

$f_0(1370)$

$$I^G(J^{PC}) = 0^+(0^{++})$$

See the review on "Spectroscopy of Light Meson Resonances" and a note on "Non- $q\bar{q}$ Candidates" in PDG 06, Journal of Physics **G33** 1 (2006).

 $f_0(1370)$ T-MATRIX POLE POSITION

Note that $\Gamma \approx 2 \operatorname{Im}(\sqrt{s_{\text{pole}}})$.

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
(1200–1500)–i(150–250) OUR ESTIMATE			
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$(1370 \pm 40) - i(195 \pm 20)$	SARANTSEV	21	RVUE $J/\psi(1S) \rightarrow \gamma(\pi\pi, K\bar{K}, \eta\eta, \omega\phi)$
$(1280.6 \pm 1.6 \pm 47.4) - i(205.2 \pm 1.7 \pm 20.7)$	¹ ALBRECHT	20	RVUE $0.9 \bar{p}p \rightarrow \pi^0\pi^0\eta, \pi^0\eta\eta, \pi^0K^+K^-$
$(1290 \pm 50) - i(170^{+20}_{-40})$	² ANISOVICH	09	RVUE $0.0 \bar{p}p, \pi N$
$(1373 \pm 15) - i(137 \pm 10)$	³ BARGIOTTI	03	OBLX $\bar{p}p$
$(1302 \pm 17) - i(166 \pm 18)$	⁴ BARBERIS	00C	$450 pp \rightarrow p_f 4\pi p_S$
$(1312 \pm 25 \pm 10) - i(109 \pm 22 \pm 15)$	BARBERIS	99D	OMEG $450 pp \rightarrow K^+K^-, \pi^+\pi^-$
$(1406 \pm 19) - i(80 \pm 6)$	⁵ KAMINSKI	99	RVUE $\pi\pi \rightarrow \pi\pi, K\bar{K}, \sigma\sigma$
$(1300 \pm 20) - i(120 \pm 20)$	ANISOVICH	98B	RVUE Compilation
$(1290 \pm 15) - i(145 \pm 15)$	BARBERIS	97B	OMEG $450 pp \rightarrow pp2(\pi^+\pi^-)$
$(1548 \pm 40) - i(560 \pm 40)$	BERTIN	97C	OBLX $0.0 \bar{p}p \rightarrow \pi^+\pi^-\pi^0$
$(1380 \pm 40) - i(180 \pm 25)$	ABELE	96B	CBAR $0.0 \bar{p}p \rightarrow \pi^0K_L^0K_L^0$
$(1300 \pm 15) - i(115 \pm 8)$	BUGG	96	RVUE
$(1330 \pm 50) - i(150 \pm 40)$	⁶ AMSLER	95B	CBAR $\bar{p}p \rightarrow 3\pi^0$
$(1360 \pm 35) - i(150-300)$	⁶ AMSLER	95C	CBAR $\bar{p}p \rightarrow \pi^0\eta\eta$
$(1390 \pm 30) - i(190 \pm 40)$	⁷ AMSLER	95D	CBAR $\bar{p}p \rightarrow 3\pi^0, \pi^0\eta\eta, \pi^0\pi^0\eta$
$1346 - i249$	^{8,9} JANSSEN	95	RVUE $\pi\pi \rightarrow \pi\pi, K\bar{K}$
$1214 - i168$	^{9,10} TORNQVIST	95	RVUE $\pi\pi \rightarrow \pi\pi, K\bar{K}, K\pi, \eta\pi$
$1364 - i139$	AMSLER	94D	CBAR $\bar{p}p \rightarrow \pi^0\pi^0\eta$
$(1365^{+20}_{-55}) - i(134 \pm 35)$	ANISOVICH	94	CBAR $\bar{p}p \rightarrow 3\pi^0, \pi^0\eta\eta$
$(1340 \pm 40) - i(127^{+30}_{-20})$	¹¹ BUGG	94	RVUE $\bar{p}p \rightarrow 3\pi^0, \eta\eta\pi^0, \eta\pi^0\pi^0$
$(1430 \pm 5) - i(73 \pm 13)$	¹² KAMINSKI	94	RVUE $\pi\pi \rightarrow \pi\pi, K\bar{K}$
$1420 - i220$	¹³ AU	87	RVUE $\pi\pi \rightarrow \pi\pi, K\bar{K}$

¹ T-matrix pole, 5 poles, 5 channels, including scattering data from HYAMS 75 ($\pi\pi$), LONGACRE 86 ($K\bar{K}$), BINON 83 ($\eta\eta$), and BINON 84C ($\eta\eta'$).

² Another pole is found at $(1510 \pm 130) - i(800^{+100}_{-150})$ MeV.

³ Coupled channel analysis of $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, and $K^\pm K_S^0\pi^\mp$.

