STRANGE MESONS
($S = \pm1$, $C = B = 0$)

$K^+ = u\overline{s}$, $K^0 = d\overline{s}$, $\overline{K}^0 = \overline{d}\,s$, $K^- = \overline{u}\,s$, similarly for K^*'s

$K^*(892)$

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

$K^*(892)$ MASS

CHARGED ONLY

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
891.59±0.24 OUR AVERAGE		Error includes scale factor of 1.1.				
890.4 ±0.2 ±0.5	79709±801	[1] BIRD	89	LASS	−	11 $K^- p \rightarrow \overline{K}^0 \pi^- p$
892.6 ±0.5	5840	BAUBILLIER	84B	HBC	−	8.25 $K^- p \rightarrow \overline{K}^0 \pi^- p$
888.0 ±3.0		NAPIER	84	SPEC	+	200 $\pi^- p \rightarrow 2K^0_S X$
891.0 ±1.0		NAPIER	84	SPEC	−	200 $\pi^- p \rightarrow 2K^0_S X$
891.7 ±2.1	3700	BARTH	83	HBC	+	70 $K^+ p \rightarrow K^0 \pi^+ X$
891.0 ±1.0	4100	TOAFF	81	HBC	−	6.5 $K^- p \rightarrow \overline{K}^0 \pi^- p$
892.8 ±1.6		AJINENKO	80	HBC	+	32 $K^+ p \rightarrow K^0 \pi^+ X$
890.7 ±0.9	1800	AGUILAR-...	78B	HBC	±	0.76 $\overline{p} p \rightarrow K^\mp K^0_S \pi^\pm$
886.6 ±2.4	1225	BALAND	78	HBC	±	12 $\overline{p} p \rightarrow (K\pi)^\pm X$
891.7 ±0.6	6706	COOPER	78	HBC	±	0.76 $\overline{p} p \rightarrow (K\pi)^\pm X$
891.9 ±0.7	9000	[2] PALER	75	HBC	−	14.3 $K^- p \rightarrow (K\pi)^- X$
892.2 ±1.5	4404	AGUILAR-...	71B	HBC	−	3.9,4.6 $K^- p \rightarrow (K\pi)^- p$
891.0 ±2.0	1000	CRENNELL	69D	DBC	−	3.9 $K^- N \rightarrow K^0 \pi^- X$
894 ±1.0	2886	[3] FRIEDMAN	69	HBC	−	2.1 $K^- p \rightarrow \overline{K}^0 \pi^- p$
892 ±2	728	FRIEDMAN	69	HBC	−	2.45 $K^- p \rightarrow \overline{K}^0 \pi^- p$
892 ±1.0	3229	FRIEDMAN	69	HBC	−	2.6 $K^- p \rightarrow \overline{K}^0 \pi^- p$
892 ±1.6	1027	FRIEDMAN	69	HBC	−	2.7 $K^- p \rightarrow \overline{K}^0 \pi^- p$
890 ±3.0	720	BARLOW	67	HBC	±	1.2 $\overline{p} p \rightarrow (K^0\pi)^\pm K^\mp$
889 ±3.0	600	BARLOW	67	HBC	±	1.2 $\overline{p} p \rightarrow (K^0\pi)^\pm K\pi$
891 ±2.3	620	[3] DEBAERE	67B	HBC	+	3.5 $K^+ p \rightarrow K^0 \pi^+ p$
891.0 ±1.2	1700	[4] WOJCICKI	64	HBC	−	1.7 $K^- p \rightarrow \overline{K}^0 \pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
890.0 ±2.3	800	[3,4] CLELAND	82	SPEC	+	30 $K^+ p \rightarrow K^0_S \pi^+ p$
896.0 ±1.1	3200	[3,4] CLELAND	82	SPEC	+	50 $K^+ p \rightarrow K^0_S \pi^+ p$
893.0 ±1.0	3600	[3,4] CLELAND	82	SPEC	−	50 $K^+ p \rightarrow K^0_S \pi^- p$
896.0 ±1.9	380	DELFOSSE	81	SPEC	+	50 $K^\pm p \rightarrow K^\pm \pi^0 p$
886.0 ±2.3	187	DELFOSSE	81	SPEC	−	50 $K^\pm p \rightarrow K^\pm \pi^0 p$
894.2 ±2.0	765	[3] CLARK	73	HBC	−	3.13 $K^- p \rightarrow \overline{K}^0 \pi^- p$
894.3 ±1.5	1150	[3,4] CLARK	73	HBC	−	3.3 $K^- p \rightarrow \overline{K}^0 \pi^- p$
888 ±2.5	540	[3] DEWIT	68	HBC	−	3 $K^- n \rightarrow \overline{K}^0 \pi^- n$
892.0 ±2.6	341	[3] SCHWEING...	68	HBC	−	5.5 $K^- p \rightarrow \overline{K}^0 \pi^- p$

*CITATION: L. Montanet et al., Physical Review D50, 1173 (1994) and 1995 off-year partial update for the 1996 edition (URL: http://pdg.lbl.gov/)

