rightarrow \Upsilon(4S)$

● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

-0.064 ± 0.032 <sup>+0.023</sup> <sub>-0.026</sub>	AUBERT,B	05N	BABR Repl. by AUBERT 08AI
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<sup>1</sup> Obtains the result from a Dalitz analysis of  $B^+ \rightarrow K_S^0 \pi^+ \pi^0$  decays. The first error is statistical, the second combines all the systematic uncertainties reported in the paper, including signal modelling.

**$A_{CP}(B^+ \rightarrow K_0^*(1430)^+ \pi^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.26 \pm 0.12^{+0.14}_{-0.08}$	<sup>1</sup> LEES	17G BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Obtains the result from a Dalitz analysis of  $B^+ \rightarrow K_S^0 \pi^+ \pi^0$  decays. The first error is statistical, the second combines all the systematic uncertainties reported in the paper, including signal modelling.

 **$A_{CP}(B^+ \rightarrow K_2^*(1430)^0 \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.05 \pm 0.23^{+0.18}_{-0.08}$	AUBERT	08AI BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow K^+ \pi^0 \pi^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.06 \pm 0.06 \pm 0.04$	LEES	11I BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow K^0 \rho^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.03 \pm 0.15$ OUR AVERAGE			

$0.21 \pm 0.19^{+0.24}_{-0.20}$	<sup>1</sup> LEES	17G BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$-0.12 \pm 0.17 \pm 0.02$	AUBERT	07Z BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Obtains the result from a Dalitz analysis of  $B^+ \rightarrow K_S^0 \pi^+ \pi^0$  decays. The first error is statistical, the second combines all the systematic uncertainties reported in the paper, including signal modelling.

 **$A_{CP}(B^+ \rightarrow K^{*+} \pi^+ \pi^-)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.07 \pm 0.07 \pm 0.04$	AUBERT,B	06U BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow \rho^0 K^*(892)^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.31 \pm 0.13 \pm 0.03$	DEL-AMO-SA..11D	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.20^{+0.32}_{-0.29} \pm 0.04$	AUBERT	03V BABR	Repl. by DEL-AMO-SANCHEZ 11D
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 **$A_{CP}(B^+ \rightarrow K^*(892)^+ f_0(980))$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.15 \pm 0.12 \pm 0.03$	DEL-AMO-SA..11D	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.34 \pm 0.21 \pm 0.03$	AUBERT,B	06G BABR	Repl. by DEL-AMO-SANCHEZ 11D
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 **$A_{CP}(B^+ \rightarrow a_1^+ K^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$+0.12 \pm 0.11 \pm 0.02$	AUBERT	08F BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow b_1^+ K^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.03 \pm 0.15 \pm 0.02$	AUBERT	08AG BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

**$A_{CP}(B^+ \rightarrow K^*(892)^0 \rho^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.01 \pm 0.16 \pm 0.02$	AUBERT,B	06G	BABR $e^+ e^- \rightarrow \gamma(4S)$

 **$A_{CP}(B^+ \rightarrow b_1^0 K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.46 \pm 0.20 \pm 0.02$	AUBERT	07BI	BABR $e^+ e^- \rightarrow \gamma(4S)$

 **$A_{CP}(B^+ \rightarrow K^0 K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.04 \pm 0.14</math> OUR AVERAGE</b>			

0.014 ± 0.168 ± 0.002      DUH      13      BELL       $e^+ e^- \rightarrow \gamma(4S)$

0.10 ± 0.26 ± 0.03      <sup>1</sup> AUBERT,BE      06c      BABR       $e^+ e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.13  $\begin{smallmatrix} +0.23 \\ -0.24 \end{smallmatrix}$  ± 0.02      LIN      07      BELL      Repl. by DUH 13

0.15 ± 0.33 ± 0.03      <sup>2</sup> AUBERT,BE      05E      BABR      Repl. by AUBERT,BE 06c

<sup>1</sup> Corresponds to 90% confidence range  $-0.31 < A_{CP} < 0.54$ .

<sup>2</sup> Corresponds to 90% confidence range  $-0.43 < A_{CP} < 0.68$ .

 **$A_{CP}(B^+ \rightarrow K_S^0 K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.21 \pm 0.14 \pm 0.01$	AAIJ	13BS	LHCB $pp$ at 7 TeV

 **$A_{CP}(B^+ \rightarrow K^+ K_S^0 K_S^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.025 \pm 0.031</math> OUR AVERAGE</b>			

0.016 ± 0.039 ± 0.009      KALIYAR      19      BELL       $e^+ e^- \rightarrow \gamma(4S)$

0.04  $\begin{smallmatrix} +0.04 \\ -0.05 \end{smallmatrix}$  ± 0.02      LEES      120      BABR       $e^+ e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.04 \pm 0.11 \pm 0.02$       <sup>1</sup> AUBERT,B      04v      BABR      Repl. by LEES 120

<sup>1</sup> Corresponds to 90% confidence range  $-0.23 < A_{CP} < 0.15$ .

 **$A_{CP}(B^+ \rightarrow K^+ K^- \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.122 \pm 0.021</math> OUR AVERAGE</b>			

$-0.170 \pm 0.073 \pm 0.017$       <sup>1</sup> HSU      17      BELL       $e^+ e^- \rightarrow \gamma(4S)$

$-0.123 \pm 0.017 \pm 0.014$       <sup>2</sup> AAIJ      14BO      LHCB       $pp$  at 7, 8 TeV

0.00 ± 0.10 ± 0.03      AUBERT      07BB      BABR       $e^+ e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.141 \pm 0.040 \pm 0.019$       <sup>3</sup> AAIJ      14      LHCB      Repl. by AAIJ 14BO

<sup>1</sup> HSU 17 provides also measurement as a function of  $K^+ K^-$  invariant mass.

<sup>2</sup> AAIJ 14BO reports also  $CP$  asymmetries in restricted regions of phase space.

<sup>3</sup> AAIJ 14 reports  $A_{CP}(B^+ \rightarrow K^+ K^- \pi^+) = -0.648 \pm 0.070 \pm 0.013 \pm 0.007$  in the Dalitz plot region of  $m_{K^+ K^-}^2 < 1.5 \text{ GeV}^2/c^4$ . The third uncertainty is due to the  $CP$  asymmetry of the  $B^\pm \rightarrow J/\psi K^\pm$  reference mode uncertainty.

**$A_{CP}(B^+ \rightarrow K^+ K^- \pi^+ \text{ nonresonant})$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.107 \pm 0.053 \pm 0.035$	<sup>1</sup> AAIJ	19AL LHCb	$pp$ at 7, 8 TeV

<sup>1</sup> Uses amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays. **$A_{CP}(B^+ \rightarrow K^+ \bar{K}^*(892)^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.123 \pm 0.087 \pm 0.045$	<sup>1</sup> AAIJ	19AL LHCb	$pp$ at 7, 8 TeV

<sup>1</sup> Uses amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays. **$A_{CP}(B^+ \rightarrow K^+ \bar{K}_0^*(1430)^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.104 \pm 0.149 \pm 0.088$	<sup>1</sup> AAIJ	19AL LHCb	$pp$ at 7, 8 TeV

<sup>1</sup> Uses amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays. **$A_{CP}(B^+ \rightarrow \phi \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.098 \pm 0.436 \pm 0.266$	<sup>1</sup> AAIJ	19AL LHCb	$pp$ at 7, 8 TeV

<sup>1</sup> Uses amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays. **$A_{CP}(B^+ \rightarrow \pi^+(K^+ K^-)_{S\text{-wave}})$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.664 \pm 0.038 \pm 0.019$	<sup>1</sup> AAIJ	19AL LHCb	$pp$ at 7, 8 TeV

<sup>1</sup> Uses amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays in the  $\pi\pi - KK$  rescattering mass region of  $0.95 < m(K^+ K^-) < 1.42 \text{ GeV}/c^2$ . **$A_{CP}(B^+ \rightarrow K^+ K^- K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.033 \pm 0.008$ OUR AVERAGE			
$-0.036 \pm 0.004 \pm 0.007$	<sup>1</sup> AAIJ	14B0 LHCb	$pp$ at 7, 8 TeV
$-0.017^{+0.019}_{-0.014} \pm 0.014$	<sup>2</sup> LEES	120 BABR	$e^+ e^- \rightarrow \gamma(4S)$

● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

$-0.043 \pm 0.009 \pm 0.008$	AAIJ	13AZ LHCb	Repl. by AAIJ 14B0
$-0.017 \pm 0.026 \pm 0.015$	AUBERT	06O BABR	Repl. by LEES 120
$0.02 \pm 0.07 \pm 0.03$	AUBERT	03M BABR	Repl. by AUBERT 06O

<sup>1</sup> AAIJ 14B0 reports also  $CP$  asymmetries in restricted regions of phase space.<sup>2</sup> All intermediate charmonium and charm resonances are removed, except of  $\chi_{c0}$ . **$A_{CP}(B^+ \rightarrow \phi K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.024 \pm 0.028$ OUR AVERAGE	Error includes scale factor of 2.3.		
$0.017 \pm 0.011 \pm 0.006$	<sup>1</sup> AAIJ	15O LHCb	$pp$ at 7, 8 TeV
$0.128 \pm 0.044 \pm 0.013$	LEES	120 BABR	$e^+ e^- \rightarrow \gamma(4S)$
$-0.07 \pm 0.17 \pm 0.03$ $-0.02$	ACOSTA	05J CDF	$p\bar{p}$ at 1.96 TeV
$0.01 \pm 0.12 \pm 0.05$	<sup>2</sup> CHEN	03B BELL	$e^+ e^- \rightarrow \gamma(4S)$



• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.022 \pm 0.021 \pm 0.009$	AAIJ	14A	LHCB	Repl. by AAIJ 150
$0.00 \pm 0.08 \pm 0.02$	AUBERT	06O	BABR	Repl. by LEES 120
$0.04 \pm 0.09 \pm 0.01$	<sup>3</sup> AUBERT	04A	BABR	Repl. by AUBERT 06O
$-0.05 \pm 0.20 \pm 0.03$	<sup>4</sup> AUBERT	02E	BABR	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> Obtained using  $A_{CP}(B^\pm \rightarrow J/\psi K^\pm) = (0.3 \pm 0.6) \times 10^{-2}$ .

<sup>2</sup> Corresponds to 90% confidence range  $-0.20 < A_{CP} < 0.22$ .

<sup>3</sup> Corresponds to 90% confidence range  $-0.10 < A_{CP} < 0.18$ .

<sup>4</sup> Corresponds to 90% confidence range  $-0.37 < A_{CP} < 0.28$ .

### $A_{CP}(B^+ \rightarrow X_0(1550)K^+)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.04 \pm 0.07 \pm 0.02</math></b>	<sup>1</sup> AUBERT	06O	BABR $e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup> Measured in the  $B^+ \rightarrow K^+ K^- K^+$  decay.

### $A_{CP}(B^+ \rightarrow K^{*+} K^+ K^-)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.11 \pm 0.08 \pm 0.03</math></b>	AUBERT,B	06U	BABR $e^+e^- \rightarrow \gamma(4S)$

### $A_{CP}(B^+ \rightarrow \phi K^*(892)^+)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.01 \pm 0.08</math> OUR AVERAGE</b>			

$0.00 \pm 0.09 \pm 0.04$  AUBERT 07BA BABR  $e^+e^- \rightarrow \gamma(4S)$

$-0.02 \pm 0.14 \pm 0.03$  <sup>1</sup> CHEN 05A BELL  $e^+e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.16 \pm 0.17 \pm 0.03$  AUBERT 03V BABR Repl. by AUBERT 07BA

$-0.13 \pm 0.29^{+0.08}_{-0.11}$  <sup>2</sup> CHEN 03B BELL Repl. by CHEN 05A

$-0.43^{+0.36}_{-0.30} \pm 0.06$  <sup>3</sup> AUBERT 02E BABR Repl. by AUBERT 03V

<sup>1</sup> Corresponds to 90% confidence range  $-0.25 < A_{CP} < 0.22$ .

<sup>2</sup> Corresponds to 90% confidence range  $-0.64 < A_{CP} < 0.36$ .

<sup>3</sup> Corresponds to 90% confidence range  $-0.88 < A_{CP} < 0.18$ .

### $A_{CP}(B^+ \rightarrow \phi(K\pi)_0^{*+})$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.04 \pm 0.15 \pm 0.04</math></b>	AUBERT	08BI	BABR $e^+e^- \rightarrow \gamma(4S)$

### $A_{CP}(B^+ \rightarrow \phi K_1(1270)^+)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.15 \pm 0.19 \pm 0.05</math></b>	AUBERT	08BI	BABR $e^+e^- \rightarrow \gamma(4S)$

### $A_{CP}(B^+ \rightarrow \phi K_2^*(1430)^+)$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.23 \pm 0.19 \pm 0.06</math></b>	AUBERT	08BI	BABR $e^+e^- \rightarrow \gamma(4S)$

**$A_{CP}(B^+ \rightarrow K^+ \phi \phi)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.08 \pm 0.07</math> OUR AVERAGE</b>			
$-0.02 \pm 0.11 \pm 0.11$	<sup>1</sup> MOHANTY 21	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$-0.10 \pm 0.08 \pm 0.02$	<sup>1</sup> LEES 11A	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Assumes  $m_{\phi\phi} < 2.85 \text{ GeV}/c^2$ .

 **$A_{CP}(B^+ \rightarrow K^+ [\phi\phi]_{\eta_c})$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.10 \pm 0.08</math> OUR AVERAGE</b>			
$0.12 \pm 0.12 \pm 0.01$	<sup>1</sup> MOHANTY 21	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.09 \pm 0.10 \pm 0.02$	<sup>1</sup> LEES 11A	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup>  $m_{\phi\phi}$  is consistent with  $\eta_c$  mass in  $[2.94, 3.02] \text{ GeV}/c^2$ .

 **$A_{CP}(B^+ \rightarrow K^*(892)^+ \gamma)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.014 \pm 0.018</math> OUR AVERAGE</b>			
$0.011 \pm 0.023 \pm 0.003$	<sup>1</sup> HORIGUCHI 17	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.018 \pm 0.028 \pm 0.007$	AUBERT 09AO	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Uses  $B(\Upsilon(4S) \rightarrow B^+ B^-) = (51.4 \pm 0.6)\%$  and  $B(\Upsilon(4S) \rightarrow B^0 \bar{B}^0) = (48.6 \pm 0.6)\%$ .

 **$A_{CP}(B^+ \rightarrow X_s \gamma)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.0275 \pm 0.0184 \pm 0.0032</math></b>	<sup>1</sup> WATANUKI 19	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Using a sum-of-exclusive technique with  $m_{X_s} < 2.8 \text{ GeV}/c^2$ .

 **$A_{CP}(B^+ \rightarrow \eta K^+ \gamma)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.12 \pm 0.07</math> OUR AVERAGE</b>			
$-0.09 \pm 0.10 \pm 0.01$	<sup>1</sup> AUBERT 09	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$-0.16 \pm 0.09 \pm 0.06$	<sup>2</sup> NISHIDA 05	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$-0.09 \pm 0.12 \pm 0.01$	<sup>1</sup> AUBERT,B 06M	BABR	Repl. by AUBERT 09

<sup>1</sup>  $m_{\eta K} < 3.25 \text{ GeV}/c^2$ .  
<sup>2</sup>  $m_{\eta K} < 2.4 \text{ GeV}/c^2$

 **$A_{CP}(B^+ \rightarrow \phi K^+ \gamma)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.13 \pm 0.11</math> OUR AVERAGE</b>	Error includes scale factor of 1.1.		
$-0.03 \pm 0.11 \pm 0.08$	SAHOO 11A	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$-0.26 \pm 0.14 \pm 0.05$	AUBERT 07Q	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow \rho^+ \gamma)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.11 \pm 0.32 \pm 0.09</math></b>	TANIGUCHI 08	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$

**$A_{CP}(B^+ \rightarrow \pi^+ \pi^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.03 ± 0.04 OUR AVERAGE</b>			
0.025 ± 0.043 ± 0.007	DUH	13 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
0.03 ± 0.08 ± 0.01	AUBERT	07BC BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.07 ± 0.06 ± 0.01	LIN	08 BELL	Repl. by DUH 13
−0.01 ± 0.10 ± 0.02	<sup>1</sup> AUBERT	05L BABR	Repl. by AUBERT 07BC
0.00 ± 0.10 ± 0.02	<sup>2</sup> CHAO	05A BELL	Repl. by CHAO 04B
−0.02 ± 0.10 ± 0.01	<sup>3</sup> CHAO	04B BELL	Repl. by LIN 08
−0.03 <sup>+0.18</sup> <sub>−0.17</sub> ± 0.02	<sup>4</sup> AUBERT	03L BABR	Repl. by AUBERT 05L
0.30 ± 0.30 <sup>+0.06</sup> <sub>−0.04</sub>	<sup>5</sup> CASEY	02 BELL	Repl. by CHAO 04B

<sup>1</sup> Corresponds to a 90% CL interval of  $-0.19 < A_{CP} < 0.21$ .

<sup>2</sup> Corresponds to a 90% CL interval of  $-0.17 < A_{CP} < 0.16$ .

<sup>3</sup> This corresponds to 90% CL interval of  $-0.18 < A_{CP} < 0.14$ .

<sup>4</sup> Corresponds to 90% confidence range  $-0.32 < A_{CP} < 0.27$ .

<sup>5</sup> Corresponds to 90% confidence range  $-0.23 < A_{CP} < +0.86$ .

 **$A_{CP}(B^+ \rightarrow \pi^+ \pi^- \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.057 ± 0.013 OUR AVERAGE</b>			
0.058 ± 0.008 ± 0.011	<sup>1</sup> AAIJ	14BO LHCb	$pp$ at 7, 8 TeV
0.032 ± 0.044 <sup>+0.040</sup> <sub>−0.037</sub>	AUBERT	09L BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.117 ± 0.021 ± 0.011	<sup>2</sup> AAIJ	14 LHCb	Repl. by AAIJ 14BO
−0.007 ± 0.077 ± 0.025	AUBERT,B	05G BABR	Repl. by AUBERT 09L
−0.39 ± 0.33 ± 0.12	AUBERT	03M BABR	Repl. by AUBERT 05G

<sup>1</sup> AAIJ 14BO reports also  $CP$  asymmetries in restricted regions of phase space.

<sup>2</sup> AAIJ 14 reports  $A_{CP}(B^+ \rightarrow \pi^+ \pi^- \pi^+) = 0.584 \pm 0.082 \pm 0.027 \pm 0.007$  in the Dalitz plot region of  $m_{\pi^+ \pi^-}^2 > 15 \text{ GeV}^2/c^4$  or  $m_{\pi^+ \pi^-}^2 < 0.4 \text{ GeV}^2/c^4$ . The third uncertainty is due to the  $CP$  asymmetry of the  $B^\pm \rightarrow J/\psi K^\pm$  reference mode uncertainty.