⁴ Average between $\pi^+\pi^-\pi^0$ and $2(\pi^+\pi^-)$.

⁵ T-matrix pole on sheet ---.

⁶ Supersedes ANISOVICH 94.

⁷ Coupled-channel analysis of $\bar{p}p \rightarrow 3\pi^0, \pi^0\eta\eta$, and $\pi^0\pi^0\eta$ on sheet IV. Demonstrates explicitly that $f_0(500)$ and $f_0(1370)$ are two different poles.

⁸ Analysis of data from FALVARD 88.

⁹ The pole is on Sheet III. Demonstrates explicitly that $f_0(500)$ and $f_0(1370)$ are two different poles.

¹⁰ Uses data from BEIER 72B, OCHS 73, HYAMS 73, GRAYER 74, ROSSELET 77, CASON 83, ASTON 88, and ARMSTRONG 91B. Coupled channel analysis with flavor symmetry and all light two-pseudoscalars systems.

¹¹ Reanalysis of ANISOVICH 94 data.

¹² T-matrix pole on sheet III.

¹³ Analysis of data from OCHS 73, GRAYER 74, BECKER 79, and CASON 83.

$f_0(1370)$ BREIT-WIGNER MASS

VALUE (MeV)

DOCUMENT ID

1200 to 1500 OUR ESTIMATE

$\pi\pi$ MODE

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1400 ± 40		¹ AUBERT 09L	BABR	$B^\pm \rightarrow \pi^\pm \pi^\pm \pi^\mp$
1470 ⁺ ₋ 6 ⁺ ₇ 72 ₂₅₅		² UEHARA 08A	BELL	10.6 $e^+e^- \rightarrow e^+e^-\pi^0\pi^0$
1259 ± 55	2.6k	BONVICINI 07	CLEO	$D^+ \rightarrow \pi^-\pi^+\pi^+$
1309 ± 1 ± 15		³ BUGG 07A	RVUE	0.0 $p\bar{p} \rightarrow 3\pi^0$
1449 ± 13	4.3k	⁴ GARMASH 06	BELL	$B^+ \rightarrow K^+\pi^+\pi^-$
1350 ± 50		ABLIKIM 05	BES2	$J/\psi \rightarrow \phi\pi^+\pi^-$
1265 ± 30 ⁺ ₋ 20 ₃₅		ABLIKIM 05Q	BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$
1434 ± 18 ± 9	848	AITALA 01A	E791	$D_s^+ \rightarrow \pi^-\pi^+\pi^+$
1308 ± 10		BARBERIS 99B	OMEG	450 $pp \rightarrow p_s p_f \pi^+\pi^-$
1315 ± 50		BELLAZZINI 99	GAM4	450 $pp \rightarrow pp\pi^0\pi^0$
1315 ± 30		ALDE 98	GAM4	100 $\pi^-p \rightarrow \pi^0\pi^0n$
1280 ± 55		BERTIN 98	OBLX	0.05–0.405 $\bar{p}p \rightarrow \pi^+\pi^+\pi^-$
1186		^{5,6} TORNQVIST 95	RVUE	$\pi\pi \rightarrow \pi\pi, K\bar{K}, K\pi, \eta\pi$
1472 ± 12		ARMSTRONG 91	OMEG	300 $pp \rightarrow pp\pi\pi, ppK\bar{K}$
1275 ± 20		BREAKSTONE 90	SFM	62 $pp \rightarrow pp\pi^+\pi^-$
1420 ± 20		AKESSON 86	SPEC	63 $pp \rightarrow pp\pi^+\pi^-$
1256		FROGGATT 77	RVUE	$\pi^+\pi^-$ channel

¹ Breit-Wigner mass.

² Breit-Wigner mass. May also be the $f_0(1500)$.

³ Reanalysis of ABELE 96C data.

⁴ Also observed by GARMASH 07 in $B^0 \rightarrow K_S^0\pi^+\pi^-$ decays. Supersedes GARMASH 05.

⁵ Uses data from BEIER 72B, OCHS 73, HYAMS 73, GRAYER 74, ROSSELET 77, CASON 83, ASTON 88, and ARMSTRONG 91B. Coupled channel analysis with flavor symmetry and all light two-pseudoscalars systems.

