# $K_1(1270)$ $I(J^P) = \frac{1}{2}(1^+)$

$K_1(1270)$ MASS

VALUE (MeV)   DOCUMENT ID

1253±7 OUR AVERAGE   Includes data from the 4 datablocks that follow this one. Error includes scale factor of 2.2. See the ideogram below.

WEIGHTED AVERAGE
1253±7 (Error scaled by 2.2)

			χ^2
GAVILLET	78	HBC	4.8
DAUM	81C	CNTR	2.9
ASNER	00B	CLEO	
GULER	11	BELL	1.9
			9.6

(Confidence Level = 0.0082)

$K_1(1270)$ MASS (MeV)
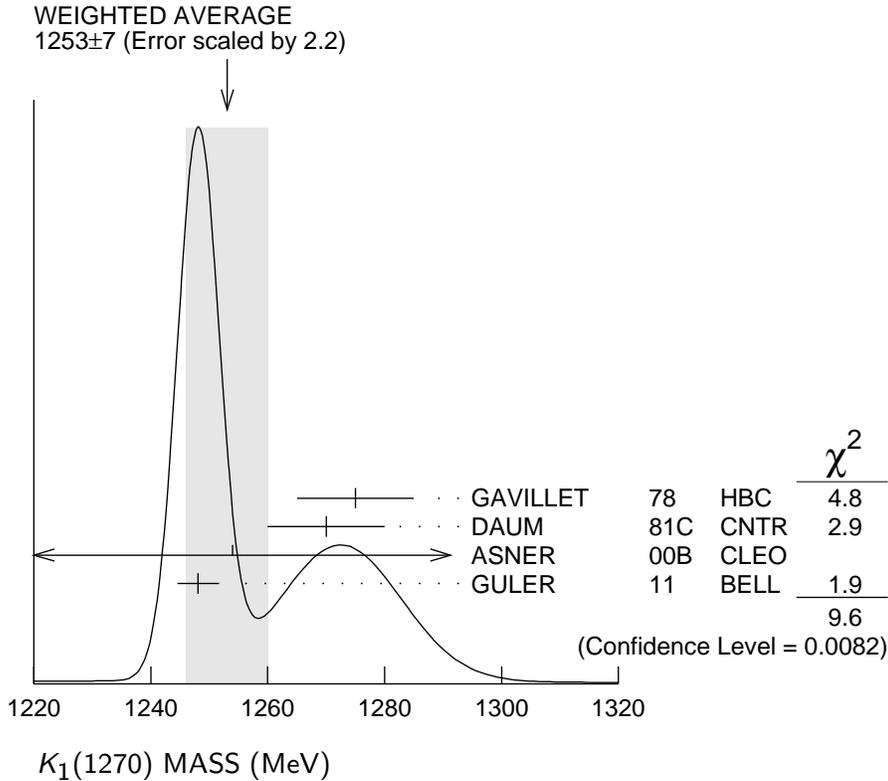
PRODUCED BY K^-, BACKWARD SCATTERING, HYPERON EXCHANGE

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 $K^- p \to \Xi^- (K\pi\pi)^+$

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 $K^- p \to K^- 2\pi p$

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

~ 1276	[2] TORNQVIST	82B	RVUE		
~ 1300	VERGEEST	79	HBC	$-$	4.2 $K^- p \to (\overline{K}\pi\pi)^- p$
1289 ± 25	[3] CARNEGIE	77	ASPK	$\pm$	13 $K^\pm p \to (K\pi\pi)^\pm p$
~ 1300	BRANDENB...	76	ASPK	$\pm$	13 $K^\pm p \to (K\pi\pi)^\pm p$
~ 1270	OTTER	76	HBC	$-$	10,14,16 $K^- p \to (\overline{K}\pi\pi)^- p$
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	COMMENT
The data in this block is included in the average printed for a previous datablock.				