 **$A_{CP}(B^+ \rightarrow \rho^0 \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.009 ± 0.019 OUR AVERAGE</b>			
0.007 ± 0.011 ± 0.016	<sup>1</sup> AAIJ	20A LHCb	$pp$ at 7, 8 TeV
0.18 ± 0.07 <sup>+0.05</sup> <sub>−0.15</sub>	AUBERT	09L BABR	$e^+ e^- \rightarrow \Upsilon(4S)$

● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

−0.074 ± 0.120 <sup>+0.035</sup> <sub>−0.055</sub> AUBERT,B 05G BABR Repl. by AUBERT 09L

−0.19 ± 0.11 ± 0.02 AUBERT 04Z BABR Repl. by AUBERT,B 05G

<sup>1</sup> This result is obtained with an amplitude analysis of  $B^+ \rightarrow \pi^+ \pi^+ \pi^-$  decays, using the isobar model within the mass range  $1.0 < m(\pi^+ \pi^-) < 1.5 \text{ GeV}$  to describe the  $\pi^+ \pi^-$  S-wave contribution.

**$A_{CP}(B^+ \rightarrow f_2(1270)\pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.40 \pm 0.06</math> OUR AVERAGE</b>			
$0.468 \pm 0.061 \pm 0.046$	<sup>1</sup> AAIJ	20A LHCB	$pp$ at 7, 8 TeV
$0.267 \pm 0.102 \pm 0.048$	<sup>2</sup> AAIJ	19AL LHCB	$pp$ at 7, 8 TeV
$0.41 \pm 0.25 \begin{smallmatrix} +0.18 \\ -0.15 \end{smallmatrix}$	AUBERT	09L BABR	$e^+e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.004 \pm 0.247 \begin{smallmatrix} +0.028 \\ -0.032 \end{smallmatrix}$	AUBERT,B	05G BABR	Repl. by AUBERT 09L
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<sup>1</sup>This result is obtained with an amplitude analysis of  $B^+ \rightarrow \pi^+\pi^+\pi^-$  decays, using the isobar model within the mass range  $1.0 < m(\pi^+\pi^-) < 1.5$  GeV to describe the  $\pi^+\pi^-$  S-wave contribution.

<sup>2</sup>Uses amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays.

 **$A_{CP}(B^+ \rightarrow \rho^0(1450)\pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.11 \pm 0.05</math> OUR AVERAGE</b>			
$-0.129 \pm 0.033 \pm 0.359$	<sup>1</sup> AAIJ	20A LHCB	$pp$ at 7, 8 TeV
$-0.109 \pm 0.044 \pm 0.024$	<sup>2</sup> AAIJ	19AL LHCB	$pp$ at 7, 8 TeV
$-0.06 \pm 0.28 \begin{smallmatrix} +0.23 \\ -0.40 \end{smallmatrix}$	AUBERT	09L BABR	$e^+e^- \rightarrow \gamma(4S)$

<sup>1</sup>This result is obtained with an amplitude analysis of  $B^+ \rightarrow \pi^+\pi^+\pi^-$  decays, using the isobar model within the mass range  $1.0 < m(\pi^+\pi^-) < 1.5$  GeV to describe the  $\pi^+\pi^-$  S-wave contribution.

<sup>2</sup>Uses amplitude analysis of  $B^\pm \rightarrow \pi^\pm K^+ K^-$  decays.

 **$A_{CP}(B^+ \rightarrow \rho_3(1690)\pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.801 \pm 0.114 \pm 0.253</math></b>	<sup>1</sup> AAIJ	20A LHCB	$pp$ at 7, 8 TeV

<sup>1</sup>This result is obtained with an amplitude analysis of  $B^+ \rightarrow \pi^+\pi^+\pi^-$  decays, using the isobar model within the mass range  $1.0 < m(\pi^+\pi^-) < 1.5$  GeV to describe the  $\pi^+\pi^-$  S-wave contribution.

 **$A_{CP}(B^+ \rightarrow f_0(1370)\pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.72 \pm 0.15 \pm 0.16</math></b>	AUBERT	09L BABR	$e^+e^- \rightarrow \gamma(4S)$

 **$A_{CP}(B^+ \rightarrow \pi^+\pi^-\pi^+ \text{ nonresonant})$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.14 \pm 0.14 \begin{smallmatrix} +0.18 \\ -0.08 \end{smallmatrix}</math></b>	AUBERT	09L BABR	$e^+e^- \rightarrow \gamma(4S)$

 **$A_{CP}(B^+ \rightarrow \rho^+\pi^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.02 \pm 0.11</math> OUR AVERAGE</b>			
$-0.01 \pm 0.13 \pm 0.02$	AUBERT	07X BABR	$e^+e^- \rightarrow \gamma(4S)$
$0.06 \pm 0.17 \begin{smallmatrix} +0.04 \\ -0.05 \end{smallmatrix}$	ZHANG	05A BELL	$e^+e^- \rightarrow \gamma(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.24 \pm 0.16 \pm 0.06$	AUBERT	04Z BABR	Repl. by AUBERT 07X
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**$A_{CP}(B^+ \rightarrow \rho^+ \rho^0)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.05 \pm 0.05</math> OUR AVERAGE</b>			
$-0.054 \pm 0.055 \pm 0.010$	AUBERT	09G BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.00 \pm 0.22 \pm 0.03$	ZHANG	03B BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-0.12 \pm 0.13 \pm 0.10$	AUBERT,BE	06G BABR	Repl. by AUBERT 09G
$-0.19 \pm 0.23 \pm 0.03$	AUBERT	03V BABR	Repl. by AUBERT,BE 06G

 **$A_{CP}(B^+ \rightarrow \omega \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.04 \pm 0.05</math> OUR AVERAGE</b>			
$-0.048 \pm 0.065 \pm 0.038$	<sup>1</sup> AAIJ	20A LHCb	$pp$ at 7, 8 TeV
$-0.02 \pm 0.08 \pm 0.01$	AUBERT	07AE BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
$-0.02 \pm 0.09 \pm 0.01$	JEN	06 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$-0.34 \pm 0.25$	<sup>2</sup> CHEN	00 CLE2	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-0.01 \pm 0.10 \pm 0.01$	AUBERT,B	06E BABR	Repl. by AUBERT 07AE
$0.03 \pm 0.16 \pm 0.01$	AUBERT	04H BABR	Repl. by AUBERT,B 06E
$0.50 \begin{smallmatrix} +0.23 \\ -0.20 \end{smallmatrix} \pm 0.02$	<sup>3</sup> WANG	04A BELL	Repl. by JEN 06
$-0.01 \begin{smallmatrix} +0.29 \\ -0.31 \end{smallmatrix} \pm 0.03$	<sup>4</sup> AUBERT	02E BABR	Repl. by AUBERT 04H

<sup>1</sup> This result is obtained with an amplitude analysis of  $B^+ \rightarrow \pi^+ \pi^+ \pi^-$  decays, using the isobar model within the mass range  $1.0 < m(\pi^+ \pi^-) < 1.5$  GeV to describe the  $\pi^+ \pi^-$  S-wave contribution.

<sup>2</sup> Corresponds to 90% confidence range  $-0.75 < A_{CP} < 0.07$ .

<sup>3</sup> Corresponds to 90% CL interval  $-0.25 < A_{CP} < 0.41$

<sup>4</sup> Corresponds to 90% confidence range  $-0.50 < A_{CP} < 0.46$ .

 **$A_{CP}(B^+ \rightarrow \omega \rho^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.20 \pm 0.09 \pm 0.02</math></b>	AUBERT	09H BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.04 \pm 0.18 \pm 0.02$	AUBERT,B	06T BABR	Repl. by AUBERT 09H
$0.05 \pm 0.26 \pm 0.02$	AUBERT	05O BABR	Repl. by AUBERT,B 06T

 **$A_{CP}(B^+ \rightarrow \eta \pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.14 \pm 0.07</math> OUR AVERAGE</b>	Error includes scale factor of 1.4.		
$-0.19 \pm 0.06 \pm 0.01$	HOI	12 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$-0.03 \pm 0.09 \pm 0.03$	AUBERT	09AV BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-0.08 \pm 0.10 \pm 0.01$	AUBERT	07AE BABR	Repl. by AUBERT 09AV
$-0.23 \pm 0.09 \pm 0.02$	CHANG	07B BELL	Repl. by HOI 12
$-0.13 \pm 0.12 \pm 0.01$	AUBERT,B	05K BABR	Repl. by AUBERT 07AE
$0.07 \pm 0.15 \pm 0.03$	CHANG	05A BELL	Repl. by CHANG 07B
$-0.44 \pm 0.18 \pm 0.01$	AUBERT	04H BABR	Repl. by AUBERT,B 05K

**$A_{CP}(B^+ \rightarrow \eta\rho^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.11±0.11 OUR AVERAGE</b>			
0.13±0.11±0.02	AUBERT	08AH BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$-0.04^{+0.34}_{-0.32} \pm 0.01$	WANG	07B BELL	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.02±0.18±0.02	AUBERT,B	05K BABR	Repl. by AUBERT 08AH

 **$A_{CP}(B^+ \rightarrow \eta'\pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.06±0.16 OUR AVERAGE</b>			
0.03±0.17±0.02	AUBERT	09AV BABR	$e^+e^- \rightarrow \Upsilon(4S)$
$0.20^{+0.37}_{-0.36} \pm 0.04$	SCHUEMANN	06 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.21±0.17±0.01	AUBERT	07AE BABR	Repl. by AUBERT 09AV
0.14±0.16±0.01	AUBERT,B	05K BABR	Repl. by AUBERT 07AE

 **$A_{CP}(B^+ \rightarrow \eta'\rho^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.26±0.17±0.02</b>	DEL-AMO-SA..10A	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.04±0.28±0.02	<sup>1</sup> AUBERT	07E BABR	Repl. by DEL-AMO-SANCHEZ 10A

<sup>1</sup> Reports  $A_{CP}$  with the opposite sign convention. **$A_{CP}(B^+ \rightarrow b_1^0\pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>+0.05±0.16±0.02</b>	AUBERT	07BI BABR	$e^+e^- \rightarrow \Upsilon(4S)$

 **$A_{CP}(B^+ \rightarrow \rho\bar{p}\pi^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.00±0.04 OUR AVERAGE</b>			
-0.02±0.05±0.02	<sup>1</sup> WEI	08 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
+0.04±0.07±0.04	AUBERT	07AV BABR	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
-0.16±0.22±0.01	WANG	04 BELL	Repl. by WEI 08
<sup>1</sup> Requires $m_{p\bar{p}} < 2.85 \text{ GeV}/c^2$ .			

 **$A_{CP}(B^+ \rightarrow \rho\bar{p}K^+)$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.00 ±0.04 OUR AVERAGE</b>	Error includes scale factor of 2.2.		
0.021±0.020±0.004	<sup>1</sup> AAIJ	14AF LHCB	$pp$ at 7, 8 TeV
-0.17 ±0.10 ±0.02	<sup>1</sup> WEI	08 BELL	$e^+e^- \rightarrow \Upsilon(4S)$
$-0.16^{+0.07}_{-0.08} \pm 0.04$	<sup>1</sup> AUBERT,B	05L BABR	$e^+e^- \rightarrow \Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
-0.047±0.036±0.007	<sup>1</sup> AAIJ	13AU LHCB	Repl. by AAIJ 14AF
-0.05 ±0.11 ±0.01	WANG	04 BELL	Repl. by WEI 08
<sup>1</sup> Requires $m_{p\bar{p}} < 2.85 \text{ GeV}/c^2$ .			

**$A_{CP}(B^+ \rightarrow p\bar{p}K^*(892)^+)$**

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.21 \pm 0.16</math> OUR AVERAGE</b>	Error includes scale factor of 1.4.		
$-0.01 \pm 0.19 \pm 0.02$	CHEN	08C	BELL $e^+e^- \rightarrow \gamma(4S)$
$+0.32 \pm 0.13 \pm 0.05$	AUBERT	07AV	BABR $e^+e^- \rightarrow \gamma(4S)$

**$A_{CP}(B^+ \rightarrow p\bar{\Lambda}\gamma)$**

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>+0.17 \pm 0.16 \pm 0.05</math></b>	WANG	07C	BELL $e^+e^- \rightarrow \gamma(4S)$

**$A_{CP}(B^+ \rightarrow p\bar{\Lambda}\pi^0)$**

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>+0.01 \pm 0.17 \pm 0.04</math></b>	WANG	07C	BELL $e^+e^- \rightarrow \gamma(4S)$

**$A_{CP}(B^+ \rightarrow K^+\ell^+\ell^-)$**

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.02 \pm 0.08</math> OUR AVERAGE</b>			
$-0.03 \pm 0.14 \pm 0.01$	<sup>1</sup> LEES	12S	BABR $e^+e^- \rightarrow \gamma(4S)$
$-0.18 \pm 0.18 \pm 0.01$	AUBERT	09T	BABR $e^+e^- \rightarrow \gamma(4S)$
$+0.04 \pm 0.10 \pm 0.02$	WEI	09A	BELL $e^+e^- \rightarrow \gamma(4S)$
••• We do not use the following data for averages, fits, limits, etc. •••			
$-0.07 \pm 0.22 \pm 0.02$	AUBERT,B	06J	BABR Repl. by AUBERT 09T

<sup>1</sup> Measured in the union of  $0.10 < q^2 < 8.12 \text{ GeV}^2/c^4$  and  $q^2 > 10.11 \text{ GeV}^2/c^4$ .  
 LEES 12S reports also individual measurements  $A_{CP}(B^+ \rightarrow K^+\ell^+\ell^-) = 0.02 \pm 0.18 \pm 0.01$  for  $0.10 < q^2 < 8.12 \text{ GeV}^2/c^4$  and  $A_{CP}(B^+ \rightarrow K^+\ell^+\ell^-) = -0.06^{+0.22}_{-0.21} \pm 0.01$  for  $q^2 > 10.11 \text{ GeV}^2/c^4$ .

**$A_{CP}(B^+ \rightarrow K^+e^+e^-)$**

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>+0.14 \pm 0.14 \pm 0.03</math></b>	WEI	09A	BELL $e^+e^- \rightarrow \gamma(4S)$

**$A_{CP}(B^+ \rightarrow K^+\mu^+\mu^-)$**

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.011 \pm 0.017</math> OUR AVERAGE</b>			
$0.012 \pm 0.017 \pm 0.001$	AAIJ	14AN	LHCB $pp$ at 7, 8 TeV
$-0.05 \pm 0.13 \pm 0.03$	WEI	09A	BELL $e^+e^- \rightarrow \gamma(4S)$
••• We do not use the following data for averages, fits, limits, etc. •••			
$0.000 \pm 0.033 \pm 0.009$	AAIJ	13BN	LHCB Repl. by AAIJ 14AN

**$A_{CP}(B^+ \rightarrow \pi^+\mu^+\mu^-)$**

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.11 \pm 0.12 \pm 0.01</math></b>	AAIJ	15AR	LHCB $pp$ at 7, 8 TeV

**$A_{CP}(B^+ \rightarrow K^{*+}\ell^+\ell^-)$**

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.09 \pm 0.14</math> OUR AVERAGE</b>			
$0.01^{+0.26}_{-0.24} \pm 0.02$	AUBERT	09T	BABR $e^+e^- \rightarrow \gamma(4S)$
$-0.13^{+0.17}_{-0.16} \pm 0.01$	WEI	09A	BELL $e^+e^- \rightarrow \gamma(4S)$
••• We do not use the following data for averages, fits, limits, etc. •••			
$0.03 \pm 0.23 \pm 0.03$	AUBERT,B	06J	BABR Repl. by AUBERT 09T

**$A_{CP}(B^+ \rightarrow K^* e^+ e^-)$**

VALUE	DOCUMENT ID	TECN	COMMENT
$-0.14^{+0.23}_{-0.22} \pm 0.02$	WEI	09A BELL	$e^+ e^- \rightarrow \gamma(4S)$

**$A_{CP}(B^+ \rightarrow K^* \mu^+ \mu^-)$**

VALUE	DOCUMENT ID	TECN	COMMENT
$-0.12 \pm 0.24 \pm 0.02$	WEI	09A BELL	$e^+ e^- \rightarrow \gamma(4S)$

**CP VIOLATION PARAMETERS IN  $B^+ \rightarrow DK^+$  AND SIMILAR DECAYS**

The parameters  $r_{B^+}$  and  $\delta_{B^+}$  are the magnitude ratio and strong phase difference between the amplitudes of  $A(B^+ \rightarrow \bar{D}^{(*)0} K^{(*)+})$  and  $A(B^+ \rightarrow D^{(*)0} K^{(*)+})$ . The measured observables are defined as  $x_{\pm} = r_{B^+} \cos(\delta_{B^+} \pm \gamma)$  and  $y_{\pm} = r_{B^+} \sin(\delta_{B^+} \pm \gamma)$ , and can be used to measure the CKM angle  $\gamma$ .

"OUR EVALUATION" is provided by the Heavy Flavor Averaging Group (HFLAV). It is derived from combinations of their results on  $B^+ \rightarrow DK^+$  and related processes.

**$\gamma$**

For angle  $\gamma(\phi_3)$  of the CKM unitarity triangle, see the review on "CP Violation" in the Reviews section.

"OUR EVALUATION" is provided by the Heavy Flavor Averaging Group (HFLAV).

