

$K_1(1270)$

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

 $K_1(1270)$ MASS

VALUE (MeV) DOCUMENT ID
1272±7 OUR AVERAGE Includes data from the 2 datablocks that follow this one.

PRODUCED BY K^- , BACKWARD SCATTERING, HYPERON EXCHANGE

VALUE (MeV) EVTS DOCUMENT ID TECN CHG COMMENT
The data in this block is included in the average printed for a previous datablock.

1275±10 700 GAVILLET 78 HBC + 4.2 $K^- p \rightarrow \Xi^- (K\pi\pi)^+$

PRODUCED BY K BEAMS

VALUE (MeV) DOCUMENT ID TECN CHG COMMENT
The data in this block is included in the average printed for a previous datablock.

1270±10 ¹ DAUM 81C CNTR - 63 $K^- p \rightarrow K^- 2\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •
~ 1276 ² TORNVIST 82B RVUE
~ 1300 VERGEEST 79 HBC - 4.2 $K^- p \rightarrow (\bar{K}\pi\pi)^- p$
1289±25 ³ CARNEGIE 77 ASPK ± 13 $K^\pm p \rightarrow (K\pi\pi)^\pm p$
~ 1300 BRANDENB... 76 ASPK ± 13 $K^\pm p \rightarrow (K\pi\pi)^\pm p$
~ 1270 OTTER 76 HBC - 10,14,16 $K^- p \rightarrow (\bar{K}\pi\pi)^- p$
1260 DAVIS 72 HBC + 12 $K^+ p$
1234±12 FIRESTONE 72B DBC + 12 $K^+ d$

¹ Well described in the chiral unitary approach of GENG 07 with two poles at 1195 and 1284 MeV and widths of 246 and 146 MeV, respectively.

² From a unitarized quark-model calculation.

³ From a model-dependent fit with Gaussian background to BRANDENBURG 76 data.

PRODUCED BY BEAMS OTHER THAN K MESONS

VALUE (MeV) EVTS DOCUMENT ID TECN CHG COMMENT
1248.1± 3.3±1.4 GULER 11 BELL $B^+ \rightarrow J/\psi K^+ \pi^+ \pi^-$

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

1279 ±10 25k ⁴ ABLIKIM 06C BES2 $J/\psi \rightarrow \bar{K}^*(892)^0 K^+ \pi^-$
1294 ±10 310 RODEBACK 81 HBC $4 \pi^- p \rightarrow \Lambda K 2\pi$
1300 40 CRENNELL 72 HBC 0 $4.5 \pi^- p \rightarrow \Lambda K 2\pi$
1242 $\begin{smallmatrix} +9 \\ -10 \end{smallmatrix}$ ⁵ ASTIER 69 HBC 0 $\bar{p} p$
1300 45 CRENNELL 67 HBC 0 $6 \pi^- p \rightarrow \Lambda K 2\pi$

⁴ Systematic errors not estimated.

⁵ This was called the C meson.

PRODUCED IN τ LEPTON DECAYS

VALUE (MeV) EVTS DOCUMENT ID TECN CHG COMMENT
1254±33±34 7k ASNER 00B CLEO ± $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$

$K_1(1270)$ WIDTHVALUE (MeV) DOCUMENT ID**90±20 OUR ESTIMATE** This is only an educated guess; the error given is larger than the error on the average of the published values.**87± 7 OUR AVERAGE** Includes data from the 2 datablocks that follow this one.**PRODUCED BY K^- , BACKWARD SCATTERING, HYPERON EXCHANGE**VALUE (MeV) EVTS DOCUMENT ID TECN CHG COMMENT

The data in this block is included in the average printed for a previous datablock.

75±15 700 GAVILLET 78 HBC + 4.2 $K^- p \rightarrow \Xi^- K \pi \pi$ **PRODUCED BY K BEAMS**VALUE (MeV) DOCUMENT ID TECN CHG COMMENT

The data in this block is included in the average printed for a previous datablock.