⁶ Also observed by ASNER 00 in $\tau^- \rightarrow \pi^-\pi^0\pi^0\nu_\tau$ decays

$K\bar{K}$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$1422 \pm 15 \pm 28$		¹ AAIJ	19H LHCb	$p\bar{p} \rightarrow D^\pm X$
$1360 \pm 31 \pm 28$	430	^{2,3} DOBBS	15	$J/\psi \rightarrow \gamma K^+ K^-$
$1350 \pm 48 \pm 15$	168	^{2,3} DOBBS	15	$\psi(2S) \rightarrow \gamma K^+ K^-$
1440 ± 6		VLADIMIRSK...06	SPEC	$40 \pi^- p \rightarrow K_S^0 K_S^0 n$
1391 ± 10		TIKHOMIROV 03	SPEC	$40.0 \pi^- C \rightarrow K_S^0 K_S^0 K_L^0 X$
1440 ± 50		BOLONKIN 88	SPEC	$40 \pi^- p \rightarrow K_S^0 K_S^0 n$
1463 ± 9		ETKIN 82B	MPS	$23 \pi^- p \rightarrow n 2K_S^0$
1425 ± 15		WICKLUND 80	SPEC	$6 \pi N \rightarrow K^+ K^- N$
~ 1300		POLYCHRO... 79	STRC	$7 \pi^- p \rightarrow n 2K_S^0$

¹ From the $D^\pm \rightarrow K^\pm K^+ K^-$ Dalitz plot fit with the isobar model A.

² Using CLEO-c data but not authored by the CLEO Collaboration.

³ From a fit to a Breit-Wigner line shape with fixed $\Gamma = 346$ MeV.

 4π MODE $2(\pi\pi)_S + \rho\rho$

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1395 ± 40		ABELE 01	CBAR	$0.0 \bar{p}d \rightarrow \pi^- 4\pi^0 p$
1374 ± 38		AMSLER 94	CBAR	$0.0 \bar{p}p \rightarrow \pi^+ \pi^- 3\pi^0$
1345 ± 12		ADAMO 93	OBLX	$\bar{n}p \rightarrow 3\pi^+ 2\pi^-$
1386 ± 30		GASPERO 93	DBC	$0.0 \bar{p}n \rightarrow 2\pi^+ 3\pi^-$
~ 1410	5751	¹ BETTINI 66	DBC	$0.0 \bar{p}n \rightarrow 2\pi^+ 3\pi^-$

¹ $\rho\rho$ dominant.

 $\eta\eta$ MODE

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$1262^{+51+82}_{-78-103}$	¹ UEHARA 10A	BELL	$10.6 e^+ e^- \rightarrow e^+ e^- \eta\eta$
1430	AMSLER 92	CBAR	$0.0 \bar{p}p \rightarrow \pi^0 \eta\eta$
1220 ± 40	ALDE 86D	GAM4	$100 \pi^- p \rightarrow n 2\eta$

¹ Breit-Wigner mass. May also be the $f_0(1500)$.

COUPLED CHANNEL MODE

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$1330.2^{+5.9}_{-6.5} \pm 5.1$	¹ AAIJ 19H	LHCb	$p\bar{p} \rightarrow D^\pm X$
1306 ± 20	² ANISOVICH 03	RVUE	

¹ From the $D^\pm \rightarrow K^\pm K^+ K^-$ Dalitz plot fit with the Triple-M amplitude in the multi-meson model of AOUDE 18.

² K-matrix pole from combined analysis of $\pi^- p \rightarrow \pi^0 \pi^0 n$, $\pi^- p \rightarrow K\bar{K}n$, $\pi^+ \pi^- \rightarrow \pi^+ \pi^-$, $\bar{p}p \rightarrow \pi^0 \pi^0 \pi^0$, $\pi^0 \eta\eta$, $\pi^0 \pi^0 \eta$, $\pi^+ \pi^- \pi^0$, $K^+ K^- \pi^0$, $K_S^0 K_S^0 \pi^0$, $K^+ K_S^0 \pi^-$ at rest, $\bar{p}n \rightarrow \pi^- \pi^- \pi^+$, $K_S^0 K^- \pi^0$, $K_S^0 K_S^0 \pi^-$ at rest.