NEUTRAL ONLY

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
896.10±0.28 OUR AVERAGE		Error includes scale factor of 1.4. See the ideogram below.				
895.9 ±0.5 ±0.2		ASTON	88	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$
894.52±0.63	25k	[2] ATKINSON	86	OMEG		20–70 γp
894.63±0.76	20k	[2] ATKINSON	86	OMEG		20–70 γp
897 ±1	28k	EVANGELISTA	80	OMEG	0	10 $\pi^- p \rightarrow K^+ \pi^- (\Lambda, \Sigma)$
898.4 ±1.4	1180	AGUILAR-...	78B	HBC	0	0.76 $\overline{p} p \rightarrow K^\mp K^0_S \pi^\pm$
894.9 ±1.6		WICKLUND	78	ASPK	0	3,4,6 $K^\pm N \rightarrow (K\pi)^0 N$
897.6 ±0.9		BOWLER	77	DBC	0	5.4 $K^+ d \rightarrow K^+ \pi^- p p$
895.5 ±1.0	3600	MCCUBBIN	75	HBC	0	3.6 $K^- p \rightarrow K^- \pi^+ n$
897.1 ±0.7	22k	[2] PALER	75	HBC	0	14.3 $K^- p \rightarrow (K\pi)^0 X$
896.0 ±0.6	10k	FOX	74	RVUE	0	2 $K^- p \rightarrow K^- \pi^+ n$
896.0 ±0.6		FOX	74	RVUE	0	2 $K^+ n \rightarrow K^+ \pi^- p$
896 ±2		[5] MATISON	74	HBC	0	12 $K^+ p \rightarrow K^+ \pi^- \Delta$
896.0 ±1.0	3186	LEWIS	73	HBC	0	2.1–2.7 $K^+ p \rightarrow K \pi \pi p$
894.0 ±1.3		[5] LINGLIN	73	HBC	0	2–13 $K^+ p \rightarrow K^+ \pi^- \pi^+ p$
898.4 ±1.3	1700	[3] BUCHNER	72	DBC	0	4.6 $K^+ n \rightarrow K^+ \pi^- p$
897.9 ±1.1	2934	[3] AGUILAR-...	71B	HBC	0	3.9,4.6 $K^- p \rightarrow K^- \pi^+ n$
898.0 ±0.7	5362	[3] AGUILAR-...	71B	HBC	0	3.9,4.6 $K^- p \rightarrow K^- \pi^+ \pi^- p$
895.0 ±1.0	4300	[4] HABER	70	DBC	0	3 $K^- N \rightarrow K^- \pi^+ X$
893.7 ±2.0	10k	DAVIS	69	HBC	0	12 $K^+ p \rightarrow K^+ \pi^- \pi^+ p$
894.7 ±1.4	1040	[3] DAUBER	67B	HBC	0	2.0 $K^- p \rightarrow K^- \pi^+ \pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
900.7 ±1.1	5900	BARTH	83	HBC	0	70 $K^+ p \rightarrow K^+ \pi^- X$

$K^*(892)^0$ mass (MeV)

[1] From a partial wave amplitude analysis.
[2] Inclusive reaction. Complicated background and phase-space effects.
[3] Mass errors enlarged by us to $\Gamma/\sqrt{N}$. See note.

[4] Number of events in peak reevaluated by us.
[5] From pole extrapolation.

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$m_{K^*(892)^0} - m_{K^*(892)^\pm}$

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
6.7±1.2 OUR AVERAGE						
7.7±1.7	2980	AGUILAR-...	78B	HBC	±0	0.76 $\overline{p}p \rightarrow K^\mp K^0_S \pi^\pm$
5.7±1.7	7338	AGUILAR-...	71B	HBC	−0	3.9,4.6 $K^- p$
6.3±4.1	283	[6] BARASH	67B	HBC		0.0 $\overline{p}p$

[6] Number of events in peak reevaluated by us.

$K^*(892)$ RANGE PARAMETER

All from partial wave amplitude analyses.

VALUE (GeV^{-1})	DOCUMENT ID		TECN	CHG	COMMENT
12.1±3.2±3.0	BIRD	89	LASS	−	11 $K^- p \rightarrow \overline{K}^0 \pi^- p$
3.4±0.7	ASTON	88	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$

$K^*(892)$ WIDTH

CHARGED ONLY

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
49.8±0.8 OUR FIT						
49.8±0.8 OUR AVERAGE						
45.2±1 ±2	79709±801	[7] BIRD	89	LASS	−	11 $K^- p \rightarrow \overline{K}^0 \pi^- p$
49.0±2.0	5840	BAUBILLIER	84B	HBC	−	8.25 $K^- p \rightarrow \overline{K}^0 \pi^- p$
56.0±4.0		NAPIER	84	SPEC	−	200 $\pi^- p \rightarrow 2K^0_S X$
51.0±2.0	4100	TOAFF	81	HBC	−	6.5 $K^- p \rightarrow \overline{K}^0 \pi^- p$
50.5±5.6		AJINENKO	80	HBC	+	32 $K^+ p \rightarrow K^0 \pi^+ X$
45.8±3.6	1800	AGUILAR-...	78B	HBC	±	0.76 $\overline{p}p \rightarrow K^\mp K^0_S \pi^\pm$
52.0±2.5	6706	[8] COOPER	78	HBC	±	0.76 $\overline{p}p \rightarrow (K\pi)^\pm X$
52.1±2.2	9000	[9] PALER	75	HBC	−	14.3 $K^- p \rightarrow (K\pi)^- X$
46.3±6.7	765	[8] CLARK	73	HBC	−	3.13 $K^- p \rightarrow \overline{K}^0 \pi^- p$
48.2±5.7	1150	[8,10] CLARK	73	HBC	−	3.3 $K^- p \rightarrow \overline{K}^0 \pi^- p$
54.3±3.3	4404	[8] AGUILAR-...	71B	HBC	−	3.9,4.6 $K^- p \rightarrow (K\pi)^- p$
53 ±4.0	2886	[8] FRIEDMAN	69	HBC	−	2.1 $K^- p \rightarrow \overline{K}^0 \pi^- p$
49 ±7.3	728	[8] FRIEDMAN	69	HBC	−	2.45 $K^- p \rightarrow \overline{K}^0 \pi^- p$
46 ±3.2	3229	[8] FRIEDMAN	69	HBC	−	2.6 $K^- p \rightarrow \overline{K}^0 \pi^- p$
49 ±6.1	1027	[8] FRIEDMAN	69	HBC	−	2.7 $K^- p \rightarrow \overline{K}^0 \pi^- p$
46.0±5.0	1700	[8,10] WOJCICKI	64	HBC	−	1.7 $K^- p \rightarrow \overline{K}^0 \pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
42.8±7.1	3700	BARTH	83	HBC	+	70 $K^+ p \rightarrow K^0 \pi^+ X$
64.0±9.2	800	[8,10] CLELAND	82	SPEC	+	30 $K^+ p \rightarrow K^0_S \pi^+ p$
62.0±4.4	3200	[8,10] CLELAND	82	SPEC	+	50 $K^+ p \rightarrow K^0_S \pi^+ p$
55.0±4.0	3600	[8,10] CLELAND	82	SPEC	−	50 $K^+ p \rightarrow K^0_S \pi^- p$
62.6±3.8	380	DELFOSSE	81	SPEC	+	50 $K^\pm p \rightarrow K^\pm \pi^0 p$
50.5±3.9	187	DELFOSSE	81	SPEC	−	50 $K^\pm p \rightarrow K^\pm \pi^0 p$