VALUE ( $^\circ$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**$65.9^{+3.3}_{-3.5}$  OUR EVALUATION**

• • • We do not use the following data for averages, fits, limits, etc. • • •

$65.4^{+3.8}_{-4.2}$	1	AAIJ	21AMLHCB	$\rho\rho$ at 7, 8, 13 TeV
$68.7^{+5.2}_{-5.1}$	2	AAIJ	21L LHCB	$\rho\rho$ at 7, 8, 13 TeV
$44 \pm 12$	3,4	AAIJ	21M LHCB	$\rho\rho$ at 7, 8, 13 TeV
$5.7^{+10.2}_{-8.8} \pm 6.7$	5	RESMI	19 BELL	$e^+ e^- \rightarrow \gamma(4S)$
$87^{+11}_{-12}$	6	AAIJ	18AD LHCB	Repl. by AAIJ 21L
$128^{+17}_{-22}$	7	AAIJ	18U LHCB	$\rho\rho$ at 7, 8 TeV
5–86 or 185–266	8	AAIJ	18Z LHCB	$\rho\rho$ at 7, 8 TeV
$80^{+21}_{-22}$	9	AAIJ	16AA LHCB	Repl. by AAIJ 16Z
$72.2^{+6.8}_{-7.3}$	10	AAIJ	16AQ LHCB	Repl. by AAIJ 21AM
$71 \pm 20$	11,12	AAIJ	16Z LHCB	$\rho\rho$ at 7, 8 TeV
$74^{+20}_{-19}$		AAIJ	15BC LHCB	$\rho\rho$ at 7, 8 TeV
$63.5^{+7.2}_{-6.7}$	13,14	AAIJ	15K LHCB	$\rho\rho$ at 7, 8 TeV
$62^{+15}_{-14}$	15	AAIJ	14BA LHCB	Repl. by AAIJ 21L



84	$+49$ $-42$	16	AAIJ	14BE	LHCB	Repl. by AAIJ 14BA
115	$+28$ $-43$	17	AAIJ	14BF	LHCB	Repl. by AAIJ 18U
72.6	$+9.7$ $-17.2$	18	AAIJ	13AK	LHCB	Repl. by AAIJ 21AM
69	$+17$ $-16$	19	LEES	13B	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
44	$+43$ $-38$	20,21	AAIJ	12AQ	LHCB	Repl. by AAIJ 13AK
77.3	$+15.1$ $-14.9 \pm 5.9$	21,22	AIHARA	12	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
68	$\pm 14 \pm 5$	23	DEL-AMO-SA..10F	BABR		Repl. by LEES 13B
7	to 173	95	24	DEL-AMO-SA..10G	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
78.4	$+10.8$ $-11.6 \pm 9.6$	25	POLUEKTOV	10	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
162	$\pm 56$	26	AUBERT	09R	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
76	$+22$ $-23 \pm 7.1$	27	AUBERT	08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F
53	$+15$ $-18 \pm 10$	28	POLUEKTOV	06	BELL	Repl. by POLUEKTOV 10
70	$\pm 31$ $+18$ $-15$	29	AUBERT,B	05Y	BABR	Repl. by AUBERT 08AL
77	$+17$ $-19 \pm 17$	30	POLUEKTOV	04	BELL	Repl. by POLUEKTOV 06

<sup>1</sup> AAIJ 21AM presents a combination of existing measurements from LHCb collaboration. It includes also charm mixing parameters.

<sup>2</sup> Uses binned Dalitz plot analysis of  $D \rightarrow K_S^0 \pi^+ \pi^-$  and  $K_S^0 K^+ K^-$  from  $B^\pm \rightarrow DK^\pm$  modes. Strong phase measurements from CLEO-c and BES-III of the  $D$  decay over the Dalitz plot are used as input. Value is modulo  $180^\circ$ .

<sup>3</sup> Measured in  $B_S^0 \rightarrow D_S^\pm K^\mp \pi^\pm \pi^\mp$  decays in restricted phase space with  $m(K^+ \pi^+ \pi^-) < 1950$  MeV,  $m(K^+ \pi^-) < 1200$  MeV and  $m(\pi^+ \pi^-) < 1200$  MeV. The value is modulo  $180^\circ$ .

<sup>4</sup> A model-independent coherence factor for the decay  $B_S \rightarrow D_S K \pi \pi$  (in the restricted phase space region) is also reported.

<sup>5</sup> Uses binned analysis of  $D \rightarrow K_S^0 \pi^+ \pi^- \pi^0$  from  $B^\pm \rightarrow DK^\pm$  modes over the phase space. Strong phase measurements from RESMI 18 analysis of CLEO-c data of the  $D$  decay over the phase space binning are used as input.

<sup>6</sup> Uses binned Dalitz plot analysis of  $D \rightarrow K_S^0 \pi^+ \pi^-$  and  $K_S^0 K^+ K^-$  from  $B^\pm \rightarrow DK^\pm$  modes. Strong phase measurements from CLEO-c of the  $D$  decay over the Dalitz plot are used as input.

<sup>7</sup> Measured in  $B_S^0 \rightarrow D_S^\mp K^\pm$  decays, constraining  $-2\beta_S$  by the measurement of  $\phi_S = 0.030 \pm 0.033$  from HFLAV. The value is modulo  $180^\circ$ .

<sup>8</sup> AAIJ 18Z reports the intervals  $(5-86)^\circ$  or  $(185-266)^\circ$  at 68% C.L. The extraction uses the time dependent CP violation measurement in  $B^0 \rightarrow D^\mp \pi^\pm$  decays with external input and some theoretical assumptions.

<sup>9</sup> Uses Dalitz plot analysis of  $D \rightarrow K_S^0 \pi^+ \pi^-$  decays coming from  $B^0 \rightarrow DK^*(892)^0$  modes. Measures  $r_{B^0} = 0.39 \pm 0.13$ , and  $\delta_{B^0} = 197_{-20}^{+24}$  degrees.

<sup>10</sup> A combination of measurements from analyses of time-integrated  $B^+ \rightarrow DK^+$ ,  $B^0 \rightarrow DK^{(*)0}$ ,  $B^0 \rightarrow DK^+ \pi^-$ , and  $B^+ \rightarrow DK^+ \pi^+ \pi^-$  tree-level decays. In addition, results from a time-dependent analysis of  $B_S^0 \rightarrow D_S K$  decays are included.

- 11 A model-independent binned Dalitz plot analysis of the decays  $B^0 \rightarrow DK^{*0}$ , with  $D \rightarrow K_S^0 \pi^+ \pi^-$  and  $D \rightarrow K_S^0 K^+ K^-$ . The results cannot be combined with the model-dependent analysis of the same dataset reported in AAIJ 16AA.
- 12 Angle  $\gamma$  required to satisfy  $0 < \gamma < 180$  degrees.
- 13 Obtained by measuring time-dependent  $CP$  asymmetry in  $B_S^0 \rightarrow K^+ K^-$  and using a U-spin relation between  $B_S^0 \rightarrow K^+ K^-$  and  $B^0 \rightarrow \pi^+ \pi^-$ .
- 14 Results are also presented using additional inputs on  $B^0 \rightarrow \pi^0 \pi^0$  and  $B^+ \rightarrow \pi^+ \pi^0$  decays from other experiments and isospin symmetry assumptions. The dependence of the results on the maximum allowed amount of U-spin breaking up to 50% is also included.
- 15 Uses binned Dalitz plot analysis of  $B^+ \rightarrow DK^+$  decays, with  $D \rightarrow K_S^0 \pi^+ \pi^-$  and  $D \rightarrow K_S^0 K^+ K^-$ . Strong phase measurements from CLEO-c (LIBBY 10) of the  $D$  decay over the Dalitz plot are used as input. Solution that satisfies  $0 < \gamma < 180$  is chosen.
- 16 AAIJ 14BE uses model-dependent analysis of  $D \rightarrow K_S^0 \pi^+ \pi^-$  amplitudes. The model is the same as in DEL-AMO-SANCHEZ 10F.
- 17 Measured in  $B_S^0 \rightarrow D_S^\mp K^\pm$  decays, constraining  $-2\beta_S$  by the measurement of  $\phi_S = 0.01 \pm 0.07 \pm 0.0$  from AAIJ 13AR. The value is modulo  $180^\circ$  at 68% CL.
- 18 Presents a confidence region  $55.4^\circ < \gamma < 82.3^\circ$  at 68% CL with best fit value  $72.6^\circ$  and includes both statistical and systematic uncertainties. The corresponding 95% CL is  $40.2^\circ < \gamma < 92.7^\circ$ . The value is determined from combination of measurements using  $D$  meson decaying to  $K^+ K^-$ ,  $\pi^+ \pi^-$ ,  $K^\pm \pi^\mp$ ,  $K_S^0 \pi^+ \pi^-$ ,  $K_S^0 K^+ K^-$ , and  $K^\pm \pi^\mp \pi^\pm \pi^\mp$ . Combines  $B^\pm \rightarrow DK^\pm$  and  $B^\pm \rightarrow D\pi^\pm$ .
- 19 Reports combination of published measurements using GGSZ, GLW, and ADS methods. Reports also  $2\sigma$  range of  $41\text{--}102^\circ$  and a  $5.9\sigma$  significance for  $\gamma(B^+ \rightarrow D^{(*)0} K^{(*)+}) \neq 0$  hypothesis.
- 20 Reports combined statistical and systematic uncertainties.
- 21 Uses binned Dalitz plot of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays from  $B^+ \rightarrow \bar{D}^0 K^+$ . Measurement of strong phases in  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  Dalitz plot from LIBBY 10 is used as input.
- 22 We combined the systematics in quadrature. The authors report separately the contribution to the systematic uncertainty due to the uncertainty on the bin-averaged strong phase difference between  $D^0$  and  $\bar{D}^0$  amplitudes.
- 23 Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$ ,  $K_S^0 K^+ K^-$  decays from  $B^+ \rightarrow D^{(*)} K^+$ ,  $DK^{*+}$  modes. The corresponding two standard deviation interval for  $\gamma$  is  $39^\circ < \gamma < 98^\circ$ .  $CP$  conservation in the combined result is ruled out with a significance of 3.5 standard deviations.
- 24 Reports confidence intervals for the CKM angle  $\gamma$  from the measured values of the GLW parameters using  $B^\pm \rightarrow DK^\pm$  decays with  $D$  mesons decaying to non- $CP(K\pi)$ ,  $CP$ -even ( $K^+ K^-$ ,  $\pi^+ \pi^-$ ), and  $CP$ -odd ( $K_S^0 \pi^0$ ,  $K_S^0 \omega$ ) states.
- 25 Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays from  $B^+ \rightarrow D^{(*)} K^+$  modes. The corresponding two standard deviation interval for  $\gamma$  is  $54.2^\circ < \gamma < 100.5^\circ$ .  $CP$  conservation in the combined result is ruled out with a significance of 3.5 standard deviations.
- 26 Uses Dalitz plot analysis of  $D^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays coming from  $B^0 \rightarrow D^0 K^{*0}$  modes. The corresponding 95% CL interval is  $77^\circ < \gamma < 247^\circ$ . A 180 degree ambiguity is implied.
- 27 Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  and  $\bar{D}^0 \rightarrow K_S^0 K^+ K^-$  decays coming from  $B^\pm \rightarrow D^{(*)} K^{(*)\pm}$  modes. The corresponding two standard deviation interval is  $29^\circ < \gamma < 122^\circ$ .

- <sup>28</sup> Uses a Dalitz plot analysis of the  $\overline{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays; Combines the  $DK^+$ ,  $D^* K^+$  and  $DK^{*+}$  modes. The corresponding two standard deviations interval for gamma is  $8^\circ < \gamma < 111^\circ$ .
- <sup>29</sup> Uses a Dalitz plot analysis of neutral  $D \rightarrow K_S^0 \pi^+ \pi^-$  decays coming from  $B^\pm \rightarrow DK^\pm$  and  $B^\pm \rightarrow D^{*0} K^\pm$  followed by  $D^{*0} \rightarrow D\pi^0, D\gamma$ . The corresponding two standard deviations interval for gamma is  $12^\circ < \gamma < 137^\circ$ . AUBERT,B 05Y also reports the amplitude ratios and the strong phases.
- <sup>30</sup> Uses a Dalitz plot analysis of the 3-body  $D \rightarrow K_S^0 \pi^+ \pi^-$  decays coming from  $B^\pm \rightarrow DK^\pm$  and  $B^\pm \rightarrow D^* K^\pm$  followed by  $D^* \rightarrow D\pi^0$ ; here we use  $D$  to denote that the neutral  $D$  meson produced in the decay is an admixture of  $D^0$  and  $\overline{D}^0$ . The corresponding two standard deviations interval for gamma is  $26^\circ < \gamma < 126^\circ$ . POLUEKTOV 04 also reports the amplitude ratios and the strong phases.

### $r_B(B^+ \rightarrow D^0 K^+)$

$r_B$  and  $\delta_B$  are the amplitude ratio and relative strong phase between the amplitudes of  $A(B^+ \rightarrow D^0 K^+)$  and  $A(B^+ \rightarrow \overline{D}^0 K^+)$ ,

"OUR EVALUATION" is provided by the Heavy Flavor Averaging Group (HFLAV).

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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#### 0.0994 ± 0.0026 OUR EVALUATION

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.0904 <sup>+0.0077</sup> <sub>-0.0075</sub>		<sup>1</sup> AAIJ	21L LHCb	$pp$ at 7, 8, 13 TeV
0.323 ± 0.147 ± 0.056		<sup>2</sup> RESMI	19 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
0.086 <sup>+0.013</sup> <sub>-0.014</sub>		<sup>3</sup> AAIJ	18AD LHCb	Repl. by AAIJ 21L
0.080 <sup>+0.019</sup> <sub>-0.021</sub>		<sup>4</sup> AAIJ	14BA LHCb	Repl. by AAIJ 21L
0.06 ± 0.04		<sup>5</sup> AAIJ	14BE LHCb	Repl. by AAIJ 14BA
0.097 ± 0.011		<sup>6</sup> AAIJ	13AE LHCb	$pp$ at 7 TeV
0.092 <sup>+0.013</sup> <sub>-0.012</sub>		<sup>7</sup> LEES	13B BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
0.07 ± 0.04		<sup>8,9</sup> AAIJ	12AQ LHCb	$pp$ at 7 TeV
0.145 ± 0.030 ± 0.015		<sup>9,10</sup> AIHARA	12 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
<0.13	90	<sup>11</sup> LEES	11D BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
0.096 ± 0.029 ± 0.006		<sup>12</sup> DEL-AMO-SA..10F	BABR	Repl. by LEES 13B
0.095 <sup>+0.051</sup> <sub>-0.041</sub>		<sup>13</sup> DEL-AMO-SA..10H	BABR	Repl. by LEES 13B
0.160 <sup>+0.040</sup> <sub>-0.038</sub> <sup>+0.051</sup> <sub>-0.015</sub>		<sup>14</sup> POLUEKTOV	10 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
0.086 ± 0.032 ± 0.015		<sup>15</sup> AUBERT	08AL BABR	Repl. by DEL-AMO-SANCHEZ 10F
<0.19	90	HORII	08 BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
0.159 <sup>+0.054</sup> <sub>-0.050</sub> ± 0.050		<sup>16</sup> POLUEKTOV	06 BELL	Repl. by POLUEKTOV 10
0.12 ± 0.08 ± 0.05		<sup>17</sup> AUBERT,B	05Y BABR	Repl. by AUBERT 08AL

<sup>1</sup> Uses binned analysis of  $D \rightarrow K_S^0 \pi^+ \pi^- \pi^0$  from  $B^\pm \rightarrow DK^\pm$  modes over the phase space. Strong phase measurements from CLEO-c and BES-III data of the  $D$  decay over the phase space binning are used as input.

<sup>2</sup> Uses binned analysis of  $D \rightarrow K_S^0 \pi^+ \pi^- \pi^0$  from  $B^\pm \rightarrow DK^\pm$  modes over the phase space. Strong phase measurements from RESMI 18 analysis of CLEO-c data of the  $D$  decay over the phase space binning are used as input.

- <sup>3</sup> Uses binned Dalitz plot analysis of  $D \rightarrow K_S^0 \pi^+ \pi^-$  and  $K_S^0 K^+ K^-$  from  $B^\pm \rightarrow DK^\pm$  modes. Strong phase measurements from CLEO-c of the  $D$  decay over the Dalitz plot are used as input.
- <sup>4</sup> Uses binned Dalitz plot analysis of  $B^+ \rightarrow DK^+$  decays, with  $D \rightarrow K_S^0 \pi^+ \pi^-$  and  $D \rightarrow K_S^0 K^+ K^-$ . Strong phase measurements from CLEO-c (LIBBY 10) of the  $D$  decay over the Dalitz plot are used as input.
- <sup>5</sup> AAIJ 14BE uses model-dependent analysis of  $D \rightarrow K_S^0 \pi^+ \pi^-$  amplitudes. The model is the same as in DEL-AMO-SANCHEZ 10F.
- <sup>6</sup> Uses  $B^\pm \rightarrow [K^\pm \pi^\mp \pi^+ \pi^-]_D h^\pm$  mode.
- <sup>7</sup> Reports combination of published measurements using GGSZ, GLW, and ADS methods.
- <sup>8</sup> Reports combined statistical and systematic uncertainties.
- <sup>9</sup> Uses binned Dalitz plot of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays from  $B^+ \rightarrow \bar{D}^0 K^+$ . Measurement of strong phases in  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  Dalitz plot from LIBBY 10 is used as input.
- <sup>10</sup> We combined the systematics in quadrature. The authors report separately the contribution to the systematic uncertainty due to the uncertainty on the bin-averaged strong phase difference between  $D^0$  and  $\bar{D}^0$  amplitudes.
- <sup>11</sup> Uses decays of neutral  $D$  to  $K^- \pi^+ \pi^0$ .
- <sup>12</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$ ,  $K_S^0 K^+ K^-$  decays from  $B^+ \rightarrow D^{(*)} K^{(*)+}$  modes. The corresponding two standard deviation interval is  $0.037 < r_B < 0.155$ .
- <sup>13</sup> Uses the Cabibbo suppressed decay of  $B^+ \rightarrow \bar{D} K^+$  followed by  $\bar{D} \rightarrow K^- \pi^+$ .
- <sup>14</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays from  $B^+ \rightarrow D^0 K^+$  modes. The corresponding two standard deviation interval is  $0.084 < r_B < 0.239$ .
- <sup>15</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  and  $\bar{D}^0 \rightarrow K_S^0 K^+ K^-$  decays coming from  $B^\pm \rightarrow D^{(*)} K^{(*)\pm}$  modes.
- <sup>16</sup> Uses a Dalitz plot analysis of the  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays; Combines the  $DK^+$ ,  $D^* K^+$  and  $DK^{*+}$  modes.
- <sup>17</sup> Uses a Dalitz analysis of neutral  $D$  decays to  $K_S^0 \pi^+ \pi^-$  in the processes  $B^\pm \rightarrow D^{(*)} K^\pm$ ,  $D^* \rightarrow D\pi^0$ ,  $D\gamma$ .

### $\delta_B(B^+ \rightarrow D^0 K^+)$

"OUR EVALUATION" is provided by the Heavy Flavor Averaging Group (HFLAV).