1248.1 $\pm$ 3.3 $\pm$1.4		GULER	11	BELL	$B^+ \to J/\psi K^+ \pi^+ \pi^-$

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

$1289.81\pm 0.56\pm1.66$	894k	AAIJ	18AI	LHCB	$D^0 \to K^\mp \pi^\pm \pi^\pm \pi^\mp$
$1279 \quad \pm 10$	25k	[1] ABLIKIM	06C	BES2	$J/\psi \to \overline{K}^*(892)^0 K^+ \pi^-$
$1294 \quad \pm 10$	310	RODEBACK	81	HBC	$4\pi^- p \to \Lambda K 2\pi$
1300	40	CRENNELL	72	HBC	$4.5\ \pi^- p \to \Lambda K 2\pi$
$1242 \quad {}^{+\ 9}_{-10}$		[2] ASTIER	69	HBC	$\overline{p}p$
1300	45	CRENNELL	67	HBC	$6\ \pi^- p \to \Lambda K 2\pi$

[1] Systematic errors not estimated.

[2] This was called the C meson.

PRODUCED IN τ LEPTON DECAYS

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

1254$\pm$33$\pm$34	7k	ASNER	00B	CLEO	$\pm$	$\tau^- \to K^- \pi^+ \pi^- \nu_\tau$

$K_1(1270)$ WIDTH

VALUE (MeV)	DOCUMENT ID

90$\pm$20 OUR ESTIMATE   This is only an educated guess; the error given is larger than the error on the average of the published values.

101$\pm$12 OUR AVERAGE   Includes data from the 4 datablocks that follow this one. Error includes scale factor of 2.2. See the ideogram below.

WEIGHTED AVERAGE
101±12 (Error scaled by 2.2)

			χ^2
GAVILLET	78	HBC	2.9
DAUM	81C	CNTR	1.7
ASNER	00B	CLEO	
GULER	11	BELL	5.0
			9.6

(Confidence Level = 0.0081)

0   50   100   150   200

$K_1(1270)$ WIDTH (MeV)
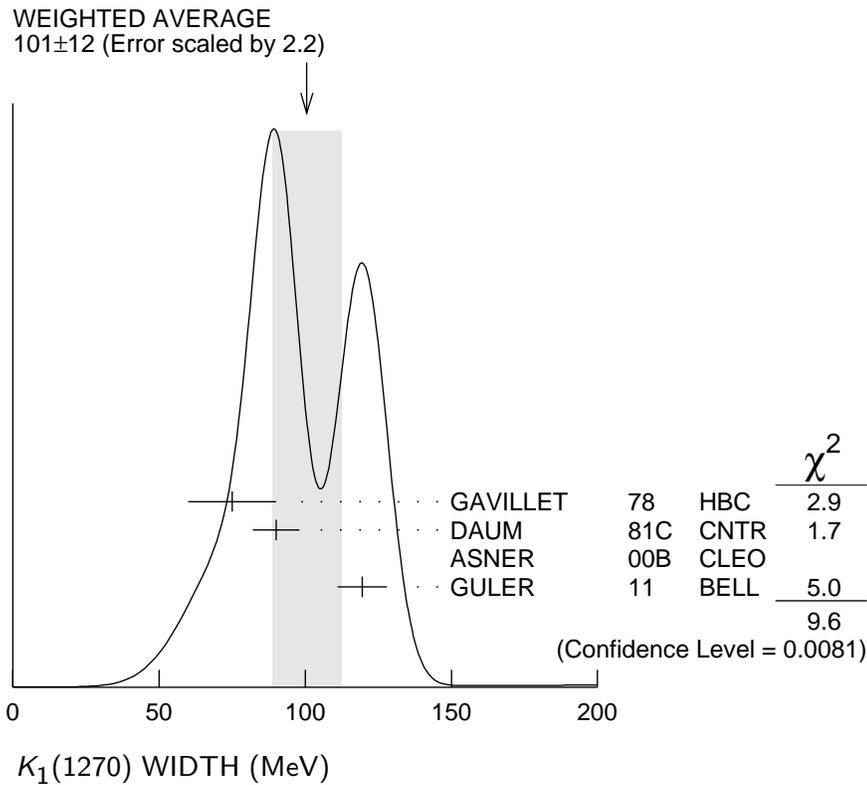
PRODUCED BY K^-, BACKWARD SCATTERING, HYPERON EXCHANGE

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 $K^- p \to$ $\Xi^- K\pi\pi$

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	[1] DAUM	81C	CNTR	−	63 $K^- p \to$ $K^- 2\pi p$

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

∼ 150	VERGEEST	79	HBC	−	4.2 $K^- p \to (\overline{K}\pi\pi)^- p$
150±71	[2] CARNEGIE	77	ASPK	±	13 $K^\pm p \to (K\pi\pi)^\pm p$
∼ 200	BRANDENB...	76	ASPK	±	13 $K^\pm p \to (K\pi\pi)^\pm p$
120	DAVIS	72	HBC	+	12 $K^+ p$
188±21	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 model-dependent fit with Gaussian background to BRANDENBURG 76 data.