NEUTRAL ONLY

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
50.5±0.6 OUR FIT Error includes scale factor of 1.1.						
50.5±0.6 OUR AVERAGE Error includes scale factor of 1.1.						
50.8±0.8±0.9		ASTON	88	LASS	0	11 $K^- p \to K^- \pi^+ n$
46.5±4.3	5900	BARTH	83	HBC	0	70 $K^+ p \to K^+ \pi^- X$
54 ±2	28k	EVANGELISTA	80	OMEG	0	10 $\pi^- p \to K^+ \pi^- (\Lambda, \Sigma)$
45.9±4.8	1180	AGUILAR-...	78B	HBC	0	0.76 $\overline{p} p \to K^\mp K^0_S \pi^\pm$
51.2±1.7		WICKLUND	78	ASPK	0	3,4,6 $K^\pm N \to (K\pi)^0 N$
48.9±2.5		BOWLER	77	DBC	0	5.4 $K^+ d \to K^+ \pi^- pp$
48 $^{+3}_{-2}$	3600	MCCUBBIN	75	HBC	0	3.6 $K^- p \to K^- \pi^+ n$
50.6±2.5	22k	[9] PALER	75	HBC	0	14.3 $K^- p \to (K\pi)^0 X$
47 ±2	10k	FOX	74	RVUE	0	2 $K^- p \to K^- \pi^+ n$
51 ±2		FOX	74	RVUE	0	2 $K^+ n \to K^+ \pi^- p$
46.0±3.3	3186	[8] LEWIS	73	HBC	0	2.1–2.7 $K^+ p \to K\pi\pi p$
51.4±5.0	1700	[8] BUCHNER	72	DBC	0	4.6 $K^+ n \to K^+ \pi^- p$
55.8$^{+4.2}_{-3.4}$	2934	[8] AGUILAR-...	71B	HBC	0	3.9,4.6 $K^- p \to K^- \pi^+ n$
48.5±2.7	5362	AGUILAR-...	71B	HBC	0	3.9,4.6 $K^- p \to K^- \pi^+ \pi^- p$
54.0±3.3	4300	[8,10] HABER	70	DBC	0	3 $K^- N \to K^- \pi^+ X$
53.2±2.1	10k	[8] DAVIS	69	HBC	0	12 $K^+ p \to K^+ \pi^- \pi^+ p$
44 ±5.5	1040	[8] DAUBER	67B	HBC	0	2.0 $K^- p \to K^- \pi^+ \pi^- p$

[7] From a partial wave amplitude analysis.
[8] Width errors enlarged by us to $4 \times \Gamma/\sqrt{N}$; see note.
[9] Inclusive reaction. Complicated background and phase-space effects.
[10] Number of events in peak reevaluated by us.

$K^*(892)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1	$K\pi$	$\sim$ 100 %	
Γ_2	$(K\pi)^\pm$	(99.899±0.009) %	
Γ_3	$(K\pi)^0$	(99.770±0.020) %	
Γ_4	$K^0\gamma$	(2.30 ±0.20) $\times 10^{-3}$	
Γ_5	$K^\pm\gamma$	(1.01 ±0.09) $\times 10^{-3}$	
Γ_6	$K\pi\pi$	$<$ 7 $\times 10^{-4}$	95%

CONSTRAINED FIT INFORMATION

An overall fit to the total width and a partial width uses 18 measurements and one constraint to determine 3 parameters. The overall fit has a $\chi^2 = 15.2$ for 16 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle \delta p_i \delta p_j \right\rangle / (\delta p_i \cdot \delta p_j)$, in percent, from the fit to parameters p_i, including 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.

$$\begin{array}{c|cc} x_5 & -100 & \\ \Gamma & 17 & -17 \\ \hline & x_2 & x_5 \end{array}$$

	Mode	Rate (MeV)
Γ_2	$(K\pi)^\pm$	49.8 ±0.8
Γ_5	$K^\pm\gamma$	0.050±0.005

CONSTRAINED FIT INFORMATION

An overall fit to the total width and a partial width uses 18 measurements and one constraint to determine 3 parameters. The overall fit has a $\chi^2 = 18.4$ for 16 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle\delta p_i \delta p_j\right\rangle/(\delta p_i \cdot \delta p_j)$, in percent, from the fit to parameters p_i, including 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_4	−100	
Γ	14	−14
	x_3	x_4

	Mode	Rate (MeV)	Scale factor
Γ_3	$(K\pi)^0$	50.4 ±0.6	1.1
Γ_4	$K^0\gamma$	0.117±0.010	

$K^*(892)$ PARTIAL WIDTHS

$\Gamma(K^0\gamma)$ — Γ_4

VALUE (keV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
116 ±10 OUR FIT						
116.5± 9.9	584	CARLSMITH	86	SPEC	0	$K^0_L A \rightarrow K^0_S \pi^0 A$

$\Gamma(K^\pm\gamma)$ — Γ_5

VALUE (keV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
50 ± 5 OUR FIT					
50 ± 5 OUR AVERAGE					
48.0±11.0	BERG	83	SPEC	−	156 $K^- A \rightarrow \overline{K}\pi A$
51.0± 5.0	CHANDLEE	83	SPEC	+	200 $K^+ A \rightarrow K\pi A$

$K^*(892)$ BRANCHING RATIOS

$\Gamma(K^0\gamma)/\Gamma_{\text{total}}$ — Γ_4/Γ

VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
2.30±0.20 OUR FIT					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.5 ±0.7	CARITHERS	75B	CNTR	0	8–16 $\overline{K}^0 A$

$\Gamma(K^\pm\gamma)/\Gamma_{\text{total}}$ — Γ_5/Γ

VALUE (units 10^{-3})	*CL%*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1.01±0.09 OUR FIT						
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<1.6	95	BEMPORAD	73	CNTR	+	10–16 $K^+ A$

$\Gamma(K\pi\pi)/\Gamma((K\pi)^\pm)$ — Γ_6/Γ_2

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
<0.0007	95	JONGEJANS	78	HBC		4 $K^- p \rightarrow p\overline{K}^0 2\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.002		WOJCICKI	64	HBC	−	1.7 $K^- p \rightarrow \overline{K}^0 \pi^- p$