$f_0(1370)$ BREIT-WIGNER WIDTHVALUE (MeV)DOCUMENT ID**200 to 500 OUR ESTIMATE** **$\pi\pi$ MODE**

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
300 ± 80		¹ AUBERT	09L BABR	$B^\pm \rightarrow \pi^\pm \pi^\pm \pi^\mp$
$90^{+2}_{-1} \quad 2^{+50}_{-22}$		² UEHARA	08A BELL	10.6 $e^+ e^- \rightarrow e^+ e^- \pi^0 \pi^0$
298 ± 21	2.6k	BONVICINI	07 CLEO	$D^+ \rightarrow \pi^- \pi^+ \pi^+$
126 ± 25	4286	³ GARMASH	06 BELL	$B^+ \rightarrow K^+ \pi^+ \pi^-$
265 ± 40		ABLIKIM	05 BES2	$J/\psi \rightarrow \phi \pi^+ \pi^-$
$350 \pm 100^{+105}_{-60}$		ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$
173 ± 32 ± 6	848	AITALA	01A E791	$D_s^+ \rightarrow \pi^- \pi^+ \pi^+$
222 ± 20		BARBERIS	99B OMEG	450 $pp \rightarrow p_s p_f \pi^+ \pi^-$
255 ± 60		BELLAZZINI	99 GAM4	450 $pp \rightarrow pp \pi^0 \pi^0$
190 ± 50		ALDE	98 GAM4	100 $\pi^- p \rightarrow \pi^0 \pi^0 n$
323 ± 13		BERTIN	98 OBLX	0.05–0.405 $\bar{n} p \rightarrow \pi^+ \pi^+ \pi^-$
350		^{4,5} TORNQVIST	95 RVUE	$\pi\pi \rightarrow \pi\pi, K\bar{K}, K\pi, \eta\pi$
195 ± 33		ARMSTRONG	91 OMEG	300 $pp \rightarrow pp\pi\pi, ppK\bar{K}$
285 ± 60		BREAKSTONE	90 SFM	62 $pp \rightarrow pp\pi^+ \pi^-$
460 ± 50		AKESSON	86 SPEC	63 $pp \rightarrow pp\pi^+ \pi^-$
~ 400		⁶ FROGGATT	77 RVUE	$\pi^+ \pi^-$ channel

¹ The systematic errors are not reported.² Breit-Wigner width. May also be the $f_0(1500)$.³ Also observed by GARMASH 07 in $B^0 \rightarrow K_S^0 \pi^+ \pi^-$ decays. Supersedes GARMASH 05.⁴ Uses data from BEIER 72B, OCHS 73, HYAMS 73, GRAYER 74, ROSSELET 77, CASON 83, ASTON 88, and ARMSTRONG 91B. Coupled channel analysis with flavor symmetry and all light two-pseudoscalars systems.⁵ Also observed by ASNER 00 in $\tau^- \rightarrow \pi^- \pi^0 \pi^0 \nu_\tau$ decays⁶ Width defined as distance between 45 and 135° phase shift. **$K\bar{K}$ MODE**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
324 ± 38 ± 42	¹ AAIJ	19H LHCb	$pp \rightarrow D^\pm X$
121 ± 15	VLADIMIRSK..06	SPEC	40 $\pi^- p \rightarrow K_S^0 K_S^0 n$
55 ± 26	TIKHOMIROV 03	SPEC	40.0 $\pi^- C \rightarrow K_S^0 K_S^0 K_L^0 X$
250 ± 80	BOLONKIN 88	SPEC	40 $\pi^- p \rightarrow K_S^0 K_S^0 n$
118^{+138}_{-16}	ETKIN 82B	MPS	23 $\pi^- p \rightarrow n 2K_S^0$
160 ± 30	WICKLUND 80	SPEC	6 $\pi N \rightarrow K^+ K^- N$
~ 150	POLYCHRO... 79	STRC	7 $\pi^- p \rightarrow n 2K_S^0$

¹ From the $D^\pm \rightarrow K^\pm K^+ K^-$ Dalitz plot fit with the isobar model A.

4π MODE 2(ππ)_S+ρρ

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
275 ± 55		ABELE	01	CBAR 0.0 $\bar{p}d \rightarrow \pi^- 4\pi^0 p$
375 ± 61		AMSLER	94	CBAR 0.0 $\bar{p}p \rightarrow \pi^+ \pi^- 3\pi^0$
398 ± 26		ADAMO	93	OBLX $\bar{n}p \rightarrow 3\pi^+ 2\pi^-$
310 ± 50		GASPERO	93	DBC 0.0 $\bar{p}n \rightarrow 2\pi^+ 3\pi^-$
~ 90	5751	¹ BETTINI	66	DBC 0.0 $\bar{p}n \rightarrow 2\pi^+ 3\pi^-$
¹ ρρ dominant.				

ηη MODE

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
484 ⁺²⁴⁶⁺²⁴⁶ ₋₁₇₀₋₂₆₃	¹ UEHARA	10A	BELL 10.6 $e^+e^- \rightarrow e^+e^-\eta\eta$
250	AMSLER	92	CBAR 0.0 $\bar{p}p \rightarrow \pi^0\eta\eta$
320 ± 40	ALDE	86D	GAM4 100 $\pi^-p \rightarrow n2\eta$
¹ Breit-Wigner width. May also be the $f_0(1500)$.			