PRODUCED BY BEAMS OTHER THAN K MESONS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.				
119.5 ± 5.2 ±6.7		GULER	11	BELL	$B^+ \to J/\psi K^+ \pi^+ \pi^-$

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
$116.11\pm 1.65\pm 2.96$	894k	AAIJ	18AI LHCB	$D^0 \to K^{\mp}\pi^{\pm}\pi^{\pm}\pi^{\mp}$
131 ± 21	25k	[1] ABLIKIM	06C BES2	$J/\psi \to \overline{K}^*(892)^0 K^+\pi^-$
66 ± 15	310	RODEBACK	81 HBC	$4\,\pi^- p \to \Lambda K\,2\pi$
60	40	CRENNELL	72 HBC	$4.5\,\pi^- p \to \Lambda K\,2\pi$
$127 \, {}^{+\ 7}_{-25}$		ASTIER	69 HBC	$\overline{p}p$
60	45	CRENNELL	67 HBC	$6\,\pi^- p \to \Lambda K\,2\pi$

[1] Systematic errors not estimated.

PRODUCED IN τ LEPTON DECAYS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
The data in this block is included in the average printed for a previous datablock.					
$260{}^{+90}_{-70}\pm 80$	7k	ASNER	00B CLEO	$\pm$	$\tau^- \to K^-\pi^+\pi^-\nu_\tau$

$K_1(1270)$ 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	$K f_0(1370)$	$(\ 3.0\pm 2.0)\,\%$
Γ_6	γK^0	seen

$K_1(1270)$ PARTIAL WIDTHS

$\Gamma(K\rho)$ Γ_1

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
57 ± 5	MAZZUCATO 79	HBC	$+$	$4.2\,K^- p \to \Xi^- (K\pi\pi)^+$
75 ± 6	CARNEGIE 77B	ASPK	$\pm$	$13\,K^{\pm}p \to (K\pi\pi)^{\pm}p$

$\Gamma(K_0^*(1430)\pi)$ Γ_2

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
26 ± 6	CARNEGIE 77B	ASPK	$\pm$	$13\,K^{\pm}p \to (K\pi\pi)^{\pm}p$

$\Gamma(K^*(892)\pi)$ Γ_3

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
14 ± 11	MAZZUCATO 79	HBC	$+$	$4.2\,K^- p \to \Xi^- (K\pi\pi)^+$
2 ± 2	CARNEGIE 77B	ASPK	$\pm$	$13\,K^{\pm}p \to (K\pi\pi)^{\pm}p$

$\Gamma(K\omega)$ $\qquad\qquad$ Γ_4

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4 ± 4	MAZZUCATO	79	HBC	+	$4.2\ K^-p \to\ \Xi^-(K\pi\pi)^+$
24 ± 3	CARNEGIE	77B	ASPK	$\pm$	$13\ K^\pm p \to\ (K\pi\pi)^\pm p$

$\Gamma(K f_0(1370))$ $\qquad\qquad$ Γ_5

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
22 ± 5	CARNEGIE	77B	ASPK	$\pm$	$13\ K^\pm p \to\ (K\pi\pi)^\pm p$

$\Gamma(\gamma K^0)$ $\qquad\qquad$ Γ_6

VALUE (keV)	DOCUMENT ID	TECN	COMMENT
$\mathbf{73.2\pm6.1\pm28.3}$	ALAVI-HARATI02B	KTEV	$K + A \to\ K^* + A$