$K^*(892)$ REFERENCES

BIRD	89	SLAC-332		(SLAC)
ASTON	88	NP B296 493	+Awaji, Bienz, Bird+	(SLAC, NAGO, CINC, INUS)
ATKINSON	86	ZPHY C30 521	+	(BONN, CERN, GLAS, LANC, MCHS, CURIN+)
CARLSMITH	86	PRL 56 18	+Bernstein, Peyaud, Turlay	(EFI, SACL)
BAUBILLIER	84B	ZPHY C26 37	+	(BIRM, CERN, GLAS, MICH, CURIN)
NAPIER	84	PL 149B 514	+Chen+	(TUFTS, ARIZ, FNAL, FLOR, NDAM+)
BARTH	83	NP B223 296	+Drevermann+	(BRUX, CERN, GENO, MONS+)
BERG	83	Thesis UMI 83-21652		(ROCH)
CHANDLEE	83	PRL 51 168	+Berg, Cihangir, Collick+	(ROCH, FNAL, MINN)
CLELAND	82	NP B208 189	+Delfosse, Dorsaz, Gloor	(DURH, GEVA, LAUS, PITT)
DELFOSSE	81	NP B183 349	+Guisan, Martin, Muhlemann, Weill+	(GEVA, LAUS)
TOAFF	81	PR D23 1500	+Musgrave, Ammar, Davis, Ecklund+	(ANL, KANS)
AJINENKO	80	ZPHY C5 177	+Barth, Dujardin+	(SERP, BRUX, MONS, SACL)
EVANGELISTA	80	NP B165 383	+	(BARI, BONN, CERN, DARE, GLAS, LIVP+)
AGUILAR-...	78B	NP B141 101	Aguilar-Benitez+	(MADR, TATA, CERN+)
BALAND	78	NP B140 220	+Grard+	(MONS, BELG, CERN, LOIC, LALO)
COOPER	78	NP B136 365	+Gurtu+	(TATA, CERN, CDEF+)
JONGEJANS	78	NP B139 383	+Cerrada+	(ZEEM, CERN, NIJM, OXF)
WICKLUND	78	PR D17 1197	+Ayres, Diebold, Greene, Kramer, Pawlicki	(ANL)
BOWLER	77	NP B126 31	+Dainton, Drake, Williams	(OXF)
CARITHERS	75B	PRL 35 349	+Muhlemann, Underwood+	(ROCH, MCGI)
MCCUBBIN	75	NP B86 13	+Lyons	(OXF)
PALER	75	NP B96 1	+Tovey, Shah, Spiro+	(RHEL, SACL, EPOL)
FOX	74	NP B80 403	+Griss	(CIT)
MATISON	74	PR D9 1872	+Galtieri, Alston-Garnjost, Flatte, Friedman+	(LBL)
BEMPORAD	73	NP B51 1	+Beusch, Freudenreich+	(CERN, ETH, LOIC)
CLARK	73	NP B54 432	+Lyons, Radojicic	(OXF)
LEWIS	73	NP B60 283	+Allen, Jacobs+	(LOWC, LOIC, CDEF)
LINGLIN	73	NP B55 408		(CERN)
BUCHNER	72	NP B45 333	+Dehm, Charriere, Cornet+	(MPIM, CERN, BRUX)
AGUILAR-...	71B	PR D4 2583	Aguilar-Benitez, Eisner, Kinson	(BNL)
HABER	70	NP B17 289	+Shapira, Alexander+	(REHO, SACL, BGNA, EPOL)
CRENNELL	69D	PRL 22 487	+Karshon, Lai, O'Neall, Scarr	(BNL)
DAVIS	69	PRL 23 1071	+Derenzo, Flatte, Garnjost, Lynch, Solmitz	(LRL)
FRIEDMAN	69	Thesis UCRL 18860		(LRL)
DEWIT	68	Thesis		(ANIK)
SCHWEING...	68	PR 166 1317	Schweingruber, Derrick, Fields+	(ANL, NWES)
BARASH	67B	PR 156 1399	+Kirsch, Miller, Tan	(COLU)
BARLOW	67	NC 50A 701	+Lillestol, Montanet+	(CERN, CDEF, IRAD, LIVP)
DAUBER	67B	PR 153 1403	+Schlein, Slater, Ticho	(UCLA)
DEBAERE	67B	NC 51A 401	+Goldschmidt-Clermont, Henri+	(BRUX, CERN)
WOJCICKI	64	PR 135B 484		(LRL)

OTHER RELATED PAPERS

KAMAL	92	PL B284 421	+Xu	(ALBE)
NAPIER	84	PL 149B 514	+Chen+	(TUFTS, ARIZ, FNAL, FLOR, NDAM+)
CLELAND	82	NP B208 189	+Delfosse, Dorsaz, Gloor	(DURH, GEVA, LAUS, PITT)
ALEXANDER	62	PRL 8 447	+Kalbfleisch, Miller, Smith	(LRL)
ALSTON	62B	CERN Conf. 291	+Ticho, Wojcicki+	(LRL)
ARMENTEROS	62C	CERN Conf. 295	+Astrer, Montanet+	(CERN, CDEF)
COLLEY	62B	CERN Conf. 315	+Gelfand+	(COLU, RUTG)
ALSTON	61	PRL 6 300	+Alvarez, Eberhard, Good+	(LRL)

$K_1(1270)$

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

Our latest mini-review on this particle can be found in the 1984 edition.

$K_1(1270)$ MASS

VALUE (MeV)	*DOCUMENT ID*
1273±7 OUR AVERAGE	Includes data from the 2 datablocks that follow this one.

PRODUCED BY K^-, BACKWARD SCATTERING, HYPERON EXCHANGE

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

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1275.0±10.0	700	GAVILLET	78	HBC	+	4.2 $K^- p \to \Xi^- (K\pi\pi)^+$

PRODUCED BY K BEAMS

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

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1270 ±10	DAUM	81C	CNTR	−	63 $K^- p \to K^- 2\pi p$

*CITATION: L. Montanet et al., Physical Review D50, 1173 (1994) and 1995 off-year partial update for the 1996 edition (URL: http://pdg.lbl.gov/)

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

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
~ 1276.0	[1] TORNQVIST	82B	RVUE		
~ 1300.0	VERGEEST	79	HBC	−	4.2 $K^- p \to (\overline{K}\pi\pi)^- p$
1289.0±25.0	[2] CARNEGIE	77	ASPK	±	13 $K^\pm p \to (K\pi\pi)^\pm p$
~ 1300	BRANDENB...	76	ASPK	±	13 $K^\pm p \to (K\pi\pi)^\pm p$
~ 1270.0	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] From a unitarized quark-model calculation.
[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	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1294 ±10	310	RODEBACK	81	HBC		4 $\pi^- p \to \Lambda K 2\pi$
1300	40	CRENNELL	72	HBC	0	4.5 $\pi^- p \to \Lambda K 2\pi$
$1242.0^{+\ 9.0}_{-10.0}$		[3] ASTIER	69	HBC	0	$\overline{p}p$
1300	45	CRENNELL	67	HBC	0	6 $\pi^- p \to \Lambda K 2\pi$

[3] This was called the C meson.