COUPLED CHANNEL MODE

VALUE (MeV)	DOCUMENT ID	TECN
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●		
147 ⁺³⁰ ₋₅₀	¹ ANISOVICH	03 RVUE
¹ K-matrix pole from combined analysis of $\pi^-p \rightarrow \pi^0\pi^0n$, $\pi^-p \rightarrow K\bar{K}n$, $\pi^+\pi^- \rightarrow \pi^+\pi^-$, $\bar{p}p \rightarrow \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$, $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, $K_S^0K_S^0\pi^0$, $K^+K_S^0\pi^-$ at rest, $\bar{p}n \rightarrow \pi^-\pi^-\pi^+$, $K_S^0K^-\pi^0$, $K_S^0K_S^0\pi^-$ at rest.		

f₀(1370) DECAY MODES

Mode	Fraction (Γ _i /Γ)
Γ ₁ ππ	seen
Γ ₂ 4π	seen
Γ ₃ 4π ⁰	seen
Γ ₄ 2π ⁺ 2π ⁻	seen
Γ ₅ π ⁺ π ⁻ 2π ⁰	seen
Γ ₆ ρρ	seen
Γ ₇ 2(ππ) _S -wave	seen
Γ ₈ π(1300)π	seen
Γ ₉ a ₁ (1260)π	seen
Γ ₁₀ ηη	seen
Γ ₁₁ K \bar{K}	seen
Γ ₁₂ K \bar{K} nπ	not seen

Γ_{13}	6π	not seen
Γ_{14}	$\omega\omega$	not seen
Γ_{15}	$\gamma\gamma$	seen
Γ_{16}	e^+e^-	not seen

$f_0(1370)$ PARTIAL WIDTHS

$\Gamma(\gamma\gamma)$ Γ_{15}
See $\gamma\gamma$ widths under $f_0(500)$ and MORGAN 90.

$\Gamma(e^+e^-)$ Γ_{16}

VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
<20	90	VOROBYEV 88	ND	$e^+e^- \rightarrow \pi^0\pi^0$

$f_0(1370)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$\Gamma(\eta\eta) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{10}\Gamma_{15}/\Gamma$

VALUE (eV)	DOCUMENT ID	TECN	COMMENT
------------	-------------	------	---------

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

$121^{+133}_{-53} + 169_{-106}$	¹ UEHARA	10A	BELL	10.6 $e^+e^- \rightarrow e^+e^-\eta\eta$
---------------------------------	---------------------	-----	------	--

¹Including interference with the $f'_2(1525)$ (parameters fixed to the values from the 2008 edition of this review, PDG 08) and $f_2(1270)$. May also be the $f_0(1500)$.

$f_0(1370)$ BRANCHING RATIOS

$\Gamma(\pi\pi)/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
-------	-----	-------------	------	---------

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

<0.10	95	OCHS	13	RVUE
0.26 ± 0.09		BUGG	96	RVUE
<0.15		¹ AMSLER	94	CBAR $\bar{p}p \rightarrow \pi^+\pi^-3\pi^0$
<0.06		GASPERO	93	DBC $0.0 \bar{p}n \rightarrow \text{hadrons}$

¹Using AMSLER 95B ($3\pi^0$).

$\Gamma(4\pi)/\Gamma_{\text{total}}$ $\Gamma_2/\Gamma = (\Gamma_3 + \Gamma_4 + \Gamma_5)/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
-------	-------------	------	---------

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

>0.72	GASPERO	93	DBC	$0.0 \bar{p}n \rightarrow \text{hadrons}$
-------	---------	----	-----	---

$\Gamma(4\pi^0)/\Gamma(4\pi)$ Γ_3/Γ_2

VALUE	DOCUMENT ID	TECN	COMMENT
-------	-------------	------	---------

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

seen	ABELE	96	CBAR	$0.0 \bar{p}p \rightarrow 5\pi^0$
0.068 ± 0.005	¹ GASPERO	93	DBC	$0.0 \bar{p}n \rightarrow \text{hadrons}$

¹Model-dependent evaluation.

$$\Gamma(2\pi^+2\pi^-)/\Gamma(4\pi) \qquad \Gamma_4/\Gamma_2 = \Gamma_4/(\Gamma_3+\Gamma_4+\Gamma_5)$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
--------------	--------------------	-------------	----------------

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

0.420±0.014	¹ GASPERO	93	DBC 0.0 $\bar{p}n \rightarrow 2\pi^+3\pi^-$
-------------	----------------------	----	---

¹ Model-dependent evaluation.

$$\Gamma(\pi^+\pi^-2\pi^0)/\Gamma(4\pi) \qquad \Gamma_5/\Gamma_2 = \Gamma_5/(\Gamma_3+\Gamma_4+\Gamma_5)$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
--------------	--------------------	-------------	----------------

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

0.512±0.019	¹ GASPERO	93	DBC 0.0 $\bar{p}n \rightarrow$ hadrons
-------------	----------------------	----	--

¹ Model-dependent evaluation.

$$\Gamma(\rho\rho)/\Gamma(4\pi) \qquad \Gamma_6/\Gamma_2$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
--------------	--------------------	-------------	----------------

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

0.26±0.07	ABELE	01B	CBAR 0.0 $\bar{p}d \rightarrow 5\pi p$
-----------	-------	-----	--

$$\Gamma(2(\pi\pi)_{S\text{-wave}})/\Gamma(\pi\pi) \qquad \Gamma_7/\Gamma_1$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
--------------	--------------------	-------------	----------------