VALUE (°)	DOCUMENT ID	TECN	COMMENT
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### 127.7<sup>+</sup><sub>-</sub> 3.6 OUR EVALUATION

• • • We do not use the following data for averages, fits, limits, etc. • • •

118.3 <sup>+</sup> <sub>-</sub> 5.5 5.6	<sup>1</sup> AAIJ	21L	LHCB	$pp$ at 7, 8, 13 TeV
83.4 <sup>+</sup> <sub>-</sub> 18.3 16.6 ± 5.1	<sup>2</sup> RESMI	19	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
101 ± 11	<sup>3</sup> AAIJ	18AD	LHCB	Repl. by AAIJ 21L
134 <sup>+</sup> <sub>-</sub> 14 15	<sup>4</sup> AAIJ	14BA	LHCB	Repl. by AAIJ 21L
115 <sup>+</sup> <sub>-</sub> 41 51	<sup>5</sup> AAIJ	14BE	LHCB	Repl. by AAIJ 14BA
105 <sup>+</sup> <sub>-</sub> 16 17	<sup>6</sup> LEES	13B	BABR	$e^+ e^- \rightarrow \Upsilon(4S)$
137 <sup>+</sup> <sub>-</sub> 35 46	<sup>7,8</sup> AAIJ	12AQ	LHCB	$pp$ at 7 TeV

129.9 ± 15.0 ± 6.0	8,9	AIHARA	12	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
119 <sup>+19</sup> <sub>-20</sub> ± 4	10	DEL-AMO-SA..10F	BABR	Repl. by LEES 13B	
136.7 <sup>+13.0</sup> <sub>-15.8</sub> ± 23.2	11	POLUEKTOV	10	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
109 <sup>+27</sup> <sub>-30</sub> ± 8	12	AUBERT	08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F
145.7 <sup>+19.0</sup> <sub>-19.7</sub> ± 23.1	13	POLUEKTOV	06	BELL	Repl. by POLUEKTOV 10
104 ± 45 <sup>+23</sup> <sub>-32</sub>	14	AUBERT,B	05Y	BABR	Repl. by AUBERT 08AL

<sup>1</sup> Uses binned Dalitz plot analysis of  $D \rightarrow K_S^0 \pi^+ \pi^-$  and  $K_S^0 K^+ K^-$  from  $B^\pm \rightarrow DK^\pm$  modes. Strong phase measurements from CLEO-c and BES-III of the  $D$  decay over the Dalitz plot are used as input. Value is modulo  $180^\circ$ .

<sup>2</sup> Uses binned analysis of  $D \rightarrow K_S^0 \pi^+ \pi^- \pi^0$  from  $B^\pm \rightarrow DK^\pm$  modes over the phase space. Strong phase measurements from RESMI 18 analysis of CLEO-c data of the  $D$  decay over the phase space binning are used as input.

<sup>3</sup> Uses binned Dalitz plot analysis of  $D \rightarrow K_S^0 \pi^+ \pi^-$  and  $K_S^0 K^+ K^-$  from  $B^\pm \rightarrow DK^\pm$  modes. Strong phase measurements from CLEO-c of the  $D$  decay over the Dalitz plot are used as input.

<sup>4</sup> Uses binned Dalitz plot analysis of  $B^+ \rightarrow DK^+$  decays, with  $D \rightarrow K_S^0 \pi^+ \pi^-$  and  $D \rightarrow K_S^0 K^+ K^-$ . Strong phase measurements from CLEO-c (LIBBY 10) of the  $D$  decay over the Dalitz plot are used as input.

<sup>5</sup> AAIJ 14BE uses model-dependent analysis of  $D \rightarrow K_S^0 \pi^+ \pi^-$  amplitudes. The model is the same as in DEL-AMO-SANCHEZ 10F.

<sup>6</sup> Reports combination of published measurements using GGSZ, GLW, and ADS methods.

<sup>7</sup> Reports combined statistical and systematic uncertainties.

<sup>8</sup> Uses binned Dalitz plot of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays from  $B^+ \rightarrow \bar{D}^0 K^+$ . Measurement of strong phases in  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  Dalitz plot from LIBBY 10 is used as input.

<sup>9</sup> We combined the systematics in quadrature. The authors report separately the contribution to the systematic uncertainty due to the uncertainty on the bin-averaged strong phase difference between  $D^0$  and  $\bar{D}^0$  amplitudes.

<sup>10</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$ ,  $K_S^0 K^+ K^-$  decays from  $B^+ \rightarrow D^{(*)} K^{(*)+}$  modes. The corresponding two standard deviation interval is  $75^\circ < \delta_B < 157^\circ$ .

<sup>11</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays from  $B^+ \rightarrow \bar{D}^0 K^+$  modes. The corresponding two standard deviation interval is  $102.2^\circ < \delta_B < 162.3^\circ$ .

<sup>12</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  and  $\bar{D}^0 \rightarrow K_S^0 K^+ K^-$  decays coming from  $B^\pm \rightarrow D^{(*)} K^{(*)\pm}$  modes.

<sup>13</sup> Uses a Dalitz plot analysis of the  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays; Combines the  $DK^+$ ,  $D^* K^+$  and  $DK^{*+}$  modes.

<sup>14</sup> Uses a Dalitz analysis of neutral  $D$  decays to  $K_S^0 \pi^+ \pi^-$  in the processes  $B^\pm \rightarrow D^{(*)} K^\pm$ ,  $D^* \rightarrow D\pi^0$ ,  $D\gamma$ .

### $r_B(B^+ \rightarrow D^0 \pi^+)$

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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• • • We do not use the following data for averages, fits, limits, etc. • • •

5.0 ± 1.7	<sup>1</sup> AAIJ	21L	LHCB $pp$ at 7, 8, 13 TeV
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<sup>1</sup> Uses binned Dalitz plot analysis of  $D \rightarrow K_S^0 \pi^+ \pi^-$  and  $K_S^0 K^+ K^-$  from  $B^\pm \rightarrow D\pi^\pm$  modes. Strong phase measurements from CLEO-c and BES-III of the  $D$  decay over the Dalitz plot are used as input.

$\delta_B(B^+ \rightarrow D^0 \pi^+)$ 

VALUE (°)	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$291^{+24}_{-26}$	<sup>1</sup> AAIJ	21L	LHCB $pp$ at 7, 8, 13 TeV
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<sup>1</sup> Uses binned Dalitz plot analysis of  $D \rightarrow K_S^0 \pi^+ \pi^-$  and  $K_S^0 K^+ K^-$  from  $B^\pm \rightarrow D \pi^\pm$  modes. Strong phase measurements from CLEO-c and BES-III of the  $D$  decay over the Dalitz plot are used as input. Value is modulo  $180^\circ$ .

 $r_B(B^+ \rightarrow D^0 K^{*+})$ 

$r_B$  and  $\delta_B$  are the amplitude ratio and relative strong phase between the amplitudes of  $A_{CP}(B^+ \rightarrow D^0 K^{*+})$  and  $A_{CP}(B^+ \rightarrow \bar{D}^0 K^{*+})$ ,

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VALUE	DOCUMENT ID	TECN	COMMENT
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**0.101<sup>+0.016</sup><sub>-0.034</sub> OUR EVALUATION**

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.143^{+0.048}_{-0.049}$	<sup>1</sup> LEES	13B	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
$0.166^{+0.073}_{-0.069}$	<sup>2</sup> DEL-AMO-SA..10F	BABR	Repl. by LEES 13B
$0.31 \pm 0.07$	<sup>3</sup> AUBERT	09AJ	BABR Repl. by LEES 13B
$0.181^{+0.088}_{-0.108} \pm 0.042$	<sup>4</sup> AUBERT	08AL	BABR Repl. by AUBERT 09AJ
$0.564^{+0.216}_{-0.155} \pm 0.093$	<sup>5</sup> POLUEKTOV	06	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Reports combination of published measurements using GGSZ, GLW, and ADS methods.

<sup>2</sup> DEL-AMO-SANCHEZ 10F reports  $r_B \cdot k = 0.149^{+0.066}_{-0.062}$  for  $k = 0.9$ .

<sup>3</sup> Obtained by combining the GLW and ADS methods. The 2-sigma range corresponds to  $[0.17, 0.43]$ .

<sup>4</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  and  $\bar{D}^0 \rightarrow K_S^0 K^+ K^-$  decays coming from  $B^\pm \rightarrow D^{(*)} K^{(*)\pm}$  modes.

<sup>5</sup> Uses a Dalitz plot analysis of the  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays; Combines the  $DK^+$ ,  $D^* K^+$  and  $DK^{*+}$  modes.

 $\delta_B(B^+ \rightarrow D^0 K^{*+})$ 

"OUR EVALUATION" is provided by the Heavy Flavor Averaging Group (HFLAV).

VALUE (°)	DOCUMENT ID	TECN	COMMENT
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**48<sup>+59</sup><sub>-16</sub> OUR EVALUATION**

• • • We do not use the following data for averages, fits, limits, etc. • • •

$101 \pm 43$	<sup>1</sup> LEES	13B	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
$111 \pm 32$	DEL-AMO-SA..10F	BABR	Repl. by LEES 13B
$104^{+39}_{-37} \pm 18$	<sup>2</sup> AUBERT	08AL	BABR Repl. by LEES 13B
$242.6^{+20.2}_{-23.2} \pm 49.4$	<sup>3</sup> POLUEKTOV	06	BELL $e^+ e^- \rightarrow \Upsilon(4S)$

<sup>1</sup> Reports combination of published measurements using GGSZ, GLW, and ADS methods.

<sup>2</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  and  $\bar{D}^0 \rightarrow K_S^0 K^+ K^-$  decays coming from  $B^\pm \rightarrow D^{(*)} K^{(*)\pm}$  modes.

<sup>3</sup> Uses a Dalitz plot analysis of the  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays; Combines the  $DK^+$ ,  $D^* K^+$  and  $DK^{*+}$  modes.

### $r_B(B^+ \rightarrow D^{*0} K^+)$

$r_B$  and  $\delta_B$  are the amplitude ratio and relative strong phase between the amplitudes of  $A(B^+ \rightarrow D^{*0} K^+)$  and  $A(B^+ \rightarrow \bar{D}^{*0} K^+)$ ,

"OUR EVALUATION" is provided by the Heavy Flavor Averaging Group (HFLAV).

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.104^{+0.013}_{-0.014}</math> OUR EVALUATION</b>			

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.106^{+0.019}_{-0.036}$	<sup>1</sup> LEES	13B	BABR $e^+ e^- \rightarrow \Upsilon(4S)$
$0.133^{+0.042}_{-0.039} \pm 0.013$	<sup>2</sup> DEL-AMO-SA...10F	BABR	Repl. by LEES 13B
$0.096^{+0.035}_{-0.051}$	<sup>3</sup> DEL-AMO-SA...10H	BABR	Repl. by LEES 13B
$0.196^{+0.072+0.064}_{-0.069-0.017}$	<sup>4</sup> POLUEKTOV 10	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$
$0.135 \pm 0.050 \pm 0.012$	<sup>5</sup> AUBERT	08AL	BABR Repl. by DEL-AMO-SANCHEZ 10F
$0.175^{+0.108}_{-0.099} \pm 0.050$	<sup>6</sup> POLUEKTOV 06	BELL	Repl. by POLUEKTOV 10
$0.17 \pm 0.10 \pm 0.04$	<sup>7</sup> AUBERT,B	05Y	BABR Repl. by AUBERT 08AL

<sup>1</sup> Reports combination of published measurements using GGSZ, GLW, and ADS methods.

<sup>2</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$ ,  $K_S^0 K^+ K^-$  decays from  $B^+ \rightarrow D^{(*)} K^{(*)+}$  modes. The corresponding two standard deviation interval is  $0.049 < r_B^* < 0.215$ .

<sup>3</sup> Uses the Cabibbo suppressed decay of  $B^+ \rightarrow \bar{D}^* K^+$  followed by  $\bar{D}^* \rightarrow \bar{D} \pi^0$  or  $\bar{D} \gamma$ , and  $\bar{D} \rightarrow K^- \pi^+$ .

<sup>4</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays from  $B^+ \rightarrow D^{*0} K^+$  modes. The corresponding two standard deviation interval is  $0.061 < r_B^* < 0.271$ .

<sup>5</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  and  $\bar{D}^0 \rightarrow K_S^0 K^+ K^-$  decays coming from  $B^\pm \rightarrow D^{(*)} K^{(*)\pm}$  modes.

<sup>6</sup> Uses a Dalitz plot analysis of the  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays; Combines the  $DK^+$ ,  $D^* K^+$  and  $DK^{*+}$  modes.

<sup>7</sup> Uses a Dalitz analysis of neutral  $D$  decays to  $K_S^0 \pi^+ \pi^-$  in the processes  $B^\pm \rightarrow D^{(*)} K^\pm$ ,  $D^* \rightarrow D \pi^0$ ,  $D \gamma$ .

### $\delta_B(B^+ \rightarrow D^{*0} K^+)$

"OUR EVALUATION" is provided by the Heavy Flavor Averaging Group (HFLAV).

VALUE (°)	DOCUMENT ID	TECN	COMMENT
<b><math>314.8^{+7.9}_{-9.9}</math> OUR EVALUATION</b>			

• • • We do not use the following data for averages, fits, limits, etc. • • •

294	$+21$ $-31$	<sup>1</sup> LEES	13B	BABR	$e^+e^- \rightarrow \Upsilon(4S)$
278	$\pm 21 \pm 6$	<sup>2</sup> DEL-AMO-SA..10F	BABR	Repl. by LEES 13B	
341.9	$+18.0$ $-19.6 \pm 23.1$	<sup>3</sup> POLUEKTOV 10	BELL	$e^+e^- \rightarrow \Upsilon(4S)$	
297	$+27$ $-29 \pm 6.4$	<sup>4</sup> AUBERT	08AL	BABR	Repl. by DEL-AMO-SANCHEZ 10F
302.0	$+33.8$ $-35.1 \pm 23.7$	<sup>5</sup> POLUEKTOV 06	BELL	Repl. by POLUEKTOV 10	
296	$\pm 41$	$+20$ $-19$	<sup>6</sup> AUBERT,B	05Y	BABR Repl. by AUBERT 08AL

<sup>1</sup> Reports combination of published measurements using GGSZ, GLW, and ADS methods. We added  $360^\circ$  to the value of  $(-66^{+21}_{-31})^\circ$  quoted by LEES 13B.

<sup>2</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$ ,  $K_S^0 K^+ K^-$  decays from  $B^+ \rightarrow D^{(*)} K^{(*)+}$  modes. The corresponding two standard deviation interval is  $236^\circ < \delta_B^* < 322^\circ$ .

<sup>3</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays from  $B^+ \rightarrow D^* K^+$  modes. The corresponding two standard deviation interval is  $296.5^\circ < \delta_B^* < 382.7^\circ$ .

<sup>4</sup> Uses Dalitz plot analysis of  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  and  $\bar{D}^0 \rightarrow K_S^0 K^+ K^-$  decays coming from  $B^\pm \rightarrow D^{(*)} K^{(*)\pm}$  modes.

<sup>5</sup> Uses a Dalitz plot analysis of the  $\bar{D}^0 \rightarrow K_S^0 \pi^+ \pi^-$  decays; Combines the  $DK^+$ ,  $D^* K^+$  and  $DK^{*+}$  modes.

<sup>6</sup> Uses a Dalitz analysis of neutral  $D$  decays to  $K_S^0 \pi^+ \pi^-$  in the processes  $B^\pm \rightarrow D^{(*)} K^\pm$ ,  $D^* \rightarrow D\pi^0$ ,  $D\gamma$ .

## PARTIAL BRANCHING FRACTIONS

### $B(B^+ \rightarrow K^{*+} \ell^+ \ell^-) (q^2 < 2.0 \text{ GeV}^2/c^4)$

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.4 <math>\pm 0.5</math> OUR AVERAGE</b>			
1.37 <sup>+0.60</sup> <sub>-0.58</sub>	AAIJ	12AH	LHCB $pp$ at 7 TeV
1.30 $\pm 0.98 \pm 0.14$	AALTONEN	11AI	CDF $p\bar{p}$ at 1.96 TeV

### $B(B^+ \rightarrow K^{*+} \ell^+ \ell^-) (2.0 < q^2 < 4.3 \text{ GeV}^2/c^4)$

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.1 <math>\pm 0.5</math> OUR AVERAGE</b>			
1.24 <sup>+0.60</sup> <sub>-0.55</sub>	AAIJ	12AH	LHCB $pp$ at 7 TeV
0.71 $\pm 1.00 \pm 0.15$	AALTONEN	11AI	CDF $p\bar{p}$ at 1.96 TeV

### $B(B^+ \rightarrow K^{*+} \ell^+ \ell^-) (4.3 < q^2 < 8.68 \text{ GeV}^2/c^4)$

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>2.4 <math>+0.8</math> <sub>-0.7</sub> OUR AVERAGE</b>			
2.50 <sup>+0.88</sup> <sub>-0.74</sub>	AAIJ	12AH	LHCB $pp$ at 7 TeV
1.71 $\pm 1.58 \pm 0.49$	AALTONEN	11AI	CDF $p\bar{p}$ at 1.96 TeV



**$B(B^+ \rightarrow K^{*+} \ell^+ \ell^-)$  ( $10.09 < q^2 < 12.86 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>2.1 \pm 0.6</math> OUR AVERAGE</b>			
$2.13^{+0.72}_{-0.66}$	AAIJ	12AH LHCB	$pp$ at 7 TeV
$1.97 \pm 0.99 \pm 0.22$	AALTONEN	11AI CDF	$p\bar{p}$ at 1.96 TeV

 **$B(B^+ \rightarrow K^{*+} \ell^+ \ell^-)$  ( $14.18 < q^2 < 16.0 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.86^{+0.40}_{-0.32}</math> OUR AVERAGE</b>			
$1.00^{+0.47}_{-0.38}$	AAIJ	12AH LHCB	$pp$ at 7 TeV
$0.52 \pm 0.61 \pm 0.09$	AALTONEN	11AI CDF	$p\bar{p}$ at 1.96 TeV

 **$B(B^+ \rightarrow K^{*+} \ell^+ \ell^-)$  ( $15.0 < q^2 < 19.0 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>1.78^{+0.32}_{-0.29}</math> OUR AVERAGE</b>			
$2.9^{+1.0}_{-0.8} \pm 0.3$	<sup>1</sup> WEHLE	21 BELL	$e^+ e^- \rightarrow \gamma(4S)$
$2.1^{+1.2}_{-1.0} \pm 0.2$	<sup>2</sup> WEHLE	21 BELL	$e^+ e^- \rightarrow \gamma(4S)$
$1.58^{+0.32}_{-0.29} \pm 0.11$	<sup>3</sup> AAIJ	14M LHCB	$pp$ at 7, 8 TeV

<sup>1</sup> Measured with  $\mu^+ \mu^-$  as lepton pair.<sup>2</sup> Measured with  $e^+ e^-$  as lepton pair.<sup>3</sup> Uses  $B(B^+ \rightarrow J/\psi(1S) K^*(892)^+) = (1.431 \pm 0.027 \pm 0.090) \times 10^{-3}$  for normalization and  $\mu^+ \mu^-$  as a lepton pair. **$B(B^+ \rightarrow K^{*+} \ell^+ \ell^-)$  ( $q^2 > 16.0 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>1.3 \pm 0.4</math> OUR AVERAGE</b>			
$1.25 \pm 0.46$	AAIJ	12AH LHCB	$pp$ at 7 TeV
$1.57 \pm 0.96 \pm 0.17$	AALTONEN	11AI CDF	$p\bar{p}$ at 1.96 TeV

 **$B(B^+ \rightarrow K^{*+} \ell^+ \ell^-)$  ( $1.0 < q^2 < 6.0 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>1.72^{+0.40}_{-0.32}</math> OUR AVERAGE</b>			
$1.2^{+0.9}_{-0.7} \pm 0.2$	<sup>1,2</sup> WEHLE	21 BELL	$e^+ e^- \rightarrow \gamma(4S)$
$1.7^{+1.0}_{-1.0} \pm 0.2$	<sup>2,3</sup> WEHLE	21 BELL	$e^+ e^- \rightarrow \gamma(4S)$
$1.79^{+0.41}_{-0.37} \pm 0.13$	<sup>4</sup> AAIJ	14M LHCB	$pp$ at 7, 8 TeV
$2.57 \pm 1.61 \pm 0.40$	AALTONEN	11AI CDF	$p\bar{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$2.90^{+0.90}_{-0.85}$	AAIJ	12AH LHCB	Repl. by AAIJ 14M

<sup>1</sup> Measured with  $\mu^+ \mu^-$  as lepton pair.<sup>2</sup> Result is determined for the range  $1.1 < q^2 < 6.0 \text{ GeV}^4/c^2$ .