$K_1(1270)$ WIDTH

VALUE (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.						
75.0±15.0	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	DAUM	81C	CNTR	−	63 $K^- p \to K^- 2\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 150.0	VERGEEST	79	HBC	−	4.2 $K^- p \to (\overline{K}\pi\pi)^- p$
150.00±71.0	[4] 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 $K^+ d$

[4] 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
• • • We do not use the following data for averages, fits, limits, etc. • • •						
66 ±15	310	RODEBACK	81	HBC		4 $\pi^- p \to \Lambda K 2\pi$
60	40	CRENNELL	72	HBC	0	4.5 $\pi^- p \to \Lambda K 2\pi$
$127.0^{+\ 7.0}_{-25.0}$		ASTIER	69	HBC	0	$\overline{p}p$
60	45	CRENNELL	67	HBC	0	6 $\pi^- p \to \Lambda K 2\pi$

$K_1(1270)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K\rho$	(42 ±6) %
Γ_2	$K_0^*(1430)\pi$	(28 ±4) %
Γ_3	$K^*(892)\pi$	(16 ±5) %
Γ_4	$K\omega$	(11.0±2.0) %
Γ_5	$K f_0(1300)$	(3.0±2.0) %

$K_1(1270)$ 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. • • •					
57.0±5.0	MAZZUCATO	79	HBC	+	4.2 $K^- p \rightarrow \Xi^- (K\pi\pi)^+$
75.0±6.0	CARNEGIE	77B	ASPK	±	13 $K^{\pm} p \rightarrow (K\pi\pi)^{\pm} p$

$\Gamma(K_0^*(1430)\pi)$ Γ_2

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
26.0±6.0	CARNEGIE	77B	ASPK	±	13 $K^{\pm} p \rightarrow (K\pi\pi)^{\pm} p$

$\Gamma(K^*(892)\pi)$ Γ_3

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
14.0±11.0	MAZZUCATO	79	HBC	+	4.2 $K^- p \rightarrow \Xi^- (K\pi\pi)^+$
2.0± 2.0	CARNEGIE	77B	ASPK	±	13 $K^{\pm} p \rightarrow (K\pi\pi)^{\pm} p$

$\Gamma(K\omega)$ Γ_4

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4.0±4.00	MAZZUCATO	79	HBC	+	4.2 $K^- p \rightarrow \Xi^- (K\pi\pi)^+$
24.0±3.0	CARNEGIE	77B	ASPK	±	13 $K^{\pm} p \rightarrow (K\pi\pi)^{\pm} p$

$\Gamma(K f_0(1300))$ Γ_5

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
22.0±5.0	CARNEGIE	77B	ASPK	±	13 $K^{\pm} p \rightarrow (K\pi\pi)^{\pm} p$

$K_1(1270)$ BRANCHING RATIOS

$\Gamma(K\rho)/\Gamma_{total}$ Γ_1/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.42±0.06	[5] DAUM	81C	CNTR	63 $K^- p \rightarrow K^- 2\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
dominant	RODEBACK	81	HBC	4 $\pi^- p \rightarrow \Lambda K 2\pi$

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.28±0.04	[5] DAUM	81C	CNTR	63 $K^- p \rightarrow K^- 2\pi p$

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.16±0.05	[5] DAUM	81C	CNTR	63 $K^- p \rightarrow K^- 2\pi p$

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.11 ±0.02	[5] DAUM	81C	CNTR	63 $K^- p \rightarrow K^- 2\pi p$

$\Gamma(K\omega)/\Gamma(K\rho)$ 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 $\pi^- p \rightarrow \Lambda K 2\pi$

$\Gamma(K f_0(1300))/\Gamma_{total}$ Γ_5/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.03 ±0.02	[5] DAUM	81C	CNTR	63 $K^- p \rightarrow K^- 2\pi p$

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

VALUE	DOCUMENT ID		TECN	COMMENT
1.0±0.7	[5] DAUM	81C	CNTR	63 $K^- p \rightarrow K^- 2\pi p$

[5] Average from low and high t data.

$K_1(1270)$ REFERENCES

TORNQVIST	82B	NP B203 268		(HELS)
DAUM	81C	NP B187 1	+Hertzberger+	(AMST, CERN, CRAC, MPIM, OXF+)
RODEBACK	81	ZPHY C9 9	+Sjogren+	(CERN, CDEF, MADR, STOH)
MAZZUCATO	79	NP B156 532	+Pennington+	(CERN, ZEEM, NIJM, OXF)
VERGEEST	79	NP B158 265	+Jongejans, Dionisi+	(NIJM, AMST, CERN, OXF)
GAVILLET	78	PL 76B 517	+Diaz, Dionisi+	(AMST, CERN, NIJM, OXF) JP
CARNEGIE	77	NP B127 509	+Cashmore, Davier, Dunwoodie, Lasinski+	(SLAC)
CARNEGIE	77B	PL 68B 287	+Cashmore, Dunwoodie, Lasinski+	(SLAC)
BRANDENB...	76	PRL 26 703	Brandenburg, Carnegie, Cashmore+	(SLAC) JP
OTTER	76	NP B106 77	+	(AACH3, BERL, CERN, LOIC, VIEN, EPOL+) JP
CRENNELL	72	PR D6 1220	+Gordon, Lai, Scarr	(BNL)
DAVIS	72	PR D5 2688	+Alston-Garnjost, Barbaro, Flatte, Friedman, Lynch+	(LBL)
FIRESTONE	72B	PR D5 505	+Goldhaber, Lissauer, Trilling	(LBL)
ASTIER	69	NP B10 65	+Marechal, Montanet+	(CDEF, CERN, IPNP, LIVP) IJP
CRENNELL	67	PRL 19 44	+Kalbfleisch, Lai, Scarr, Schumann	(BNL) I