90± 8 ⁶ DAUM 81C CNTR - 63 $K^- p \rightarrow K^- 2\pi p$

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

~ 150 VERGEEST 79 HBC - 4.2 $K^- p \rightarrow (\bar{K} \pi \pi)^- p$ 150±71 ⁷ CARNEGIE 77 ASPK ± 13 $K^\pm p \rightarrow (K \pi \pi)^\pm p$ ~ 200 BRANDENB... 76 ASPK ± 13 $K^\pm p \rightarrow (K \pi \pi)^\pm p$ 120 DAVIS 72 HBC + 12 $K^+ p$ 188±21 FIRESTONE 72B DBC + 12 $K^+ d$ ⁶ Well described in the chiral unitary approach of GENG 07 with two poles at 1195 and 1284 MeV and widths of 246 and 146 MeV, respectively.⁷ From a model-dependent fit with Gaussian background to BRANDENBURG 76 data.**PRODUCED BY BEAMS OTHER THAN K MESONS**VALUE (MeV) EVTS DOCUMENT ID TECN CHG COMMENT**119.5± 5.2±6.7** GULER 11 BELL $B^+ \rightarrow J/\psi K^+ \pi^+ \pi^-$

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

131 ±21 25k ⁸ ABLIKIM 06C BES2 $J/\psi \rightarrow \bar{K}^*(892)^0 K^+ \pi^-$ 66 ±15 310 RODEBACK 81 HBC $4 \pi^- p \rightarrow \Lambda K 2\pi$ 60 40 CRENNELL 72 HBC 0 $4.5 \pi^- p \rightarrow \Lambda K 2\pi$ 127 $\begin{smallmatrix} + 7 \\ - 25 \end{smallmatrix}$ ASTIER 69 HBC 0 $\bar{p} p$ 60 45 CRENNELL 67 HBC 0 $6 \pi^- p \rightarrow \Lambda K 2\pi$ ⁸ Systematic errors not estimated.**PRODUCED IN τ LEPTON DECAYS**VALUE (MeV) EVTS DOCUMENT ID TECN CHG COMMENT**260 $\begin{smallmatrix} + 90 \\ - 70 \end{smallmatrix}$ ±80** 7k ASNER 00B CLEO ± $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$

$K_1(1270)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $K\rho$	(42 \pm 6) %
Γ_2 $K_0^*(1430)\pi$	(28 \pm 4) %
Γ_3 $K^*(892)\pi$	(16 \pm 5) %
Γ_4 $K\omega$	(11.0 \pm 2.0) %
Γ_5 $Kf_0(1370)$	(3.0 \pm 2.0) %
Γ_6 γK^0	seen

 $K_1(1270)$ PARTIAL WIDTHS **$\Gamma(K\rho)$ Γ_1**

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

57 \pm 5	MAZZUCATO 79	HBC	+	4.2 $K^- p \rightarrow \Xi^- (K\pi\pi)^+$
75 \pm 6	CARNEGIE 77B	ASPK	\pm	13 $K^\pm p \rightarrow (K\pi\pi)^\pm p$

 $\Gamma(K_0^*(1430)\pi)$ Γ_2

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

26 \pm 6	CARNEGIE 77B	ASPK	\pm	13 $K^\pm p \rightarrow (K\pi\pi)^\pm p$
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 $\Gamma(K^*(892)\pi)$ Γ_3

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

14 \pm 11	MAZZUCATO 79	HBC	+	4.2 $K^- p \rightarrow \Xi^- (K\pi\pi)^+$
2 \pm 2	CARNEGIE 77B	ASPK	\pm	13 $K^\pm p \rightarrow (K\pi\pi)^\pm p$

 $\Gamma(K\omega)$ Γ_4

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

4 \pm 4	MAZZUCATO 79	HBC	+	4.2 $K^- p \rightarrow \Xi^- (K\pi\pi)^+$
24 \pm 3	CARNEGIE 77B	ASPK	\pm	13 $K^\pm p \rightarrow (K\pi\pi)^\pm p$

 $\Gamma(Kf_0(1370))$ Γ_5

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

22 \pm 5	CARNEGIE 77B	ASPK	\pm	13 $K^\pm p \rightarrow (K\pi\pi)^\pm p$
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 $\Gamma(\gamma K^0)$ Γ_6

VALUE (keV)	DOCUMENT ID	TECN	COMMENT
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73.2\pm6.1\pm28.3	ALAVI-HARATI02B	KTEV	$K + A \rightarrow K^* + A$
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$K_1(1270)$ BRANCHING RATIOS **$\Gamma(K\rho)/\Gamma_{\text{total}}$ Γ_1/Γ**

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.42 ± 0.06	⁹ DAUM	81C	CNTR 63 $K^- p \rightarrow K^- 2\pi p$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.584 ± 0.043	¹⁰ GULER	11	BELL $B^+ \rightarrow J/\psi K^+ \pi^+ \pi^-$
dominant	RODEBACK	81	HBC 4 $\pi^- p \rightarrow \Lambda K 2\pi$