<sup>3</sup> Measured with  $e^+e^-$  as lepton pair.<sup>4</sup> Uses  $B(B^+ \rightarrow J/\psi(1S)K^*(892)^+) = (1.431 \pm 0.027 \pm 0.090) \times 10^{-3}$  for normalization and  $\mu^+\mu^-$  as a lepton pair. Measured in  $1.1 < q^2 < 6.0 \text{ GeV}^2/c^4$ . **$B(B^+ \rightarrow K^{*+}\ell^+\ell^-)$  ( $0.0 < q^2 < 4.3 \text{ GeV}^2/c^4$ )**

VALUE (units $10^{-7}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>2.01 \pm 1.39 \pm 0.27</math></b>	AALTONEN	11A1	CDF $p\bar{p}$ at 1.96 TeV

 **$B(B^+ \rightarrow K^{*+}\mu^+\mu^-) / B(B^+ \rightarrow K^{*+}e^+e^-)$  ( $0.045 < q^2 < 1.1 \text{ GeV}^2/c^4$ )**

VALUE	DOCUMENT ID	TECN	COMMENT
$0.62^{+0.60}_{-0.36} \pm 0.07$	WEHLE	21	BELL $e^+e^- \rightarrow \gamma(4S)$

 **$B(B^+ \rightarrow K^{*+}\mu^+\mu^-) / B(B^+ \rightarrow K^{*+}e^+e^-)$  ( $1.1 < q^2 < 6.0 \text{ GeV}^2/c^4$ )**

VALUE	DOCUMENT ID	TECN	COMMENT
$0.72^{+0.99}_{-0.44} \pm 0.14$	WEHLE	21	BELL $e^+e^- \rightarrow \gamma(4S)$

 **$B(B^+ \rightarrow K^{*+}\mu^+\mu^-) / B(B^+ \rightarrow K^{*+}e^+e^-)$  ( $15.0 < q^2 < 19.0 \text{ GeV}^2/c^4$ )**

VALUE	DOCUMENT ID	TECN	COMMENT
$1.40^{+1.99}_{-0.68} \pm 0.11$	WEHLE	21	BELL $e^+e^- \rightarrow \gamma(4S)$

 **$B(B^+ \rightarrow K^+\ell^+\ell^-)$  ( $q^2 < 2.0 \text{ GeV}^2/c^4$ )**

VALUE (units $10^{-7}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>0.51 \pm 0.08</math> OUR AVERAGE</b>	Error includes scale factor of 1.5.		
$0.556 \pm 0.053 \pm 0.027$	<sup>1</sup> AAIJ	13H	LHCB $pp$ at 7 TeV
$0.36 \pm 0.11 \pm 0.03$	AALTONEN	11A1	CDF $p\bar{p}$ at 1.96 TeV

<sup>1</sup> Measured in  $0.05 < q^2 < 2.0 \text{ GeV}^2/c^4$  range. **$B(B^+ \rightarrow K^+\ell^+\ell^-)$  ( $2.0 < q^2 < 4.3 \text{ GeV}^2/c^4$ )**

VALUE (units $10^{-7}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>0.60 \pm 0.07</math> OUR AVERAGE</b>	Error includes scale factor of 1.3.		
$0.573 \pm 0.053 \pm 0.023$	AAIJ	13H	LHCB $pp$ at 7 TeV
$0.80 \pm 0.15 \pm 0.05$	AALTONEN	11A1	CDF $p\bar{p}$ at 1.96 TeV

 **$B(B^+ \rightarrow K^+\ell^+\ell^-)$  ( $4.3 < q^2 < 8.68 \text{ GeV}^2/c^4$ )**

VALUE (units $10^{-7}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>1.03 \pm 0.07</math> OUR AVERAGE</b>			
$1.003 \pm 0.070 \pm 0.039$	AAIJ	13H	LHCB $pp$ at 7 TeV
$1.18 \pm 0.19 \pm 0.09$	AALTONEN	11A1	CDF $p\bar{p}$ at 1.96 TeV

 **$B(B^+ \rightarrow K^+\ell^+\ell^-)$  ( $10.09 < q^2 < 12.86 \text{ GeV}^2/c^4$ )**

VALUE (units $10^{-7}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>0.58 \pm 0.05</math> OUR AVERAGE</b>			
$0.565 \pm 0.050 \pm 0.022$	AAIJ	13H	LHCB $pp$ at 7 TeV
$0.68 \pm 0.12 \pm 0.05$	AALTONEN	11A1	CDF $p\bar{p}$ at 1.96 TeV

**$B(B^+ \rightarrow K^+ \ell^+ \ell^-)$  ( $14.18 < q^2 < 16.0 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.40 \pm 0.05</math> OUR AVERAGE</b>	Error includes scale factor of 1.4.		
$0.377 \pm 0.036 \pm 0.015$	AAIJ	13H	LHCB $pp$ at 7 TeV
$0.53 \pm 0.10 \pm 0.03$	AALTONEN	11A1	CDF $p\bar{p}$ at 1.96 TeV

 **$B(B^+ \rightarrow K^+ \ell^+ \ell^-)$  ( $16.0 < q^2 < 18.0 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.354 \pm 0.036 \pm 0.018</math></b>	AAIJ	13H	LHCB $pp$ at 7 TeV

 **$B(B^+ \rightarrow K^+ \ell^+ \ell^-)$  ( $18.0 < q^2 < 22.0 \text{ GeV}^2/c^4$ )**

$F_H$  is a fractional contribution of (pseudo) scalar and tensor amplitudes to the decay width in the massless muon approximation.

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.312 \pm 0.040 \pm 0.016</math></b>	AAIJ	13H	LHCB $pp$ at 7 TeV

 **$B(B^+ \rightarrow K^+ \ell^+ \ell^-)$  ( $15.0 < q^2 < 22.0 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.85 \pm 0.03 \pm 0.04</math></b>	<sup>1</sup> AAIJ	14M	LHCB $pp$ at 7, 8 TeV

<sup>1</sup> Uses  $B(B^+ \rightarrow J/\psi(1S) K^+) = (0.998 \pm 0.014 \pm 0.040) \times 10^{-3}$  for normalization and  $\mu^+ \mu^-$  as a lepton pair.

 **$B(B^+ \rightarrow K^+ \ell^+ \ell^-)$  ( $16.0 < q^2 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.48 \pm 0.11 \pm 0.03</math></b>	AALTONEN	11A1	CDF $p\bar{p}$ at 1.96 TeV

 **$B(B^+ \rightarrow K^+ \ell^+ \ell^-)$  ( $1.0 < q^2 < 6.0 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>1.26 \pm 0.12</math> OUR AVERAGE</b>	Error includes scale factor of 1.9. See the ideogram below.		
$2.30 \begin{smallmatrix} +0.41 \\ -0.38 \end{smallmatrix} \pm 0.05$	<sup>1</sup> CHOUDHURY 21	BELL	$e^+ e^- \rightarrow \gamma(4S)$
$1.66 \begin{smallmatrix} +0.32 \\ -0.29 \end{smallmatrix} \pm 0.04$	<sup>2</sup> CHOUDHURY 21	BELL	$e^+ e^- \rightarrow \gamma(4S)$
$1.40 \begin{smallmatrix} +0.98 \\ -0.34 \end{smallmatrix} \pm 0.69$	<sup>3</sup> AAIJ	19S	LHCB $pp$ at 7, 8, 13 TeV
$1.19 \pm 0.034 \pm 0.059$	<sup>4</sup> AAIJ	14M	LHCB $pp$ at 7, 8 TeV
$1.41 \pm 0.20 \pm 0.10$	AALTONEN	11A1	CDF $p\bar{p}$ at 1.96 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

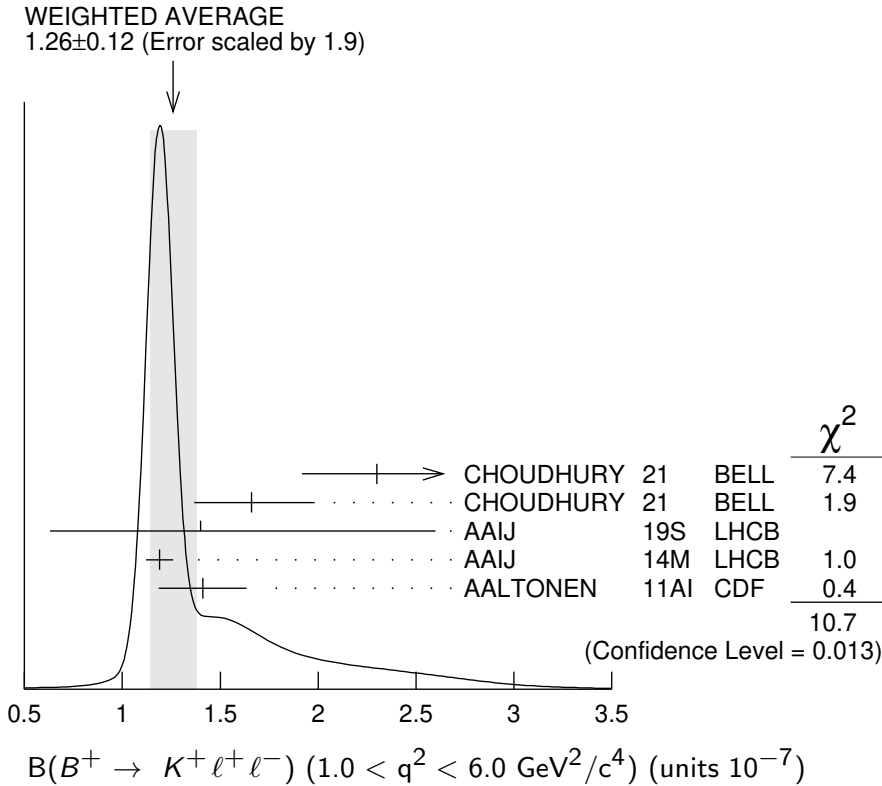
$1.56 \begin{smallmatrix} +0.19 \\ -0.15 \end{smallmatrix} \begin{smallmatrix} +0.06 \\ -0.04 \end{smallmatrix}$	<sup>5</sup> AAIJ	14AR	LHCB $pp$ at 7, 8 TeV
$1.205 \pm 0.085 \pm 0.070$	AAIJ	13H	LHCB Repl. by AAIJ 14M

<sup>1</sup> Measured for  $B^+ \rightarrow K^+ \mu^+ \mu^-$  decays. Measurements in other  $q^2$  bins are also reported.

<sup>2</sup> Measured for  $B^+ \rightarrow K^+ e^+ e^-$  decays. Measurements in other  $q^2$  bins are also reported.

<sup>3</sup> Measured by taking the ratio of the branching fraction from  $B^+ \rightarrow K^+ e^+ e^-$  and  $B^+ \rightarrow J/\psi(e^+ e^-) K^+$  decays and multiplying it by the measured value of  $B^+ \rightarrow J/\psi K^+$  and  $J/\psi \rightarrow e^+ e^-$  as in PDG 18. The branching fraction of  $B^+ \rightarrow K^+ e^+ e^-$  is determined in the region  $1.1 < q^2 < 6 \text{ GeV}^2/c^4$ .

- <sup>4</sup> Uses  $B(B^+ \rightarrow J/\psi(1S)K^+) = (0.998 \pm 0.014 \pm 0.040) \times 10^{-3}$  for normalization and  $\mu^+\mu^-$  for leptons. Measured for  $1.1 < q^2 < 6.0 \text{ GeV}^2/c^4$ .
- <sup>5</sup> Measured by taking the ratio of the branching fraction from  $B^+ \rightarrow K^+ e^+ e^-$  and  $B^+ \rightarrow J/\psi(e^+ e^-)K^+$  decays and multiplying it by the measured value of  $B^+ \rightarrow J/\psi K^+$  and  $J/\psi \rightarrow e^+ e^-$  as in PDG 12. The branching fraction of  $B^+ \rightarrow K^+ e^+ e^-$  is determined in the region  $1 < q^2 < 6 \text{ GeV}^2/c^4$ .



**$B(B^+ \rightarrow K^+ \mu^+ \mu^-) / B(B^+ \rightarrow K^+ e^+ e^-) (1.0 < q^2 < 6.0 \text{ GeV}^2/c^4)$**

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.86 ± 0.06 OUR AVERAGE</b>			
1.39 <sup>+0.36</sup> <sub>-0.33</sub> ± 0.02	<sup>1</sup> CHOU DHURY 21	BELL	$e^+ e^- \rightarrow \gamma(4S)$
0.846 <sup>+0.060</sup> <sub>-0.054</sub> <sup>+0.016</sup> <sub>-0.014</sub>	<sup>2</sup> AAIJ	19S LHCB	$pp$ at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.745 <sup>+0.090</sup> <sub>-0.074</sub> ± 0.036	<sup>3</sup> AAIJ	14AR LHCB	$pp$ at 7, 8 TeV

<sup>1</sup> Measurements in other  $q^2$  bins are also reported.

<sup>2</sup> The ratio is determined using the relative branching fractions of the decays  $B^+ \rightarrow K^+ \ell^+ \ell^-$  and  $B^+ \rightarrow J/\psi(\rightarrow \ell^+ \ell^-) K^+$ , with  $\ell = e, \mu$ . Measured for the region  $1.1 < q^2 < 6.0 \text{ GeV}^2/c^4$ .

<sup>3</sup> The ratio is determined using the relative branching fractions of the decays  $B^+ \rightarrow K^+ \ell^+ \ell^-$  and  $B^+ \rightarrow J/\psi(\rightarrow \ell^+ \ell^-) K^+$ , with  $\ell = e, \mu$ .

**$B(B^+ \rightarrow K^+ \ell^+ \ell^-) (0.0 < q^2 < 4.3 \text{ GeV}^2/c^4)$**

VALUE (units $10^{-7}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.13 ± 0.19 ± 0.08</b>	AALTONEN	11AI CDF	$p\bar{p}$ at 1.96 TeV

**$B(B^+ \rightarrow K^+ \pi^+ \pi^- \mu^+ \mu^-)$  ( $1.00 < q^2 < 6.00 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$1.38^{+0.15}_{-0.14} \pm 0.08$	AAIJ	14AZ LHCb	$pp$ at 7, 8 TeV

 **$B(B^+ \rightarrow K^+ \pi^+ \pi^- \mu^+ \mu^-)$  ( $0.10 < q^2 < 2.00 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$1.33^{+0.13}_{-0.12} \pm 0.09$	AAIJ	14AZ LHCb	$pp$ at 7, 8 TeV

 **$B(B^+ \rightarrow K^+ \pi^+ \pi^- \mu^+ \mu^-)$  ( $2.00 < q^2 < 4.30 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-8}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$5.38^{+0.94}_{-0.87} \pm 0.35$	AAIJ	14AZ LHCb	$pp$ at 7, 8 TeV

 **$B(B^+ \rightarrow K^+ \pi^+ \pi^- \mu^+ \mu^-)$  ( $4.30 < q^2 < 8.68 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-7}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$1.01^{+0.12}_{-0.13} \pm 0.09$	AAIJ	14AZ LHCb	$pp$ at 7, 8 TeV

 **$B(B^+ \rightarrow K^+ \pi^+ \pi^- \mu^+ \mu^-)$  ( $10.09 < q^2 < 12.86 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-8}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$5.07^{+0.94}_{-0.89} \pm 0.47$	AAIJ	14AZ LHCb	$pp$ at 7, 8 TeV

 **$B(B^+ \rightarrow K^+ \pi^+ \pi^- \mu^+ \mu^-)$  ( $14.18 < q^2 < 19.00 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-8}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.48^{+0.39}_{-0.29} \pm 0.05$	AAIJ	14AZ LHCb	$pp$ at 7, 8 TeV

 **$B(B^+ \rightarrow \pi^+ \mu^+ \mu^-)/B(B^+ \rightarrow K^+ \mu^+ \mu^-)$  ( $1.00 < q^2 < 6.00 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-2}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$3.8 \pm 0.9 \pm 0.1$	AAIJ	15AR LHCb	$pp$ at 7, 8 TeV

 **$B(B^+ \rightarrow \pi^+ \mu^+ \mu^-)$  ( $1.00 < q^2 < 6.00 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-9}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$4.55^{+1.05}_{-1.00} \pm 0.15$	AAIJ	15AR LHCb	$pp$ at 7, 8 TeV

 **$B(B^+ \rightarrow \pi^+ \mu^+ \mu^-)$  ( $15.00 < q^2 < 22.00 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-9}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$3.29^{+0.84}_{-0.70} \pm 0.07$	AAIJ	15AR LHCb	$pp$ at 7, 8 TeV

 **$B(B^+ \rightarrow \pi^+ \mu^+ \mu^-)/B(B^+ \rightarrow K^+ \mu^+ \mu^-)$  ( $15.0 < q^2 < 22.0 \text{ GeV}^2/c^4$ )**

<u>VALUE (units <math>10^{-2}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$3.7 \pm 0.8 \pm 0.1$	AAIJ	15AR LHCb	$pp$ at 7, 8 TeV

**$A_{FB}(B^+ \rightarrow K^+ \mu^+ \mu^-)$  ( $1.1 < q^2 < 6.0 \text{ GeV}^2/c^4$ )**

$A_{FB}$  is the forward-backward angular asymmetry of the lepton pair in  $B \rightarrow K^{(*)} \ell^+ \ell^-$  decay as defined in  $B^+$ ,  $B^0$  admixture particle listings.

VALUE	DOCUMENT ID	TECN	COMMENT
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**−0.003±0.017 OUR AVERAGE**

−0.14 $\begin{smallmatrix} +0.07 \\ -0.06 \end{smallmatrix}$ ±0.03	<sup>1</sup> SIRUNYAN	18DX CMS	$pp$ at 8 TeV
0.005±0.015±0.010	<sup>2</sup> AAIJ	140 LHCb	$pp$ at 7,8 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.02 $\begin{smallmatrix} +0.05 & +0.02 \\ -0.03 & -0.01 \end{smallmatrix}$	AAIJ	13H LHCb	Repl. by AAIJ 140
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<sup>1</sup> Measurement is performed in  $1.0 < q^2 < 6.0 \text{ GeV}^2/c^4$ . SIRUNYAN 18DX reports also measurements in several other  $q^2$  intervals.