OTHER RELATED PAPERS

SUZUKI	93	PR D47 1252		(LBL)
BAUBILLIER	82B	NP B202 21	+	(BIRM, CERN, GLAS, MSU, CURIN)
FERNANDEZ	82	ZPHY C16 95	+Aguilar-Benitez+	(MADR, CERN, CDEF, STOH) JP
GAVILLET	82	ZPHY C16 119	+Armenteros+	(CERN, CDEF, PADO, ROMA)
SHEN	66	PRL 17 726	+Butterworth, Fu, Goldhaber, Trilling	(LRL)
Also	66	Private Comm.	Goldhaber	(LRL)
ALMEIDA	65	PL 16 184	+Atherton, Byer, Dornan, Forson+	(CAVE)
ARMENTEROS	64	PL 9 207	+Edwards, D'Andlau+	(CERN, CDEF)
Also	66	PR 145 1095	Barash, Kirsch, Miller, Tan	(COLU)
ARMENTEROS	64B	Dubna Conf. 1 577	+Edwards, D'Andlau+	(CERN, CDEF)
Also	64C	Dubna Conf. 1 617	Armenteros	

$K_1(1400)$

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

$K_1(1400)$ MASS

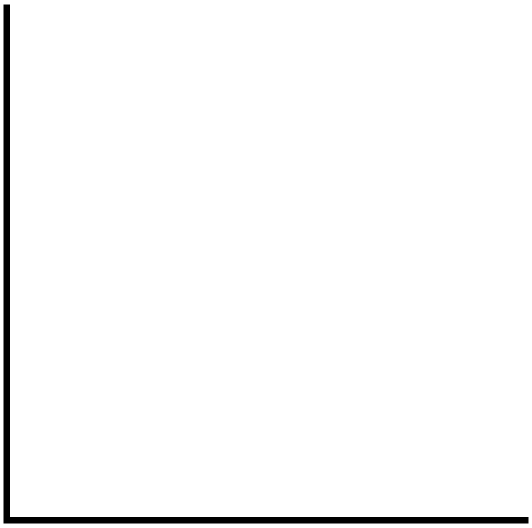
VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
1402 ± 7 OUR AVERAGE					
1373 ±14 ±18	[1] ASTON	87	LASS	0	$11\ K^- p \to \overline{K}^0 \pi^+ \pi^- n$
1392 ±18	BAUBILLIER	82B	HBC	0	$8.25\ K^- p \to K^0_S \pi^+ \pi^- n$
1410 ±25	DAUM	81C	CNTR	−	$63\ K^- p \to K^- 2\pi p$
1415 ±15	ETKIN	80	MPS	0	$6\ K^- p \to \overline{K}^0 \pi^+ \pi^- n$
1404.0±10.0	[2] CARNEGIE	77	ASPK	±	$13\ K^\pm p \to (K\pi\pi)^\pm p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 1350	[3] TORNQVIST	82B	RVUE		
~ 1400.0	VERGEEST	79	HBC	−	$4.2\ K^- p \to (\overline{K}\pi\pi)^- p$
~ 1400	BRANDENB...	76	ASPK	±	$13\ K^\pm p \to (K\pi\pi)^\pm p$
1420	DAVIS	72	HBC	+	$12\ K^+ p$
1368 ±18	FIRESTONE	72B	DBC	+	$12\ K^+ d$

[1] From partial-wave analysis of $K^0 \pi^+ \pi^-$ system.
[2] From a model-dependent fit with Gaussian background to BRANDENBURG 76 data.
[3] From a unitarized quark-model calculation.

$K_1(1400)$ WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
174 ±13 OUR AVERAGE Error includes scale factor of 1.6. See the ideogram below.					
188 ±54 ±60	[4] ASTON	87	LASS	0	$11\ K^- p \to \overline{K}^0 \pi^+ \pi^- n$
276 ±65	BAUBILLIER	82B	HBC	0	$8.25\ K^- p \to K^0_S \pi^+ \pi^- n$
195 ±25	DAUM	81C	CNTR	−	$63\ K^- p \to K^- 2\pi p$
180 ±10	ETKIN	80	MPS	0	$6\ K^- p \to \overline{K}^0 \pi^+ \pi^- n$
142.0±16.0	[5] CARNEGIE	77	ASPK	±	$13\ K^\pm p \to (K\pi\pi)^\pm p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 200.0	VERGEEST	79	HBC	−	$4.2\ K^- p \to (\overline{K}\pi\pi)^- p$
~ 160	BRANDENB...	76	ASPK	±	$13\ K^\pm p \to (K\pi\pi)^\pm p$
80	DAVIS	72	HBC	+	$12\ K^+ p$
241 ±30	FIRESTONE	72B	DBC	+	$12\ K^+ d$

[4] From partial-wave analysis of $K^0 \pi^+ \pi^-$ system.
[5] From a model-dependent fit with Gaussian background to BRANDENBURG 76 data.



$K_1(1400)$ width (MeV)

$K_1(1400)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K^*(892)\pi$	(94 ±6) %
Γ_2	$K\rho$	(3.0±3.0) %
Γ_3	$K f_0(1300)$	(2.0±2.0) %
Γ_4	$K\omega$	(1.0±1.0) %
Γ_5	$K_0^*(1430)\pi$	

$K_1(1400)$ PARTIAL WIDTHS

$\Gamma(K^*(892)\pi)$ — Γ_1

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
117.0±10.0	CARNEGIE	77	ASPK	±	13 $K^\pm p \to (K\pi\pi)^\pm p$

$\Gamma(K\rho)$ — Γ_2

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
2.0±1.0	CARNEGIE	77	ASPK	±	13 $K^\pm p \to (K\pi\pi)^\pm p$

$\Gamma(K\omega)$ — Γ_4

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
23.0±12.0	CARNEGIE	77	ASPK	±	13 $K^\pm p \to (K\pi\pi)^\pm p$

$K_1(1400)$ BRANCHING RATIOS

$\Gamma(K^*(892)\pi)/\Gamma_{\text{total}}$ — Γ_1/Γ

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.94±0.06	[6] DAUM	81C	CNTR	63 $K^- p \to K^- 2\pi p$

$\Gamma(K\rho)/\Gamma_{\text{total}}$ — Γ_2/Γ

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.03 ±0.03	[6] DAUM	81C	CNTR	63 $K^- p \to K^- 2\pi p$

$\Gamma(K f_0(1300))/\Gamma_{\text{total}}$ — Γ_3/Γ

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.02 ±0.02	[6] DAUM	81C	CNTR	63 $K^- p \to K^- 2\pi p$

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

VALUE	DOCUMENT ID	TECN	COMMENT
0.01 ±0.01	[6] DAUM 81C	CNTR	63 $K^- p \to K^- 2\pi p$

$\Gamma(K_0^*(1430)\pi)/\Gamma_{total}$ — Γ_5/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
~ 0.00	[6] DAUM 81C	CNTR	63 $K^- p \to K^- 2\pi p$

D-wave/S-wave RATIO FOR $K_1(1400) \to K^*(892)\pi$

VALUE	DOCUMENT ID	TECN	COMMENT
0.04 ±0.01	[6] DAUM 81C	CNTR	63 $K^- p \to K^- 2\pi p$

[6] Average from low and high t data.