 $\Gamma(K_0^*(1430)\pi)/\Gamma_{\text{total}}$ Γ_2/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.28 ± 0.04	⁹ DAUM	81C	CNTR 63 $K^- p \rightarrow K^- 2\pi p$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.0201 ± 0.0064	¹⁰ GULER	11	BELL $B^+ \rightarrow J/\psi K^+ \pi^+ \pi^-$

 $\Gamma(K^*(892)\pi)/\Gamma_{\text{total}}$ Γ_3/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.16 ± 0.05	⁹ DAUM	81C	CNTR 63 $K^- p \rightarrow K^- 2\pi p$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.171 ± 0.023	¹⁰ GULER	11	BELL $B^+ \rightarrow J/\psi K^+ \pi^+ \pi^-$

 $\Gamma(K\omega)/\Gamma_{\text{total}}$ Γ_4/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.11 ± 0.02	⁹ DAUM	81C	CNTR 63 $K^- p \rightarrow K^- 2\pi p$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.225 ± 0.052	¹⁰ GULER	11	BELL $B^+ \rightarrow J/\psi K^+ \pi^+ \pi^-$

 $\Gamma(K\omega)/\Gamma(K\rho)$ Γ_4/Γ_1

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<0.30	95	RODEBACK	81	HBC 4 $\pi^- p \rightarrow \Lambda K 2\pi$

 $\Gamma(K f_0(1370))/\Gamma_{\text{total}}$ Γ_5/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.03 ± 0.02	⁹ DAUM	81C	CNTR 63 $K^- p \rightarrow K^- 2\pi p$

D-wave/S-wave RATIO FOR $K_1(1270) \rightarrow K^*(892)\pi$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1.0 ± 0.7	⁹ DAUM	81C	CNTR 63 $K^- p \rightarrow K^- 2\pi p$

⁹ Average from low and high t data.¹⁰ Assuming that decays are saturated by the $K\rho$, $K_0^*(1430)\pi$, $K^*(892)\pi$, $K\omega$ decay modes and neglecting interference between them. The values $B(\omega \rightarrow \pi^+\pi^-) = (1.53^{+0.11}_{-0.13})\%$ and $B(K_0^*(1430) \rightarrow K\pi) = (93 \pm 10)\%$ are used. Systematic uncertainties not estimated.

$K_1(1270)$ REFERENCES

GULER	11	PR D83 032005	H. Guler <i>et al.</i>	(BELLE Collab.)
GENG	07	PR D75 014017	L.S. Geng <i>et al.</i>	
ABLIKIM	06C	PL B633 681	M. Ablikim <i>et al.</i>	(BES Collab.)
ALAVI-HARATI	02B	PRL 89 072001	A. Alavi-Harati <i>et al.</i>	(FNAL KTeV Collab.)
ASNER	00B	PR D62 072006	D.M. Asner <i>et al.</i>	(CLEO Collab.)
TORNQVIST	82B	NP B203 268	N.A. Tornqvist	(HELS)
DAUM	81C	NP B187 1	C. Daum <i>et al.</i>	(AMST, CERN, CRAC, MPIM+)
RODEBACK	81	ZPHY C9 9	S. Rodeback <i>et al.</i>	(CERN, CDEF, MADR+)
MAZZUCATO	79	NP B156 532	M. Mazzucato <i>et al.</i>	(CERN, ZEEM, NIJM+)
VERGEEST	79	NP B158 265	J.S.M. Vergeest <i>et al.</i>	(NIJM, AMST, CERN+)
GAVILLET	78	PL 76B 517	P. Gavillet <i>et al.</i>	(AMST, CERN, NIJM+) JP
CARNEGIE	77	NP B127 509	R.K. Carnegie <i>et al.</i>	(SLAC)
CARNEGIE	77B	PL 68B 287	R.K. Carnegie <i>et al.</i>	(SLAC)
BRANDENB...	76	PRL 36 703	G.W. Brandenburg <i>et al.</i>	(SLAC) JP
OTTER	76	NP B106 77	G. Otter <i>et al.</i>	(AACH3, BERL, CERN, LOIC+) JP
CRENNELL	72	PR D6 1220	D.J. Crennell <i>et al.</i>	(BNL)
DAVIS	72	PR D5 2688	P.J. Davis <i>et al.</i>	(LBL)
FIRESTONE	72B	PR D5 505	A. Firestone <i>et al.</i>	(LBL)
ASTIER	69	NP B10 65	A. Astier <i>et al.</i>	(CDEF, CERN, IPNP, LIVP) IJP
CRENNELL	67	PRL 19 44	D.J. Crennell <i>et al.</i>	(BNL) I