<sup>2</sup> AAIJ 140 reports 68% C.L. interval, which we encode as midpoint with uncertainty as half of the width of interval.

 **$A_{FB}(B^+ \rightarrow K^+ \mu^+ \mu^-)$  ( $15.0 < q^2 < 22.0 \text{ GeV}^2/c^4$ )**

VALUE	DOCUMENT ID	TECN	COMMENT
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<b>−0.015±0.015±0.01</b>	<sup>1</sup> AAIJ	140 LHCb	$pp$ at 7, 8 TeV
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<sup>1</sup> AAIJ 140 reports 68% C.L. interval, which we encode as midpoint with uncertainty as half of the width of interval.

 **$F_H(B^+ \rightarrow K^+ \mu^+ \mu^-)$  ( $1.1 < q^2 < 6.0 \text{ GeV}^2/c^4$ )**

$F_H$  is a fractional contribution of (pseudo) scalar and tensor amplitudes to the decay width in the massless muon approximation.

VALUE	DOCUMENT ID	TECN	COMMENT
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**0.04±0.04 OUR AVERAGE**

0.38 $\begin{smallmatrix} +0.17 \\ -0.21 \end{smallmatrix}$ ±0.09	<sup>1</sup> SIRUNYAN	18DX CMS	$pp$ at 8 TeV
0.03±0.03±0.02	<sup>2</sup> AAIJ	140 LHCb	$pp$ at 7, 8 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.05 $\begin{smallmatrix} +0.08 & +0.04 \\ -0.05 & -0.02 \end{smallmatrix}$	AAIJ	13H LHCb	Repl. by AAIJ 140
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<sup>1</sup> Measurement is performed in  $1.0 < q^2 < 6.0 \text{ GeV}^2/c^4$ . SIRUNYAN 18DX reports also measurements in several other  $q^2$  intervals.

<sup>2</sup> AAIJ 140 reports 68% C.L. interval, which we encode as midpoint with uncertainty as half of the width of interval.

 **$F_H(B^+ \rightarrow K^+ \mu^+ \mu^-)$  ( $15.0 < q^2 < 22.0 \text{ GeV}^2/c^4$ )**

$F_H$  is a fractional contribution of (pseudo) scalar and tensor amplitudes to the decay width in the massless muon approximation.

VALUE	DOCUMENT ID	TECN	COMMENT
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<b>0.035±0.035±0.02</b>	<sup>1</sup> AAIJ	140 LHCb	$pp$ at 7, 8 TeV
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<sup>1</sup> AAIJ 140 reports 68% C.L. interval, which we encode as midpoint with uncertainty as half of the width of interval.

## FORWARD-BACKWARD ASYMMETRIES

The forward-backward asymmetry is defined as  $A_{FB} = [N(q_{FB} > 0) - N(q_{FB} < 0)] / [N(q_{FB} > 0) + N(q_{FB} < 0)]$ , where  $q_{FB} = -q_B \cdot \text{sgn}(\eta_B)$  with  $q_B$  as the  $B$  hadron electric charge,  $\eta_B$  as its pseudorapidity, and  $\text{sgn}(\eta_B)$  as a sign function of  $\eta_B$ .

### $A_{FB}(B^\pm \rightarrow J/\psi K^\pm)$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
$-0.24 \pm 0.41 \pm 0.19$	ABAZOV	15 D0	$p\bar{p}$ at 1.96 TeV

### $A_{FB}(B^\pm \rightarrow K^*(892)^+ \mu^+ \mu^-) (1.0 < q^2 < 8.68 \text{ GeV}^2/c^4)$

VALUE	DOCUMENT ID	TECN	COMMENT
$-0.14^{+0.32}_{-0.35} \pm 0.17$	<sup>1,2</sup> SIRUNYAN	21AC CMS	$pp$ at 8 TeV

<sup>1</sup> SIRUNYAN 21AC measurement is performed in  $1.0 < q^2 < 8.68 \text{ GeV}^2/c^4$ . Reports also measurements in several other  $q^2$  intervals.

<sup>2</sup>  $A_{FB}$  is defined with respect to  $\mu^+ \mu^-$  direction and not the  $B$  direction.

### $A_{FB}(B^\pm \rightarrow K^*(892)^+ \mu^+ \mu^-) (1.1 < q^2 < 6.0 \text{ GeV}^2/c^4)$

VALUE	DOCUMENT ID	TECN	COMMENT
$-0.08^{+0.07}_{-0.08} \pm 0.02$	<sup>1</sup> AAIJ	21J LHCb	$pp$ at 7, 8, 13 TeV

<sup>1</sup> The full set of CP-averaged angular observables is measured as a function of the  $q^2$ . The  $A_{FB}$  is measured related to the dimuon system.

### $A_{FB}(B^\pm \rightarrow K^*(892)^+ \mu^+ \mu^-) (10.09 < q^2 < 12.86 \text{ GeV}^2/c^4)$

VALUE	DOCUMENT ID	TECN	COMMENT
$0.09^{+0.16}_{-0.11} \pm 0.04$	<sup>1,2</sup> SIRUNYAN	21AC CMS	$pp$ at 8 TeV

<sup>1</sup> SIRUNYAN 21AC measurement is performed in  $10.09 < q^2 < 12.86 \text{ GeV}^2/c^4$ . Reports also measurements in several other  $q^2$  intervals.

<sup>2</sup>  $A_{FB}$  is defined with respect to  $\mu^+ \mu^-$  direction and not the  $B$  direction.

### $A_{FB}(B^\pm \rightarrow K^*(892)^+ \mu^+ \mu^-) (14.18 < q^2 < 19.0 \text{ GeV}^2/c^4)$

VALUE	DOCUMENT ID	TECN	COMMENT
$0.33^{+0.11}_{-0.07} \pm 0.05$	<sup>1,2</sup> SIRUNYAN	21AC CMS	$pp$ at 8 TeV

<sup>1</sup> SIRUNYAN 21AC measurement is performed in  $14.18 < q^2 < 19.0 \text{ GeV}^2/c^4$ . Reports also measurements in several other  $q^2$  intervals.

<sup>2</sup>  $A_{FB}$  is defined with respect to  $\mu^+ \mu^-$  direction and not the  $B$  direction.

### $A_{FB}(B^\pm \rightarrow K^*(892)^+ \mu^+ \mu^-) (15.0 < q^2 < 19.0 \text{ GeV}^2/c^4)$

VALUE	DOCUMENT ID	TECN	COMMENT
$0.31 \pm 0.06 \pm 0.04$	<sup>1</sup> AAIJ	21J LHCb	$pp$ at 7, 8, 13 TeV

<sup>1</sup> The full set of CP-averaged angular observables is measured as a function of the  $q^2$ . The  $A_{FB}$  is measured related to the dimuon system.

$$A_P(B^+) = [\sigma(B^-) - \sigma(B^+)] / [\sigma(B^-) + \sigma(B^+)]$$

Production asymmetries

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>-5.2±1.9 OUR AVERAGE</b>			
-4.1±4.9±1.0	<sup>1</sup> AAIJ	17AP LHCb	$pp$ at 7 TeV
-5.3±3.1±1.0	<sup>1</sup> AAIJ	17AP LHCb	$pp$ at 8 TeV
-2.3±2.4±3.7	<sup>2</sup> AAIJ	17BF LHCb	$pp$ at 7 TeV
-7.4±1.5±3.2	<sup>2</sup> AAIJ	17BF LHCb	$pp$ at 8 TeV

<sup>1</sup> AAIJ 17AP uses  $B^+ \rightarrow \bar{D}^0 \pi^+$  decays with  $B^+$  transverse momenta  $p_T$  and rapidities  $y$  in the region of  $2 < p_T < 30$  GeV/c and  $2.1 < y < 4.5$ .

<sup>2</sup> AAIJ 17BF uses  $B^+ \rightarrow J/\psi K^+$  decays with  $B^+$  transverse momenta  $p_T$  and rapidities  $y$  in the region of  $0 < p_T < 30$  GeV/c and  $2.1 < y < 4.5$ .

## $B^\pm$ REFERENCES

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AAIJ	20AI	PR D102 112003	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	20AJ	PR D102 112010	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	20AN	JHEP 2012 139	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	20D	PR D101 032005	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	20K	JHEP 2003 146	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	20N	JHEP 2006 058	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	20P	JHEP 2006 129	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	20S	JHEP 2008 123	R. Aaij <i>et al.</i>	(LHCb Collab.)
CHILIKIN	20	JHEP 2005 034	K. Chilikin <i>et al.</i>	(BELLE Collab.)
CHU	20	PR D101 052012	K. Chu <i>et al.</i>	(BELLE Collab.)
LEES	20C	PRL 124 152001	J.P. Lees <i>et al.</i>	(BABAR Collab.)
PRIM	20	PR D101 032007	M.T. Prim <i>et al.</i>	(BELLE Collab.)
AAIJ	19AC	PR D99 092009	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	19AL	PRL 123 231802	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	19AM	PRL 123 241802	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	19O	EPJ C79 537	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	19P	EPJ C79 675	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	19S	PRL 122 191801	R. Aaij <i>et al.</i>	(LHCb Collab.)
BHARDWAJ	19	PR D99 111101	V. Bhardwaj <i>et al.</i>	(BELLE Collab.)
CHILIKIN	19	PR D100 012001	K. Chilikin <i>et al.</i>	(BELLE Collab.)
GARG	19	PR D99 071102	R. Garg <i>et al.</i>	(BELLE Collab.)
KALIYAR	19	PR D99 031102	A.B. Kaliyar <i>et al.</i>	(BELLE Collab.)
LEES	19C	PR D100 111101	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LI	19A	PRL 122 082001	Y.B. Li <i>et al.</i>	(BELLE Collab.)
LI	19G	PR D100 112010	Y. Li <i>et al.</i>	(BELLE Collab.)
LU	19	PR D99 032003	P.-C. Lu <i>et al.</i>	(BELLE Collab.)
PDG	19	RPP 2019 at pdg.lbl.gov	M. Tanabashi <i>et al.</i>	(PDG Collab.)
RESMI	19	JHEP 1910 178	P.K. Resmi <i>et al.</i>	(BELLE Collab.)
SIRUNYAN	19CM	JHEP 1912 100	A.M. Sirunyan <i>et al.</i>	(CMS Collab.)
WATANUKI	19	PR D99 032012	S. Watanuki <i>et al.</i>	(BELLE Collab.)
AAIJ	18A	PL B777 16	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	18AD	JHEP 1808 176	R. Aaij <i>et al.</i>	(LHCb Collab.)
Also		JHEP 1810 107 (errat.)	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	18B	JHEP 1801 131	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	18U	JHEP 1803 059	R. Aaij <i>et al.</i>	(LHCb Collab.)



AAIJ	18W	JHEP 1805 160	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	18X	JHEP 1805 067	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	18Z	JHEP 1806 084	R. Aaij <i>et al.</i>	(LHCb Collab.)
GELB	18	PR D98 112016	M. Gelb <i>et al.</i>	(BELLE Collab.)
KATO	18	PR D97 012005	Y. Kato <i>et al.</i>	(BELLE Collab.)
LI	18A	EPJ C78 252	Y.B. Li <i>et al.</i>	(BELLE Collab.)
PDG	18	PR D98 030001	M. Tanabashi <i>et al.</i>	(PDG Collab.)
RESMI	18	JHEP 1801 082	P.K. Resmi <i>et al.</i>	
SIBIDANOV	18	PRL 121 031801	A. Sibidanov <i>et al.</i>	(BELLE Collab.)
SIRUNYAN	18DX	PR D98 112011	A.M. Sirunyan <i>et al.</i>	(CMS Collab.)
VOSSSEN	18	PR D98 012005	A. Vossen <i>et al.</i>	(BELLE Collab.)
AAIJ	17	PR D95 012002	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	17AD	PL B769 305	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	17AP	PR D95 052005	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	17AQ	PR D95 071101	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	17AR	PR D96 011101	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	17BF	PL B774 139	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	17BO	JHEP 1711 156	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	17E	PL B765 307	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	17K	EPJ C77 72	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	17O	JHEP 1703 036	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	17R	JHEP 1704 162	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	17Y	EPJ C77 161	R. Aaij <i>et al.</i>	(LHCb Collab.)
ABAZOV	17A	PR D95 031101	V.M. Abazov <i>et al.</i>	(D0 Collab.)
BELENO	17	PR D96 091102	C. Beleno <i>et al.</i>	(BELLE Collab.)
GRYGIER	17	PR D96 091101	J. Grygier <i>et al.</i>	(BELLE Collab.)
HORIGUCHI	17	PRL 119 191802	T. Horiguchi <i>et al.</i>	(BELLE Collab.)
HSU	17	PR D96 031101	C.-L. Hsu <i>et al.</i>	(BELLE Collab.)
KHACHATRY...	17C	PL B764 66	V. Khachatryan <i>et al.</i>	(CMS Collab.)
LEES	17	PRL 118 031802	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	17G	PR D96 072001	J.P. Lees <i>et al.</i>	(BABAR Collab.)
AABOUD	16L	EPJ C76 513	M. Aaboud <i>et al.</i>	(ATLAS Collab.)
AAIJ	16AA	JHEP 1608 137	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	16AH	PR D94 072001	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	16AQ	JHEP 1612 087	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	16L	PL B760 117	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	16M	PR D93 051101	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	16R	PR D93 119902	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	16Z	JHEP 1606 131	R. Aaij <i>et al.</i>	(LHCb Collab.)
BHARDWAJ	16	PR D93 052016	V. Bhardwaj <i>et al.</i>	(BELLE Collab.)
DEL-AMO-SA...	16	PR D93 052013	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
LEES	16	PRL 116 041801	J.P. Lees <i>et al.</i>	(BABAR Collab.)
PDG	16	CP C40 100001	C. Patrignani <i>et al.</i>	(PDG Collab.)
AAIJ	15AR	JHEP 1510 034	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	15BC	PR D92 112005	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	15K	PL B741 1	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	15O	PRL 115 051801	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	15V	PR D91 092002	R. Aaij <i>et al.</i>	(LHCb Collab.)
Also		PR D93 119901 (errat.)	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	15W	PR D91 112014	R. Aaij <i>et al.</i>	(LHCb Collab.)
ABAZOV	15	PRL 114 051803	V.M. Abazov <i>et al.</i>	(D0 Collab.)
BALA	15	PR D91 051101	A. Bala <i>et al.</i>	(BELLE Collab.)
CHOI	15A	PR D91 092011	S.-K. Choi <i>et al.</i>	(BELLE Collab.)
GOH	15	PR D91 071101	Y.M. Goh <i>et al.</i>	(BELLE Collab.)
HELLER	15	PR D91 112009	A. Heller <i>et al.</i>	(BELLE Collab.)
KRONENBIT...	15	PR D92 051102	B. Kronenbitter <i>et al.</i>	(BELLE Collab.)
LEES	15	PR D91 012003	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	15C	PR D91 052002	J.P. Lees <i>et al.</i>	(BABAR Collab.)
VINOKUROVA	15	JHEP 1506 132	A. Vinokurova <i>et al.</i>	(BELLE Collab.)
Also		JHEP 1702 088 (errat.)	A. Vinokurava <i>et al.</i>	(BELLE Collab.)
WIEHCZYN...	15	PR D91 032008	J. Wiechczynski <i>et al.</i>	(BELLE Collab.)
YOOK	15	PR D91 052016	Y. Yook <i>et al.</i>	(BELLE Collab.)
AAIJ	14	PRL 112 011801	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14A	PL B728 85	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14AC	PRL 112 131802	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14AF	PRL 113 141801	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14AN	JHEP 1409 177	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14AR	PRL 113 151601	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14AZ	JHEP 1410 064	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14BA	JHEP 1410 097	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14BE	NP B888 169	R. Aaij <i>et al.</i>	(LHCb Collab.)

AAIJ	14BF	JHEP 1411 060	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14BO	PR D90 112004	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14E	JHEP 1404 114	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14M	JHEP 1406 133	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14O	JHEP 1405 082	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14V	PL B733 36	R. Aaij <i>et al.</i>	(LHCb Collab.)
ABAZOV	14A	PR D89 012004	V.M. Abazov <i>et al.</i>	(D0 Collab.)
CHOBANOVA	14	PR D90 012002	V. Chobanova <i>et al.</i>	(BELLE Collab.)
IWASHITA	14	PTEP 2014 043C01	T. Iwashita <i>et al.</i>	(BELLE Collab.)
LEES	14A	PR D89 011102	J.P. Lees <i>et al.</i>	(BABAR Collab.)
TIEN	14	PR D89 011101	K.-J. Tien <i>et al.</i>	(BELLE Collab.)
AAIJ	13AE	PL B723 44	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	13AK	PL B726 151	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	13AP	PR D87 092007	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	13AR	PR D87 112010	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	13AU	PR D88 052015	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	13AZ	PRL 111 101801	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	13BC	PRL 111 112003	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	13BN	PRL 111 151801	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	13BS	PL B726 646	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	13H	JHEP 1302 105	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	13R	JHEP 1302 043	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	13S	EPJ C73 2462	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	13Z	JHEP 1309 006	R. Aaij <i>et al.</i>	(LHCb Collab.)
ABAZOV	13M	PRL 110 241801	V.M. Abazov <i>et al.</i>	(D0 Collab.)
DUH	13	PR D87 031103	Y. T. Duh <i>et al.</i>	(BELLE Collab.)
HARA	13	PRL 110 131801	K. Hara <i>et al.</i>	(BELLE Collab.)
LEES	13A	PR D87 032004	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	13B	PR D87 052015	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	13I	PR D87 112005	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	13K	PR D88 031102	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	13M	PR D88 032012	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	13T	PR D88 072006	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LUTZ	13	PR D87 111103	O. Lutz <i>et al.</i>	(BELLE Collab.)
NAYAK	13	PR D88 091104	M. Nayak <i>et al.</i>	(BELLE Collab.)
SIBIDANOV	13	PR D88 032005	A. Sibidanov <i>et al.</i>	(BELLE Collab.)
AAIJ	12AA	PR D85 091103	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	12AC	PR D85 091105	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	12AD	PR D85 112004	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	12AH	JHEP 1207 133	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	12AQ	PL B718 43	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	12AY	JHEP 1212 125	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	12C	PRL 108 101601	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	12E	PL B708 241	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	12L	EPJ C72 2118	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	12M	PL B712 203	R. Aaij <i>et al.</i>	(LHCb Collab.)
Also		PL B713 351 (errat.)	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	12T	PRL 108 161801	R. Aaij <i>et al.</i>	(LHCb Collab.)
AIHARA	12	PR D85 112014	H. Aihara <i>et al.</i>	(BELLE Collab.)
DEL-AMO-SA...	12	PR D85 092017	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
HOI	12	PRL 108 031801	C.-T. Hoi <i>et al.</i>	(BELLE Collab.)
KIM	12A	PR D86 031101	J.H. Kim <i>et al.</i>	(BELLE Collab.)
LEES	12AA	PR D86 092004	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	12B	PR D85 052003	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	12D	PRL 109 101802	J.P. Lees <i>et al.</i>	(BABAR Collab.)
Also		PR D88 072012	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	12J	PR D85 071103	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	12O	PR D85 112010	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	12P	PR D86 012004	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	12S	PR D86 032012	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	12Z	PR D86 091102	J.P. Lees <i>et al.</i>	(BABAR Collab.)
PDG	12	PR D86 010001	J. Beringer <i>et al.</i>	(PDG Collab.)
STYPULA	12	PR D86 072007	J. Stypula <i>et al.</i>	(BELLE Collab.)
AAIJ	11E	PR D84 092001	R. Aaij <i>et al.</i>	(LHCb Collab.)
Also		PR D85 039904 (errat.)	R. Aaij <i>et al.</i>	(LHCb Collab.)
AALTONEN	11	PRL 106 121804	T. Aaltonen <i>et al.</i>	(CDF Collab.)
AALTONEN	11AI	PRL 107 201802	T. Aaltonen <i>et al.</i>	(CDF Collab.)
AALTONEN	11AJ	PR D84 091504	T. Aaltonen <i>et al.</i>	(CDF Collab.)
AALTONEN	11B	PR D83 032008	T. Aaltonen <i>et al.</i>	(CDF Collab.)
AALTONEN	11L	PRL 106 161801	T. Aaltonen <i>et al.</i>	(CDF Collab.)
AUSHEV	11	PR D83 051102	T. Aushev <i>et al.</i>	(BELLE Collab.)