$K_1(1400)$ REFERENCES

ASTON 87 NP B292 693 +Awaji, D'Amore+ (SLAC, NAGO, CINC, INUS)
BAUBILLIER 82B NP B202 21 + (BIRM, CERN, GLAS, MSU, CURIN)
TORNQVIST 82B NP B203 268 (HELS)
DAUM 81C NP B187 1 +Hertzberger+ (AMST, CERN, CRAC, MPIM, OXF+)
ETKIN 80 PR D22 42 +Foley, Lindenbaum, Kramer+ (BNL, CUNY) JP
VERGEEST 79 NP B158 265 +Jongejans, Dionisi+ (NIJM, AMST, CERN, OXF)
CARNEGIE 77 NP B127 509 +Cashmore, Davier, Dunwoodie, Lasinski+ (SLAC)
BRANDENB... 76 PRL 26 703 Brandenburg, Carnegie, Cashmore+ (SLAC) JP
DAVIS 72 PR D5 2688 +Alston-Garnjost, Barbaro, Flatte, Friedman, Lynch+ (LBL)
FIRESTONE 72B PR D5 505 +Goldhaber, Lissauer, Trilling (LBL)

OTHER RELATED PAPERS

SUZUKI 93 PR D47 1252 (LBL)
FERNANDEZ 82 ZPHY C16 95 +Aguilar-Benitez+ (MADR, CERN, CDEF, STOH)
SHEN 66 PRL 17 726 +Butterworth, Fu, Goldhaber, Trilling (LRL)
Also 66 Private Comm. Goldhaber (LRL)
ALMEIDA 65 PL 16 184 +Atherton, Byer, Dornan, Forson+ (CAVE)
ARMENTEROS 64 PL 9 207 +Edwards, D'Andlau+ (CERN, CDEF)
Also 66 PR 145 1095 Barash, Kirsch, Miller, Tan (COLU)
ARMENTEROS 64B Dubna Conf. 1 577 +Edwards, D'Andlau+ (CERN, CDEF)
Also 64C Dubna Conf. 1 617 Armenteros

$K^*(1410)$

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

$K^*(1410)$ MASS

All from partial wave amplitude analyses.

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
1412±12 OUR AVERAGE Error includes scale factor of 1.1.				
1367±54	BIRD 89	LASS	–	11 $K^- p \to \overline{K}^0 \pi^- p$
1380±21±19	ASTON 88	LASS	0	11 $K^- p \to K^- \pi^+ n$
1420± 7±10	ASTON 87	LASS	0	11 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1474±25	BAUBILLIER 82B	HBC	0	8.25 $K^- p \to \overline{K}^0 2\pi n$
1500±30	ETKIN 80	MPS	0	6 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$

$K^*(1410)$ WIDTH

All from partial wave amplitude analyses.

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
227± 22 OUR AVERAGE Error includes scale factor of 1.1.				
114±101	BIRD 89	LASS	–	11 $K^- p \to \overline{K}^0 \pi^- p$
176± 52±22	ASTON 88	LASS	0	11 $K^- p \to K^- \pi^+ n$
240± 18±12	ASTON 87	LASS	0	11 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
275± 65	BAUBILLIER 82B	HBC	0	8.25 $K^- p \to \overline{K}^0 2\pi n$
500±100	ETKIN 80	MPS	0	6 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$

$K^*(1410)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1	$K^*(892)\pi$	> 40 %	95%
Γ_2	$K\pi$	(6.6 ± 1.3) %	
Γ_3	$K\rho$	< 7 %	95%

$K^*(1410)$ BRANCHING RATIOS

$\Gamma(K\rho)/\Gamma(K^*(892)\pi)$ — Γ_3/Γ_1

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
<0.17	95	ASTON	84	LASS	0	11 $K^- p \rightarrow \overline{K}^0 2\pi n$

$\Gamma(K\pi)/\Gamma(K^*(892)\pi)$ — Γ_2/Γ_1

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
<0.16	95	ASTON	84	LASS	0	11 $K^- p \rightarrow \overline{K}^0 2\pi n$

$\Gamma(K\pi)/\Gamma_{total}$ — Γ_2/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.066±0.010±0.008	ASTON	88	LASS	0	11 $K^- p \rightarrow K^-\pi^+ n$

$K^*(1410)$ REFERENCES

BIRD	89	SLAC-332		(SLAC)	
ASTON	88	NP B296 493	+Awaji, Bienz, Bird+	(SLAC, NAGO, CINC, INUS)	
ASTON	87	NP B292 693	+Awaji, D'Amore+	(SLAC, NAGO, CINC, INUS)	
ASTON	84	PL 149B 258	+Carnegie, Dunwoodie+	(SLAC, CARL, OTTA)	JP
BAUBILLIER	82B	NP B202 21	+	(BIRM, CERN, GLAS, MSU, CURIN)	
ETKIN	80	PR D22 42	+Foley, Lindenbaum, Kramer+	(BNL, CUNY)	JP

$K_0^*(1430)$

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

Our latest mini-review on this particle can be found in the 1984 edition.