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

5.6±2.6	¹ ABELE	01	CBAR 0.0 $\bar{p}d \rightarrow \pi^-4\pi^0 p$
---------	--------------------	----	---

¹ From the combined data of ABELE 96 and ABELE 96C.

$$\Gamma(2(\pi\pi)_{S\text{-wave}})/\Gamma(4\pi) \qquad \Gamma_7/\Gamma_2$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
--------------	--------------------	-------------	----------------

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

0.51±0.09	ABELE	01B	CBAR 0.0 $\bar{p}d \rightarrow 5\pi p$
-----------	-------	-----	--

$$\Gamma(\rho\rho)/\Gamma(2(\pi\pi)_{S\text{-wave}}) \qquad \Gamma_6/\Gamma_7$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
--------------	--------------------	-------------	----------------

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

large	BARBERIS	00C	450 $pp \rightarrow p_f 4\pi p_s$
1.6 ±0.2	AMSLER	94	CBAR $\bar{p}p \rightarrow \pi^+\pi^-3\pi^0$
~ 0.65	GASPERO	93	DBC 0.0 $\bar{p}n \rightarrow$ hadrons

$$\Gamma(\pi(1300)\pi)/\Gamma(4\pi) \qquad \Gamma_8/\Gamma_2$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
--------------	--------------------	-------------	----------------

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

0.17±0.06	ABELE	01B	CBAR 0.0 $\bar{p}d \rightarrow 5\pi p$
-----------	-------	-----	--

$$\Gamma(a_1(1260)\pi)/\Gamma(4\pi) \qquad \Gamma_9/\Gamma_2$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
--------------	--------------------	-------------	----------------

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

0.06±0.02	ABELE	01B	CBAR 0.0 $\bar{p}d \rightarrow 5\pi p$
-----------	-------	-----	--

$\Gamma(\eta\eta)/\Gamma(4\pi)$ $\Gamma_{10}/\Gamma_2 = \Gamma_{10}/(\Gamma_3+\Gamma_4+\Gamma_5)$

VALUE	DOCUMENT ID	TECN	COMMENT
-------	-------------	------	---------

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

$(28 \pm 11) \times 10^{-3}$	¹ ANISOVICH	02D	SPEC	Combined fit
$(4.7 \pm 2.0) \times 10^{-3}$	BARBERIS	00E		450 $p\bar{p} \rightarrow p_f \eta \eta p_S$

¹From a combined K-matrix analysis of Crystal Barrel ($0. \rho\bar{p} \rightarrow \pi^0 \pi^0 \pi^0, \pi^0 \eta \eta, \pi^0 \pi^0 \eta$), GAMS ($\pi p \rightarrow \pi^0 \pi^0 n, \eta \eta n, \eta \eta' n$), and BNL ($\pi p \rightarrow K \bar{K} n$) data.

 $\Gamma(K\bar{K})/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE	DOCUMENT ID	TECN
-------	-------------	------

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

0.35 ± 0.13	BUGG	96	RVUE
-------------	------	----	------

 $\Gamma(K\bar{K})/\Gamma(\pi\pi)$ Γ_{11}/Γ_1

VALUE	DOCUMENT ID	TECN	COMMENT
-------	-------------	------	---------

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

0.08 ± 0.08	ABLIKIM	05	BES2	J/ψ → φπ ⁺ π ⁻ , φK ⁺ K ⁻
0.91 ± 0.20	¹ BARGIOTTI	03	OBLX	$\bar{p}p$
0.12 ± 0.06	² ANISOVICH	02D	SPEC	Combined fit
0.46 ± 0.15 ± 0.11	BARBERIS	99D	OMEG	450 $p\bar{p} \rightarrow K^+ K^-, \pi^+ \pi^-$

¹Coupled channel analysis of $\pi^+ \pi^- \pi^0, K^+ K^- \pi^0$, and $K^\pm K_S^0 \pi^\mp$.

²From a combined K-matrix analysis of Crystal Barrel ($0. \rho\bar{p} \rightarrow \pi^0 \pi^0 \pi^0, \pi^0 \eta \eta, \pi^0 \pi^0 \eta$), GAMS ($\pi p \rightarrow \pi^0 \pi^0 n, \eta \eta n, \eta \eta' n$), and BNL ($\pi p \rightarrow K \bar{K} n$) data.