BHARDWAJ	11	PRL 107 091803	V. Bhardwaj <i>et al.</i>	(BELLE Collab.)
CHEN	11F	PR D84 071501	P. Chen <i>et al.</i>	(BELLE Collab.)
CHOI	11	PR D84 052004	S.-K. Choi <i>et al.</i>	(BELLE Collab.)
DEL-AMO-SA...	11B	PR D83 032004	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
DEL-AMO-SA...	11C	PR D83 032007	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
DEL-AMO-SA...	11D	PR D83 051101	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
DEL-AMO-SA...	11F	PR D83 052011	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
DEL-AMO-SA...	11K	PR D83 091101	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
DEL-AMO-SA...	11L	PRL 107 041804	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
GULER	11	PR D83 032005	H. Guler <i>et al.</i>	(BELLE Collab.)
HORII	11	PRL 106 231803	Y. Horii <i>et al.</i>	(BELLE Collab.)
LEES	11A	PR D84 012001	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	11D	PR D84 012002	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	11I	PR D84 092007	J.P. Lees <i>et al.</i>	(BABAR Collab.)
SAHOO	11A	PR D84 071101	H. Sahoo <i>et al.</i>	(BELLE Collab.)
SEON	11	PR D84 071106	O. Seon <i>et al.</i>	(BELLE Collab.)
VINOKUROVA	11	PL B706 139	A. Vinokurova <i>et al.</i>	(BELLE Collab.)
AALTONEN	10A	PR D81 031105	T. Aaltonen <i>et al.</i>	(CDF Collab.)
AUBERT	10	PRL 104 011802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	10D	PR D81 052009	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	10E	PR D81 051101	B. Aubert <i>et al.</i>	(BABAR Collab.)
BOZEK	10	PR D82 072005	A. BOZEK <i>et al.</i>	(BELLE Collab.)
DEL-AMO-SA...	10A	PR D82 011502	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
DEL-AMO-SA...	10B	PR D82 011101	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
DEL-AMO-SA...	10F	PRL 105 121801	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
DEL-AMO-SA...	10G	PR D82 072004	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
DEL-AMO-SA...	10H	PR D82 072006	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
DEL-AMO-SA...	10I	PR D82 091101	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
DEL-AMO-SA...	10K	PR D82 092006	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
DEL-AMO-SA...	10Q	PR D82 112002	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
HARA	10	PR D82 071101	K. Hara <i>et al.</i>	(BELLE Collab.)
LIBBY	10	PR D82 112006	J. Libby <i>et al.</i>	(CLEO Collab.)
POLUEKTOV	10	PR D81 112002	A. Poluektov <i>et al.</i>	(BELLE Collab.)
SAKAI	10	PR D82 091104	K. Sakai <i>et al.</i>	(BELLE Collab.)
WEDD	10	PR D81 111104	R. Wedd <i>et al.</i>	(BELLE Collab.)
AALTONEN	09B	PR D79 011104	T. Aaltonen <i>et al.</i>	(CDF Collab.)
ABAZOV	09Y	PR D79 111102	V.M. Abazov <i>et al.</i>	(D0 Collab.)
ABULENCIA	09	PR D79 112003	A. Abulencia <i>et al.</i>	(CDF Collab.)
AUBERT	09	PR D79 011102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09A	PR D79 012002	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09AA	PR D79 112001	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09AB	PR D79 112004	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09AF	PR D80 051101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09AJ	PR D80 092001	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09AO	PRL 103 211802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09AT	PR D80 111105	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09AV	PR D80 112002	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09B	PRL 102 132001	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09F	PR D79 051102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09G	PRL 102 141802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09H	PR D79 052005	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09J	PR D79 051101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09L	PR D79 072006	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09Q	PR D79 052011	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09R	PR D79 072003	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09S	PR D79 092002	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09T	PRL 102 091803	B. Aubert <i>et al.</i>	(BABAR Collab.)
Also		EPAPS Document No. E-PRLTAO-102-060910		(BABAR Collab.)
AUBERT	09V	PR D79 091101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09Y	PRL 103 051803	B. Aubert <i>et al.</i>	(BABAR Collab.)
CHANG	09	PR D79 052006	Y.-W. Chang <i>et al.</i>	(BELLE Collab.)
CHEN	09C	PR D80 111103	P. Chen <i>et al.</i>	(BELLE Collab.)
LIU	09	PR D79 071102	C. Liu <i>et al.</i>	(BELLE Collab.)
WEI	09A	PRL 103 171801	J.-T. Wei <i>et al.</i>	(BELLE Collab.)
Also		EPAPS Supplement EPAPS_appendix.pdf		(BELLE Collab.)
WIEHCZYN...	09	PR D80 052005	J. Wiechczynski <i>et al.</i>	(BELLE Collab.)
ABAZOV	08O	PRL 100 211802	V.M. Abazov <i>et al.</i>	(D0 Collab.)
ADACHI	08	PR D77 091101	I. Adachi <i>et al.</i>	(BELLE Collab.)
AUBERT	08A	PR D77 011101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08AA	PR D77 111102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08AB	PR D78 012006	B. Aubert <i>et al.</i>	(BABAR Collab.)

AUBERT	08AD	PR D77 091104	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08AG	PR D78 011104	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08AH	PR D78 011107	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08AI	PR D78 012004	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08AL	PR D78 034023	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08AT	PRL 100 231803	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08AV	PRL 101 081801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08B	PR D77 011102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08BC	PR D78 072007	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08BD	PR D78 091101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08BE	PR D78 091102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08BF	PR D78 092002	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08BH	PR D78 112001	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08BI	PRL 101 161801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08BK	PRL 101 201801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08BL	PRL 101 261802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08BN	PR D78 112003	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08D	PR D77 011107	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08F	PRL 100 051803	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08G	PRL 100 171803	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08H	PR D77 031101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08N	PRL 100 021801	B. Aubert <i>et al.</i>	(BABAR Collab.)
Also		PR D79 092002	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08Q	PRL 100 151802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08W	PRL 101 082001	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08X	PRL 101 091801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	08Y	PR D77 111101	B. Aubert <i>et al.</i>	(BABAR Collab.)
BHARDWAJ	08	PR D78 051104	V. Bhardwaj <i>et al.</i>	(BELLE Collab.)
BRODZICKA	08	PRL 100 092001	J. Brodzicka <i>et al.</i>	(BELLE Collab.)
CHEN	08C	PRL 100 251801	J.-H. Chen <i>et al.</i>	(BELLE Collab.)
HORII	08	PR D78 071901	Y. Horii <i>et al.</i>	(BELLE Collab.)
IWABUCHI	08	PRL 101 041601	M. Iwabuchi <i>et al.</i>	(BELLE Collab.)
LIN	08	NAT 452 332	S.-W. Lin <i>et al.</i>	(BELLE Collab.)
LIVENTSEV	08	PR D77 091503	D. Liventsev <i>et al.</i>	(BELLE Collab.)
PDG	08	PL B667 1	C. Amsler <i>et al.</i>	(PDG Collab.)
TANIGUCHI	08	PRL 101 111801	N. Taniguchi <i>et al.</i>	(BELLE Collab.)
WEI	08	PL B659 80	J.-T. Wei <i>et al.</i>	(BELLE Collab.)
WEI	08A	PR D78 011101	J.-T. Wei <i>et al.</i>	(BELLE Collab.)
WICHT	08	PL B662 323	J. Wicht <i>et al.</i>	(BELLE Collab.)
ADAM	07	PRL 99 041802	N.E. Adam <i>et al.</i>	(CLEO Collab.)
Also		PR D76 012007	D.M. Asner <i>et al.</i>	(CLEO Collab.)
AUBERT	07AC	PR D76 031101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07AE	PR D76 031103	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07AG	PRL 99 051801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07AL	PR D76 052002	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07AN	PR D76 051101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07AR	PR D76 071103	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07AV	PR D76 092004	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07AZ	PRL 99 201801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07BA	PRL 99 201802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07BB	PRL 99 221801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07BC	PR D76 091102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07BI	PRL 99 241803	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07BJ	PRL 99 251801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07BL	PRL 99 261801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07BN	PR D76 111101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07E	PRL 98 051802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07H	PR D75 031101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07L	PRL 98 151802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07M	PRL 98 171801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07N	PR D75 072002	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07Q	PR D75 051102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07R	PRL 98 211804	B. Aubert <i>et al.</i>	(BABAR Collab.)
Also		PRL 100 189903E	B. Aubert <i>et al.</i>	(BABAR Collab.)
Also		PRL 100 199905E	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07X	PR D75 091103	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	07Z	PR D76 011103	B. Aubert <i>et al.</i>	(BABAR Collab.)
CHANG	07B	PR D75 071104	P. Chang <i>et al.</i>	(BELLE Collab.)
CHEN	07D	PRL 99 221802	K.-F. Chen <i>et al.</i>	(BELLE Collab.)
HOKUUE	07	PL B648 139	T. Hokuue <i>et al.</i>	(BELLE Collab.)
LIN	07	PRL 98 181804	S.-W. Lin <i>et al.</i>	(BELLE Collab.)

LIN	07A	PRL 99 121601	S.-W. Lin <i>et al.</i>	(BELLE Collab.)
SATOYAMA	07	PL B647 67	N. Satoyama <i>et al.</i>	(BELLE Collab.)
SCHUEMANN	07	PR D75 092002	J. Schuemann <i>et al.</i>	(BELLE Collab.)
TSAI	07	PR D75 111101	Y.-T. Tsai <i>et al.</i>	(BELLE Collab.)
URQUIJO	07	PR D75 032001	P. Urquijo <i>et al.</i>	(BELLE Collab.)
WANG	07B	PR D75 092005	C.H. Wang <i>et al.</i>	(BELLE Collab.)
WANG	07C	PR D76 052004	M.-Z. Wang <i>et al.</i>	(BELLE Collab.)
XIE	07	PR D75 017101	Q.L. Xie <i>et al.</i>	(BELLE Collab.)
ABE	06	PR D73 051106	K. Abe <i>et al.</i>	(BELLE Collab.)
ABULENCIA	06J	PRL 96 191801	A. Abulencia <i>et al.</i>	(CDF Collab.)
ACOSTA	06	PRL 96 202001	D. Acosta <i>et al.</i>	(CDF Collab.)
AUBERT	06	PR D73 011101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	06E	PRL 96 052002	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	06F	PR D73 011103	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	06J	PR D73 051105	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	06K	PR D73 057101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	06N	PR D74 031103	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	06O	PR D74 032003	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	06Z	PR D73 111104	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	06A	PR D73 112004	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	06C	PR D74 011102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	06E	PR D74 011106	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	06G	PRL 97 201801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	06H	PRL 97 201802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	06J	PR D73 092001	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	06M	PR D74 031102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	06P	PR D74 031105	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	06T	PR D74 051102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	06U	PR D74 051104	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	06Y	PR D74 091105	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,BE	06A	PR D74 099903 (errat.)	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,BE	06C	PRL 97 171805	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,BE	06G	PRL 97 261801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,BE	06H	PRL 97 261803	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,BE	06J	PR D74 111102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,BE	06M	PR D74 071101	B. Aubert <i>et al.</i>	(BABAR Collab.)
CHISTOV	06A	PR D74 111105	R. Chistov <i>et al.</i>	(BELLE Collab.)
FANG	06	PR D74 012007	F. Fang <i>et al.</i>	(BELLE Collab.)
GABYSHEV	06	PRL 97 202003	N. Gabyshev <i>et al.</i>	(BELLE Collab.)
GABYSHEV	06A	PRL 97 242001	N. Gabyshev <i>et al.</i>	(BELLE Collab.)
GARMASH	06	PRL 96 251803	A. Garmash <i>et al.</i>	(BELLE Collab.)
IKADO	06	PRL 97 251802	K. Ikado <i>et al.</i>	(BELLE Collab.)
JEN	06	PR D74 111101	C.-M. Jen <i>et al.</i>	(BELLE Collab.)
KUMAR	06	PR D74 051103	R. Kumar <i>et al.</i>	(BELLE Collab.)
MOHAPATRA	06	PRL 96 221601	D. Mohapatra <i>et al.</i>	(BELLE Collab.)
POLUEKTOV	06	PR D73 112009	A. Poluektov <i>et al.</i>	(BELLE Collab.)
SCHUEMANN	06	PRL 97 061802	J. Schuemann <i>et al.</i>	(BELLE Collab.)
SONI	06	PL B634 155	N. Soni <i>et al.</i>	(BELLE Collab.)
ABE	05A	PRL 94 221805	K. Abe <i>et al.</i>	(BELLE Collab.)
ABE	05B	PR D71 072003	K. Abe <i>et al.</i>	(BELLE Collab.)
Also		PR D71 079903 (errat.)	K. Abe <i>et al.</i>	(BELLE Collab.)
ABE	05G	PRL 95 231802	K. Abe <i>et al.</i>	(BELLE Collab.)
ACOSTA	05J	PRL 95 031801	D. Acosta <i>et al.</i>	(CDF Collab.)
AUBERT	05	PRL 94 011801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	05B	PR D71 031501	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	05G	PR D72 032004	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	05H	PRL 94 101801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	05J	PRL 94 141801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	05K	PRL 94 171801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	05L	PRL 94 181802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	05M	PRL 94 191802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	05N	PR D71 031102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	05O	PR D71 031103	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	05R	PR D71 071103	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	05U	PR D71 091103	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	05X	PR D71 111101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	05B	PRL 95 041804	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	05E	PR D72 011102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	05G	PR D72 052002	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	05K	PRL 95 131803	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	05L	PR D72 051101	B. Aubert <i>et al.</i>	(BABAR Collab.)

AUBERT,B	05N	PR D72 072003	B. Aubert <i>et al.</i>	(BABAR Collab.)
Also		PR D74 099903 (errata.)	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	05O	PR D72 051102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	05T	PR D72 071102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	05U	PR D72 071103	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	05V	PR D72 071104	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	05Y	PRL 95 121802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,BE	05E	PRL 95 221801	B. Aubert <i>et al.</i>	(BABAR Collab.)
CHANG	05	PR D71 072007	M.-C. Chang <i>et al.</i>	(BELLE Collab.)
CHANG	05A	PR D71 091106	P. Chang <i>et al.</i>	(BELLE Collab.)
CHAO	05A	PR D71 031502	Y. Chao <i>et al.</i>	(BELLE Collab.)
CHEN	05A	PRL 94 221804	K.-F. Chen <i>et al.</i>	(BELLE Collab.)
GARMASH	05	PR D71 092003	A. Garmash <i>et al.</i>	(BELLE Collab.)
ITOH	05	PRL 95 091601	R. Itoh <i>et al.</i>	(BELLE Collab.)
LEE	05	PRL 95 061802	Y.-J. Lee <i>et al.</i>	(BELLE Collab.)
LIVENTSEV	05	PR D72 051109	D. Liventsev <i>et al.</i>	(BELLE Collab.)
MAJUMDER	05	PRL 95 041803	G. Majumder <i>et al.</i>	(BELLE Collab.)
MOHAPATRA	05	PR D72 011101	D. Mohapatra <i>et al.</i>	(BELLE Collab.)
NISHIDA	05	PL B610 23	S. Nishida <i>et al.</i>	(BELLE Collab.)
OKABE	05	PL B614 27	T. Okabe <i>et al.</i>	(BELLE Collab.)
SAIGO	05	PRL 94 091601	M. Saigo <i>et al.</i>	(BELLE Collab.)
WANG	05A	PL B617 141	M.-Z. Wang <i>et al.</i>	(BELLE Collab.)
XIE	05	PR D72 051105	Q.L. Xie <i>et al.</i>	(BELLE Collab.)
YANG	05	PRL 94 111802	H. Yang <i>et al.</i>	(BELLE Collab.)
ZHANG	05A	PRL 94 031801	J. Zhang <i>et al.</i>	(BELLE Collab.)
ZHANG	05B	PR D71 091107	L.M. Zhang <i>et al.</i>	(BELLE Collab.)
ZHANG	05D	PRL 95 141801	J. Zhang <i>et al.</i>	(BELLE Collab.)
ABDALLAH	04E	EPJ C33 307	J. Abdallah <i>et al.</i>	(DELPHI Collab.)
ABE	04D	PR D69 112002	K. Abe <i>et al.</i>	(BELLE Collab.)
AUBERT	04A	PR D69 011102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	04C	PRL 92 111801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	04H	PRL 92 061801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	04K	PRL 92 141801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	04M	PRL 92 201802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	04N	PRL 92 202002	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	04O	PRL 92 221803	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	04P	PRL 92 241802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	04Q	PR D69 051101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	04T	PR D69 071103	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	04Y	PRL 93 041801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	04Z	PRL 93 051802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	04B	PR D70 011101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	04D	PR D70 032006	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	04L	PRL 93 131804	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	04P	PR D70 092001	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	04S	PRL 93 181801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	04U	PR D70 091105	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	04V	PRL 93 181805	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,BE	04	PR D70 111102	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,BE	04A	PR D70 112006	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,BE	04B	PR D70 091106	B. Aubert <i>et al.</i>	(BABAR Collab.)
CHAO	04	PR D69 111102	Y. Chao <i>et al.</i>	(BELLE Collab.)
CHAO	04B	PRL 93 191802	Y. Chao <i>et al.</i>	(BELLE Collab.)
CHISTOV	04	PRL 93 051803	R. Chistov <i>et al.</i>	(BELLE Collab.)
DRUTSKOY	04	PRL 92 051801	A. Drutskoy <i>et al.</i>	(BELLE Collab.)
GARMASH	04	PR D69 012001	A. Garmash <i>et al.</i>	(BELLE Collab.)
LEE	04	PRL 93 211801	Y.-J. Lee <i>et al.</i>	(BELLE Collab.)
MAJUMDER	04	PR D70 111103	G. Majumder <i>et al.</i>	(BELLE Collab.)
NAKAO	04	PR D69 112001	M. Nakao <i>et al.</i>	(BELLE Collab.)
POLUEKTOV	04	PR D70 072003	A. Poluektov <i>et al.</i>	(BELLE Collab.)
SCHWANDA	04	PRL 93 131803	C. Schwanda <i>et al.</i>	(BELLE Collab.)
WANG	04	PRL 92 131801	M.Z. Wang <i>et al.</i>	(BELLE Collab.)
WANG	04A	PR D70 012001	C.H. Wang <i>et al.</i>	(BELLE Collab.)
ZANG	04	PR D69 017101	S.L. Zang <i>et al.</i>	(BELLE Collab.)
ABE	03B	PR D67 032003	K. Abe <i>et al.</i>	(BELLE Collab.)
ABE	03D	PRL 90 131803	K. Abe <i>et al.</i>	(BELLE Collab.)
ADAM	03	PR D67 032001	N.E. Adam <i>et al.</i>	(CLEO Collab.)
ADAM	03B	PR D68 012004	N.E. Adam <i>et al.</i>	(CLEO Collab.)
ATHAR	03	PR D68 072003	S.B. Athar <i>et al.</i>	(CLEO Collab.)
AUBERT	03K	PRL 90 231801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	03L	PRL 91 021801	B. Aubert <i>et al.</i>	(BABAR Collab.)