$K_1(1270)$ BRANCHING RATIOS

$\Gamma(K\rho)/\Gamma_{\text{total}}$ $\qquad\qquad$ Γ_1/Γ

VALUE		DOCUMENT ID		TECN	COMMENT
$\mathbf{0.42\ \pm0.06}$	[1]	DAUM	81C	CNTR	$63\ K^-p \to\ K^-2\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.584 ± 0.043	[2]	GULER	11	BELL	$B^+ \to\ J/\psi K^+\pi^+\pi^-$
dominant		RODEBACK	81	HBC	$4\ \pi^-p \to\ \Lambda K 2\pi$

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

VALUE		DOCUMENT ID		TECN	COMMENT
$\mathbf{0.28\ \pm0.04}$	[1]	DAUM	81C	CNTR	$63\ K^-p \to\ K^-2\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0201 ± 0.0064	[2]	GULER	11	BELL	$B^+ \to\ J/\psi K^+\pi^+\pi^-$

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

VALUE		DOCUMENT ID		TECN	COMMENT
$\mathbf{0.16\ \pm0.05}$	[1]	DAUM	81C	CNTR	$63\ K^-p \to\ K^-2\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.171 ± 0.023	[2]	GULER	11	BELL	$B^+ \to\ J/\psi K^+\pi^+\pi^-$

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

VALUE		DOCUMENT ID		TECN	COMMENT
$\mathbf{0.11\ \pm0.02}$	[1]	DAUM	81C	CNTR	$63\ K^-p \to\ K^-2\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.225 ± 0.052	[2]	GULER	11	BELL	$B^+ \to\ J/\psi K^+\pi^+\pi^-$

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

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

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.03±0.02	[1] DAUM	81C	CNTR	63 $K^- p \to K^- 2\pi p$

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

VALUE	DOCUMENT ID		TECN	COMMENT
1.0±0.7	[1] DAUM	81C	CNTR	63 $K^- p \to K^- 2\pi p$

[1] Average from low and high t data.

[2] 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 $B(\omega \to \pi^+\pi^-) = (1.53^{+0.11}_{-0.13})\%$ and $B(K_0^*(1430) \to K\pi) = (93 \pm 10)\%$ are used. Systematic uncertainties not estimated.

$K_1(1270)$ REFERENCES

AAIJ	18AI	EPJ C78 443	R. Aaij *et al.*	(LHCb Collab.)
GULER	11	PR D83 032005	H. Guler *et al.*	(BELLE Collab.)
GENG	07	PR D75 014017	L.S. Geng *et al.*	
ABLIKIM	06C	PL B633 681	M. Ablikim *et al.*	(BES Collab.)
ALAVI-HARATI	02B	PRL 89 072001	A. Alavi-Harati *et al.*	(FNAL KTeV Collab.)
ASNER	00B	PR D62 072006	D.M. Asner *et al.*	(CLEO Collab.)
TORNQVIST	82B	NP B203 268	N.A. Tornqvist	(HELS)
DAUM	81C	NP B187 1	C. Daum *et al.*	(AMST, CERN, CRAC, MPIM+)
RODEBACK	81	ZPHY C9 9	S. Rodeback *et al.*	(CERN, CDEF, MADR+)
MAZZUCATO	79	NP B156 532	M. Mazzucato *et al.*	(CERN, ZEEM, NIJM+)
VERGEEST	79	NP B158 265	J.S.M. Vergeest *et al.*	(NIJM, AMST, CERN+)
GAVILLET	78	PL 76B 517	P. Gavillet *et al.*	(AMST, CERN, NIJM+) JP
CARNEGIE	77	NP B127 509	R.K. Carnegie *et al.*	(SLAC)
CARNEGIE	77B	PL 68B 287	R.K. Carnegie *et al.*	(SLAC)
BRANDENB...	76	PRL 36 703	G.W. Brandenburg *et al.*	(SLAC) JP
OTTER	76	NP B106 77	G. Otter *et al.*	(AACH3, BERL, CERN, LOIC+) JP
CRENNELL	72	PR D6 1220	D.J. Crennell *et al.*	(BNL)
DAVIS	72	PR D5 2688	P.J. Davis *et al.*	(LBL)
FIRESTONE	72B	PR D5 505	A. Firestone *et al.*	(LBL)
ASTIER	69	NP B10 65	A. Astier *et al.*	(CDEF, CERN, IPNP, LIVP) IJP
CRENNELL	67	PRL 19 44	D.J. Crennell *et al.*	(BNL) I