 $\Gamma(K\bar{K}n\pi)/\Gamma_{\text{total}}$ Γ_{12}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
-------	-------------	------	---------

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

< 0.03	GASPERO	93	DBC	0.0 $\bar{p}n \rightarrow$ hadrons
----------	---------	----	-----	------------------------------------

 $\Gamma(6\pi)/\Gamma_{\text{total}}$ Γ_{13}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
-------	-------------	------	---------

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

< 0.22	GASPERO	93	DBC	0.0 $\bar{p}n \rightarrow$ hadrons
----------	---------	----	-----	------------------------------------

 $\Gamma(\omega\omega)/\Gamma_{\text{total}}$ Γ_{14}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
-------	-------------	------	---------

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

< 0.13	GASPERO	93	DBC	0.0 $\bar{p}n \rightarrow$ hadrons
----------	---------	----	-----	------------------------------------

 $f_0(1370)$ REFERENCES

SARANTSEV	21	PL B816 136227	A.V. Sarantsev <i>et al.</i>	(BONN, PNPI)
ALBRECHT	20	EPJ C80 453	M. Albrecht <i>et al.</i>	(Crystal Barrel Collab.)
AAIJ	19H	JHEP 1904 063	R. Aaij <i>et al.</i>	(LHCb Collab.)
AOUDE	18	PR D98 056021	R.T. Aoude <i>et al.</i>	
DOBBS	15	PR D91 052006	S. Dobbs <i>et al.</i>	(NWES)
OCHS	13	JP G40 043001	W. Ochs	
UEHARA	10A	PR D82 114031	S. Uehara <i>et al.</i>	(BELLE Collab.)
ANISOVICH	09	IJMP A24 2481	V.V. Anisovich, A.V. Sarantsev	
AUBERT	09L	PR D79 072006	B. Aubert <i>et al.</i>	(BABAR Collab.)