AUBERT	03M	PRL 91 051801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	03O	PRL 91 071801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	03U	PRL 91 221802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	03V	PRL 91 171802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	03W	PRL 91 161801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	03X	PR D68 092001	B. Aubert <i>et al.</i>	(BABAR Collab.)
BORNHEIM	03	PR D68 052002	A. Bornheim <i>et al.</i>	(CLEO Collab.)
CHEN	03B	PRL 91 201801	K.-F. Chen <i>et al.</i>	(BELLE Collab.)
CHOI	03	PRL 91 262001	S.-K. Choi <i>et al.</i>	(BELLE Collab.)
CSORNA	03	PR D67 112002	S.E. Csorna <i>et al.</i>	(CLEO Collab.)
EDWARDS	03	PR D68 011102	K.W. Edwards <i>et al.</i>	(CLEO Collab.)
FANG	03	PRL 90 071801	F. Fang <i>et al.</i>	(BELLE Collab.)
HUANG	03	PRL 91 241802	H.-C. Huang <i>et al.</i>	(BELLE Collab.)
ISHIKAWA	03	PRL 91 261601	A. Ishikawa <i>et al.</i>	(BELLE Collab.)
KROKOVNY	03B	PRL 91 262002	P. Krokovny <i>et al.</i>	(BELLE Collab.)
SWAIN	03	PR D68 051101	S.K. Swain <i>et al.</i>	(BELLE Collab.)
UNNO	03	PR D68 011103	Y. Unno <i>et al.</i>	(BELLE Collab.)
ZHANG	03B	PRL 91 221801	J. Zhang <i>et al.</i>	(BELLE Collab.)
ABE	02	PRL 88 021801	K. Abe <i>et al.</i>	(BELLE Collab.)
ABE	02B	PRL 88 031802	K. Abe <i>et al.</i>	(BELLE Collab.)
ABE	02H	PRL 88 171801	K. Abe <i>et al.</i>	(BELLE Collab.)
ABE	02K	PRL 88 181803	K. Abe <i>et al.</i>	(BELLE Collab.)
ABE	02N	PL B538 11	K. Abe <i>et al.</i>	(BELLE Collab.)
ABE	02O	PR D65 091103	K. Abe <i>et al.</i>	(BELLE Collab.)
ABE	02W	PRL 89 151802	K. Abe <i>et al.</i>	(BELLE Collab.)
ACOSTA	02C	PR D65 092009	D. Acosta <i>et al.</i>	(CDF Collab.)
ACOSTA	02F	PR D66 052005	D. Acosta <i>et al.</i>	(CDF Collab.)
AHMED	02B	PR D66 031101	S. Ahmed <i>et al.</i>	(CLEO Collab.)
AUBERT	02	PR D65 032001	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	02C	PRL 88 101805	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	02E	PR D65 051101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	02F	PR D65 091101	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	02L	PRL 88 241801	B. Aubert <i>et al.</i>	(BABAR Collab.)
BRIERE	02	PRL 89 081803	R. Briere <i>et al.</i>	(CLEO Collab.)
CASEY	02	PR D66 092002	B.C.K. Casey <i>et al.</i>	(BELLE Collab.)
CHEN	02B	PL B546 196	K.-F. Chen <i>et al.</i>	(BELLE Collab.)
DRUTSKOY	02	PL B542 171	A. Drutskoy <i>et al.</i>	(BELLE Collab.)
DYTMAN	02	PR D66 091101	S.A. Dytman <i>et al.</i>	(CLEO Collab.)
ECKHART	02	PRL 89 251801	E. Eckhart <i>et al.</i>	(CLEO Collab.)
EDWARDS	02B	PR D65 111102	K.W. Edwards <i>et al.</i>	(CLEO Collab.)
GABYSHEV	02	PR D66 091102	N. Gabyshev <i>et al.</i>	(BELLE Collab.)
GARMASH	02	PR D65 092005	A. Garmash <i>et al.</i>	(BELLE Collab.)
GODANG	02	PRL 88 021802	R. Godang <i>et al.</i>	(CLEO Collab.)
GORDON	02	PL B542 183	A. Gordon <i>et al.</i>	(BELLE Collab.)
LU	02	PRL 89 191801	R.-S. Lu <i>et al.</i>	(BELLE Collab.)
MAHAPATRA	02	PRL 88 101803	R. Mahapatra <i>et al.</i>	(CLEO Collab.)
NISHIDA	02	PRL 89 231801	S. Nishida <i>et al.</i>	(BELLE Collab.)
ABE	01H	PRL 87 101801	K. Abe <i>et al.</i>	(BELLE Collab.)
ABE	01I	PRL 87 111801	K. Abe <i>et al.</i>	(BELLE Collab.)
ABE	01K	PR D64 071101	K. Abe <i>et al.</i>	(BELLE Collab.)
ABE	01L	PRL 87 161601	K. Abe <i>et al.</i>	(BELLE Collab.)
ABE	01M	PL B517 309	K. Abe <i>et al.</i>	(BELLE Collab.)
ALEXANDER	01B	PR D64 092001	J.P. Alexander <i>et al.</i>	(CLEO Collab.)
AMMAR	01B	PRL 87 271801	R. Ammar <i>et al.</i>	(CLEO Collab.)
ANDERSON	01B	PRL 87 181803	S. Anderson <i>et al.</i>	(CLEO Collab.)
AUBERT	01D	PRL 87 151801	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	01E	PRL 87 151802	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	01F	PRL 87 201803	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	01G	PRL 87 221802	B. Aubert <i>et al.</i>	(BABAR Collab.)
BARATE	01E	EPJ C19 213	R. Barate <i>et al.</i>	(ALEPH Collab.)
BRIERE	01	PRL 86 3718	R.A. Biere <i>et al.</i>	(CLEO Collab.)
BROWDER	01	PRL 86 2950	T.E. Browder <i>et al.</i>	(CLEO Collab.)
EDWARDS	01	PRL 86 30	K.W. Edwards <i>et al.</i>	(CLEO Collab.)
GRITSAN	01	PR D64 077501	A. Gritsan <i>et al.</i>	(CLEO Collab.)
RICHICHI	01	PR D63 031103	S.J. Richichi <i>et al.</i>	(CLEO Collab.)
ABBIENDI	00B	PL B476 233	G. Abbiendi <i>et al.</i>	(OPAL Collab.)
ABE	00C	PR D62 071101	K. Abe <i>et al.</i>	(SLD Collab.)
AHMED	00B	PR D62 112003	S. Ahmed <i>et al.</i>	(CLEO Collab.)
ANASTASSOV	00	PRL 84 1393	A. Anastassov <i>et al.</i>	(CLEO Collab.)
BARATE	00R	PL B492 275	R. Barate <i>et al.</i>	(ALEPH Collab.)
BEHRENS	00	PR D61 052001	B.H. Behrens <i>et al.</i>	(CLEO Collab.)

BONVICINI	00	PRL 84 5940	G. Bonvicini <i>et al.</i>	(CLEO Collab.)
CHEN	00	PRL 85 525	S. Chen <i>et al.</i>	(CLEO Collab.)
COAN	00	PRL 84 5283	T.E. Coan <i>et al.</i>	(CLEO Collab.)
CRONIN-HEN...	00	PRL 85 515	D. Cronin-Hennessy <i>et al.</i>	(CLEO Collab.)
CSORNA	00	PR D61 111101	S.E. Csorna <i>et al.</i>	(CLEO Collab.)
JESSOP	00	PRL 85 2881	C.P. Jessop <i>et al.</i>	(CLEO Collab.)
RICHICHI	00	PRL 85 520	S.J. Richichi <i>et al.</i>	(CLEO Collab.)
ABBIENDI	99J	EPJ C12 609	G. Abbiendi <i>et al.</i>	(OPAL Collab.)
AFFOLDER	99B	PRL 83 3378	T. Affolder <i>et al.</i>	(CDF Collab.)
BARTELT	99	PRL 82 3746	J. Bartelt <i>et al.</i>	(CLEO Collab.)
COAN	99	PR D59 111101	T.E. Coan <i>et al.</i>	(CLEO Collab.)
ABE	98B	PR D57 5382	F. Abe <i>et al.</i>	(CDF Collab.)
ABE	98O	PR D58 072001	F. Abe <i>et al.</i>	(CDF Collab.)
ABE	98Q	PR D58 092002	F. Abe <i>et al.</i>	(CDF Collab.)
ACCIARRI	98S	PL B438 417	M. Acciarri <i>et al.</i>	(L3 Collab.)
ANASTASSOV	98	PRL 80 4127	A. Anastassov <i>et al.</i>	(CLEO Collab.)
ATHANAS	98	PRL 80 5493	M. Athanas <i>et al.</i>	(CLEO Collab.)
BARATE	98Q	EPJ C4 387	R. Barate <i>et al.</i>	(ALEPH Collab.)
BEHRENS	98	PRL 80 3710	B.H. Behrens <i>et al.</i>	(CLEO Collab.)
BERGFELD	98	PRL 81 272	T. Bergfeld <i>et al.</i>	(CLEO Collab.)
BRANDENB...	98	PRL 80 2762	G. Brandenbrug <i>et al.</i>	(CLEO Collab.)
CAPRINI	98	NP B530 153	I. Caprini, L. Lellouch, M. Neubert	(BCIP, CERN)
GODANG	98	PRL 80 3456	R. Godang <i>et al.</i>	(CLEO Collab.)
ABE	97J	PRL 79 590	K. Abe <i>et al.</i>	(SLD Collab.)
ACCIARRI	97F	PL B396 327	M. Acciarri <i>et al.</i>	(L3 Collab.)
ARTUSO	97	PL B399 321	M. Artuso <i>et al.</i>	(CLEO Collab.)
ATHANAS	97	PRL 79 2208	M. Athanas <i>et al.</i>	(CLEO Collab.)
BROWDER	97	PR D56 11	T. Browder <i>et al.</i>	(CLEO Collab.)
FU	97	PRL 79 3125	X. Fu <i>et al.</i>	(CLEO Collab.)
JESSOP	97	PRL 79 4533	C.P. Jessop <i>et al.</i>	(CLEO Collab.)
ABE	96B	PR D53 3496	F. Abe <i>et al.</i>	(CDF Collab.)
ABE	96C	PRL 76 4462	F. Abe <i>et al.</i>	(CDF Collab.)
ABE	96H	PRL 76 2015	F. Abe <i>et al.</i>	(CDF Collab.)
ABE	96L	PRL 76 4675	F. Abe <i>et al.</i>	(CDF Collab.)
ABE	96Q	PR D54 6596	F. Abe <i>et al.</i>	(CDF Collab.)
ABE	96R	PRL 77 5176	F. Abe <i>et al.</i>	(CDF Collab.)
ADAM	96D	ZPHY C72 207	W. Adam <i>et al.</i>	(DELPHI Collab.)
ALEXANDER	96T	PRL 77 5000	J.P. Alexander <i>et al.</i>	(CLEO Collab.)
ASNER	96	PR D53 1039	D.M. Asner <i>et al.</i>	(CLEO Collab.)
BARISH	96B	PRL 76 1570	B.C. Barish <i>et al.</i>	(CLEO Collab.)
BERGFELD	96B	PRL 77 4503	T. Bergfeld <i>et al.</i>	(CLEO Collab.)
BISHAI	96	PL B369 186	M. Bishai <i>et al.</i>	(CLEO Collab.)
BUSKULIC	96J	ZPHY C71 31	D. Buskulic <i>et al.</i>	(ALEPH Collab.)
GIBAUT	96	PR D53 4734	D. Gibaut <i>et al.</i>	(CLEO Collab.)
PDG	96	PR D54 1	R. M. Barnett <i>et al.</i>	(PDG Collab.)
ABREU	95N	PL B357 255	P. Abreu <i>et al.</i>	(DELPHI Collab.)
ABREU	95Q	ZPHY C68 13	P. Abreu <i>et al.</i>	(DELPHI Collab.)
ADAM	95	ZPHY C68 363	W. Adam <i>et al.</i>	(DELPHI Collab.)
AKERS	95T	ZPHY C67 379	R. Akers <i>et al.</i>	(OPAL Collab.)
ALBRECHT	95D	PL B353 554	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALEXANDER	95	PL B341 435	J. Alexander <i>et al.</i>	(CLEO Collab.)
Also		PL B347 469 (erratum)	J. Alexander <i>et al.</i>	(CLEO Collab.)
ARTUSO	95	PRL 75 785	M. Artuso <i>et al.</i>	(CLEO Collab.)
BARISH	95	PR D51 1014	B.C. Barish <i>et al.</i>	(CLEO Collab.)
BUSKULIC	95	PL B343 444	D. Buskulic <i>et al.</i>	(ALEPH Collab.)
ABE	94D	PRL 72 3456	F. Abe <i>et al.</i>	(CDF Collab.)
ALAM	94	PR D50 43	M.S. Alam <i>et al.</i>	(CLEO Collab.)
ALBRECHT	94D	PL B335 526	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ATHANAS	94	PRL 73 3503	M. Athanas <i>et al.</i>	(CLEO Collab.)
Also		PRL 74 3090 (erratum)	M. Athanas <i>et al.</i>	(CLEO Collab.)
PDG	94	PR D50 1173	L. Montanet <i>et al.</i>	(CERN, LBL, BOST+)
STONE	94	HEPSY 93-11	S. Stone	
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ABREU	93D	ZPHY C57 181	P. Abreu <i>et al.</i>	(DELPHI Collab.)
ABREU	93G	PL B312 253	P. Abreu <i>et al.</i>	(DELPHI Collab.)
ACTON	93C	PL B307 247	P.D. Acton <i>et al.</i>	(OPAL Collab.)
ALBRECHT	93E	ZPHY C60 11	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALEXANDER	93B	PL B319 365	J. Alexander <i>et al.</i>	(CLEO Collab.)
AMMAR	93	PRL 71 674	R. Ammar <i>et al.</i>	(CLEO Collab.)
BEAN	93B	PRL 70 2681	A. Bean <i>et al.</i>	(CLEO Collab.)



BUSKULIC	93D	PL B307 194	D. Buskalic <i>et al.</i>	(ALEPH Collab.)
Also		PL B325 537 (erratum)	D. Buskalic <i>et al.</i>	(ALEPH Collab.)
SANGHERA	93	PR D47 791	S. Sanghera <i>et al.</i>	(CLEO Collab.)
ALBRECHT	92C	PL B275 195	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	92E	PL B277 209	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	92G	ZPHY C54 1	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
BORTOLETTO	92	PR D45 21	D. Bortoletto <i>et al.</i>	(CLEO Collab.)
BUSKULIC	92G	PL B295 396	D. Buskalic <i>et al.</i>	(ALEPH Collab.)
ALBRECHT	91B	PL B254 288	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	91C	PL B255 297	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	91E	PL B262 148	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
BERKELMAN	91	ARNPS 41 1	K. Berkelman, S. Stone	(CORN, SYRA)
"Decays of <i>B</i> Mesons"				
FULTON	91	PR D43 651	R. Fulton <i>et al.</i>	(CLEO Collab.)
ALBRECHT	90B	PL B241 278	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	90J	ZPHY C48 543	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ANTREASYAN	90B	ZPHY C48 553	D. Antreasyan <i>et al.</i>	(Crystal Ball Collab.)
BORTOLETTO	90	PRL 64 2117	D. Bortoletto <i>et al.</i>	(CLEO Collab.)
Also		PR D45 21	D. Bortoletto <i>et al.</i>	(CLEO Collab.)
WEIR	90B	PR D41 1384	A.J. Weir <i>et al.</i>	(Mark II Collab.)
ALBRECHT	89G	PL B229 304	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
AVERY	89B	PL B223 470	P. Avery <i>et al.</i>	(CLEO Collab.)
BEBEK	89	PRL 62 8	C. Bebek <i>et al.</i>	(CLEO Collab.)
BORTOLETTO	89	PRL 62 2436	D. Bortoletto <i>et al.</i>	(CLEO Collab.)
ALBRECHT	88F	PL B209 119	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	88K	PL B215 424	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	87C	PL B185 218	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	87D	PL B199 451	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
AVERY	87	PL B183 429	P. Avery <i>et al.</i>	(CLEO Collab.)
BEBEK	87	PR D36 1289	C. Bebek <i>et al.</i>	(CLEO Collab.)
ALAM	86	PR D34 3279	M.S. Alam <i>et al.</i>	(CLEO Collab.)
PDG	86	PL 170B 1	M. Aguilar-Benitez <i>et al.</i>	(CERN, CIT+)
GILES	84	PR D30 2279	R. Giles <i>et al.</i>	(CLEO Collab.)