PDG	08	PL B667 1	C. Amsler <i>et al.</i>	(PDG Collab.)
UEHARA	08A	PR D78 052004	S. Uehara <i>et al.</i>	(BELLE Collab.)
BONVICINI	07	PR D76 012001	G. Bonvicini <i>et al.</i>	(CLEO Collab.)
BUGG	07A	JP G34 151	D.V. Bugg <i>et al.</i>	
GARMASH	07	PR D75 012006	A. Garmash <i>et al.</i>	(BELLE Collab.)
GARMASH	06	PRL 96 251803	A. Garmash <i>et al.</i>	(BELLE Collab.)
PDG	06	JP G33 1	W.-M. Yao <i>et al.</i>	(PDG Collab.)
VLADIMIRSK...	06	PAN 69 493	V.V. Vladimirovsky <i>et al.</i>	(ITEP, Moscow)
		Translated from YAF 69 515.		
ABLIKIM	05	PL B607 243	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	05Q	PR D72 092002	M. Ablikim <i>et al.</i>	(BES Collab.)
GARMASH	05	PR D71 092003	A. Garmash <i>et al.</i>	(BELLE Collab.)
ANISOVICH	03	EPJ A16 229	V.V. Anisovich <i>et al.</i>	
BARGIOTTI	03	EPJ C26 371	M. Bargiotti <i>et al.</i>	(OBELIX Collab.)
TIKHOMIROV	03	PAN 66 828	G.D. Tikhomirov <i>et al.</i>	
		Translated from YAF 66 860.		
ANISOVICH	02D	PAN 65 1545	V.V. Anisovich <i>et al.</i>	
		Translated from YAF 65 1583.		
ABELE	01	EPJ C19 667	A. Abele <i>et al.</i>	(Crystal Barrel Collab.)
ABELE	01B	EPJ C21 261	A. Abele <i>et al.</i>	(Crystal Barrel Collab.)
AITALA	01A	PRL 86 765	E.M. Aitala <i>et al.</i>	(FNAL E791 Collab.)
ASNER	00	PR D61 012002	D.M. Asner <i>et al.</i>	(CLEO Collab.)
BARBERIS	00C	PL B471 440	D. Barberis <i>et al.</i>	(WA 102 Collab.)
BARBERIS	00E	PL B479 59	D. Barberis <i>et al.</i>	(WA 102 Collab.)
BARBERIS	99B	PL B453 316	D. Barberis <i>et al.</i>	(Omega Expt.)
BARBERIS	99D	PL B462 462	D. Barberis <i>et al.</i>	(Omega Expt.)
BELLAZZINI	99	PL B467 296	R. Bellazzini <i>et al.</i>	
KAMINSKI	99	EPJ C9 141	R. Kaminski, L. Lesniak, B. Loiseau	(CRAC, PARIN)
ALDE	98	EPJ A3 361	D. Alde <i>et al.</i>	(GAM4 Collab.)
Also		PAN 62 405	D. Alde <i>et al.</i>	(GAMS Collab.)
		Translated from YAF 62 446.		
ANISOVICH	98B	SPU 41 419	V.V. Anisovich <i>et al.</i>	
		Translated from UFN 168 481.		
BERTIN	98	PR D57 55	A. Bertin <i>et al.</i>	(OBELIX Collab.)
BARBERIS	97B	PL B413 217	D. Barberis <i>et al.</i>	(WA 102 Collab.)
BERTIN	97C	PL B408 476	A. Bertin <i>et al.</i>	(OBELIX Collab.)
ABELE	96	PL B380 453	A. Abele <i>et al.</i>	(Crystal Barrel Collab.)
ABELE	96B	PL B385 425	A. Abele <i>et al.</i>	(Crystal Barrel Collab.)
ABELE	96C	NP A609 562	A. Abele <i>et al.</i>	(Crystal Barrel Collab.)
BUGG	96	NP B471 59	D.V. Bugg, A.V. Sarantsev, B.S. Zou	(LOQM, PNPI)
AMSLER	95B	PL B342 433	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
AMSLER	95C	PL B353 571	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
AMSLER	95D	PL B355 425	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
JANSEN	95	PR D52 2690	G. Jansen <i>et al.</i>	(STON, ADLD, JULI)
TORNQVIST	95	ZPHY C68 647	N.A. Tornqvist	(HELS)
AMSLER	94	PL B322 431	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.) JPC
AMSLER	94D	PL B333 277	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
ANISOVICH	94	PL B323 233	V.V. Anisovich <i>et al.</i>	(Crystal Barrel Collab.) JPC
BUGG	94	PR D50 4412	D.V. Bugg <i>et al.</i>	(LOQM)
KAMINSKI	94	PR D50 3145	R. Kaminski, L. Lesniak, J.P. Maillet	(CRAC+)
ADAMO	93	NP A558 13C	A. Adamo <i>et al.</i>	(OBELIX Collab.) JPC
GASPERO	93	NP A562 407	M. Gaspero	(ROMA1) JPC
AMSLER	92	PL B291 347	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
ARMSTRONG	91	ZPHY C51 351	T.A. Armstrong <i>et al.</i>	(ATHU, BARI, BIRM+)
ARMSTRONG	91B	ZPHY C52 389	T.A. Armstrong <i>et al.</i>	(ATHU, BARI, BIRM+)
BREAKSTONE	90	ZPHY C48 569	A.M. Breakstone <i>et al.</i>	(ISU, BGNA, CERN+)
MORGAN	90	ZPHY C48 623	D. Morgan, M.R. Pennington	(RAL, DURH)
ASTON	88	NP B296 493	D. Aston <i>et al.</i>	(SLAC, NAGO, CINC, INUS)
BOLONKIN	88	NP B309 426	B.V. Bolonkin <i>et al.</i>	(ITEP, SERP)
FALVARD	88	PR D38 2706	A. Falvard <i>et al.</i>	(CLER, FRAS, LALO+)
VOROBYEV	88	SJNP 48 273	P.V. Vorobiev <i>et al.</i>	(NOVO)
		Translated from YAF 48 436.		
AU	87	PR D35 1633	K.L. Au, D. Morgan, M.R. Pennington	(DURH, RAL)
AKESSON	86	NP B264 154	T. Akesson <i>et al.</i>	(Axial Field Spec. Collab.)
ALDE	86D	NP B269 485	D.M. Alde <i>et al.</i>	(BELG, LAPP, SERP, CERN+)
LONGACRE	86	PL B177 223	R.S. Longacre <i>et al.</i>	(BNL, BRAN, CUNY+)
BINON	84C	NC 80A 363	F.G. Binon <i>et al.</i>	(BELG, LAPP, SERP+)
BINON	83	NC 78A 313	F.G. Binon <i>et al.</i>	(BELG, LAPP, SERP+)
CASON	83	PR D28 1586	N.M. Cason <i>et al.</i>	(NDAM, ANL)
ETKIN	82B	PR D25 1786	A. Etkin <i>et al.</i>	(BNL, CUNY, TUFTS, VAND)
WICKLUND	80	PRL 45 1469	A.B. Wicklund <i>et al.</i>	(ANL)

BECKER	79	NP B151 46	H. Becker <i>et al.</i>	(MPIM, CERN, ZEEM, CRAC)
POLYCHRO...	79	PR D19 1317	V.A. Polychronakos <i>et al.</i>	(NDAM, ANL)
FROGGATT	77	NP B129 89	C.D. Froggatt, J.L. Petersen	(GLAS, NORD)
ROSSELET	77	PR D15 574	L. Rosselet <i>et al.</i>	(GEVA, SACL)
HYAMS	75	NP B100 205	B.D. Hyams <i>et al.</i>	(CERN, MPIM)
GRAYER	74	NP B75 189	G. Grayer <i>et al.</i>	(CERN, MPIM)
HYAMS	73	NP B64 134	B.D. Hyams <i>et al.</i>	(CERN, MPIM)
OCHS	73	Thesis	W. Ochs	(MPIM, MUNI)
BEIER	72B	PRL 29 511	E.W. Beier <i>et al.</i>	(PENN)
BETTINI	66	NC 42A 695	A. Bettini <i>et al.</i>	(PADO, PISA)