$K_0^*(1430)$ MASS

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
1429 ±4±5	[1] ASTON	88	LASS	0	11 $K^- p \rightarrow K^-\pi^+ n$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 1430	BAUBILLIER	84B	HBC	−	8.25 $K^- p \rightarrow \overline{K}^0\pi^- p$
~ 1425	[2,3] ESTABROOKS	78	ASPK		13 $K^\pm p \rightarrow K^\pm\pi^\pm(n,\Delta)$
~ 1450.0	MARTIN	78	SPEC		10 $K^\pm p \rightarrow K_S^0\pi p$

[1] Uses a model for the background, without this background they get a mass 1340 MeV, where the phase shift passes 90°.
[2] Mass defined by pole position.
[3] From elastic $K\pi$ partial-wave analysis.

$K_0^*(1430)$ WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
287±10±21	ASTON	88	LASS	0	11 $K^- p \rightarrow K^-\pi^+ n$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 200	BAUBILLIER	84B	HBC	−	8.25 $K^- p \rightarrow \overline{K}^0\pi^- p$
200 to 300	[4] ESTABROOKS	78	ASPK		13 $K^\pm p \rightarrow K^\pm\pi^\pm(n,\Delta)$

[4] From elastic $K\pi$ partial-wave analysis.

$K_0^*(1430)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K\pi$	(93 ± 10) %

$K_0^*(1430)$ BRANCHING RATIOS

$\Gamma(K\pi)/\Gamma_{total}$ Γ_1/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.93±0.04±0.09	ASTON	88	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$

$K_0^*(1430)$ REFERENCES

ASTON 88 NP B296 493 +Awaji, Bienz, Bird+ (SLAC, NAGO, CINC, INUS)
BAUBILLIER 84B ZPHY C26 37 + (BIRM, CERN, GLAS, MICH, CURIN)
ESTABROOKS 78 NP B133 490 +Carnegie+ (MCGI, CARL, DURH, SLAC)
MARTIN 78 NP B134 392 +Shimada, Baldi, Bohringer+ (DURH, GEVA)

OTHER RELATED PAPERS

TORNQVIST 82 PRL 49 624 (HELS)
GOLDBERG 69 PL 30B 434 +Huffer, Laloum+ (SABRE Collab.)
SCHLEIN 69 Argonne Conf. 446 (UCLA)
TRIPPE 68 PL 28B 203 +Chien, Malamud, Mellema, Schlein+ (UCLA)

$K_2^*(1430)$

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

We consider that phase-shift analyses provide more reliable determinations of the mass and width.

$K_2^*(1430)$ MASS

CHARGED ONLY, WITH FINAL STATE $K\pi$

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1425.4± 1.3 OUR AVERAGE		Error includes scale factor of 1.1.				
1423.4± 2 ±3	24809± 820	[1] BIRD	89	LASS	−	11 $K^- p \rightarrow \overline{K}^0 \pi^- p$
1420 ± 4	1587	BAUBILLIER	84B	HBC	−	8.25 $K^- p \rightarrow \overline{K}^0 \pi^- p$
1436 ± 5.5	400	[2,3] CLELAND	82	SPEC	+	30 $K^+ p \rightarrow K_S^0 \pi^+ p$
1430 ± 3.2	1500	[2,3] CLELAND	82	SPEC	+	50 $K^+ p \rightarrow K_S^0 \pi^+ p$
1430 ± 3.2	1200	[2,3] CLELAND	82	SPEC	−	50 $K^+ p \rightarrow K_S^0 \pi^- p$
1423.0± 5.0	935	TOAFF	81	HBC	−	6.5 $K^- p \rightarrow \overline{K}^0 \pi^- p$
1428.0± 4.6		[4] MARTIN	78	SPEC	+	10 $K^\pm p \rightarrow K_S^0 \pi p$
1423.8± 4.6		[4] MARTIN	78	SPEC	−	10 $K^\pm p \rightarrow K_S^0 \pi p$
1420.0± 3.1	1400	AGUILAR-...	71B	HBC	−	3.9,4.6 $K^- p$
1425 ± 8.0	225	[2,3] BARNHAM	71C	HBC	+	$K^+ p \rightarrow K^0 \pi^+ p$
1416.0±10.0	220	CRENNELL	69D	DBC	−	3.9 $K^- N \rightarrow \overline{K}^0 \pi^- N$
1414 ±13.0	60	[2] LIND	69	HBC	+	9 $K^+ p \rightarrow K^0 \pi^+ p$
1427.0±12.0	63	[2] SCHWEING...	68	HBC	−	5.5 $K^- p \rightarrow \overline{K} \pi N$
1423 ±11.0	39	[2] BASSANO	67	HBC	−	4.6–5.0 $K^- p \rightarrow \overline{K}^0 \pi^- p$

NEUTRAL ONLY

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1432.4± 1.3 OUR AVERAGE						
1431.2± 1.8± 0.7		[5] ASTON	88	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$
1434 ± 4 ± 6		[5] ASTON	87	LASS	0	11 $K^- p \rightarrow \overline{K}^0 \pi^+ \pi^- n$
1433 ± 6 ±10		[5] ASTON	84B	LASS	0	11 $K^- p \rightarrow \overline{K}^0 2\pi n$
1471 ±12		[5] BAUBILLIER	82B	HBC	0	8.25 $K^- p \rightarrow N K_S^0 \pi\pi$
1428 ± 3		[5] ASTON	81C	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$
1434.0± 2.0		[5] ESTABROOKS	78	ASPK	0	13 $K^\pm p \rightarrow p K \pi$
1440.0±10.0		[5] BOWLER	77	DBC	0	5.5 $K^+ d \rightarrow K \pi p p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1420.0± 7.0	300	HENDRICK	76	DBC		8.25 $K^+ N \rightarrow K^+ \pi N$
1421.6± 4.2	800	MCCUBBIN	75	HBC	0	3.6 $K^- p \rightarrow K^- \pi^+ n$
1420.1± 4.3		[6] LINGLIN	73	HBC	0	2–13 $K^+ p \rightarrow K^+ \pi^- X$
1419.1± 3.7	1800	AGUILAR-...	71B	HBC	0	3.9,4.6 $K^- p$
1416 ± 6	600	CORDS	71	DBC	0	9 $K^+ n \rightarrow K^+ \pi^- p$
1421.1± 2.6	2200	DAVIS	69	HBC	0	12 $K^+ p \rightarrow K^+ \pi^- X$

[1] From a partial wave amplitude analysis.
[2] Errors enlarged by us to $\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.
[3] Number of events in peak re-evaluated by us.
[4] Systematic error added by us.
[5] From phase shift or partial-wave analysis.
[6] From pole extrapolation, using world $K^+ p$ data summary tape.

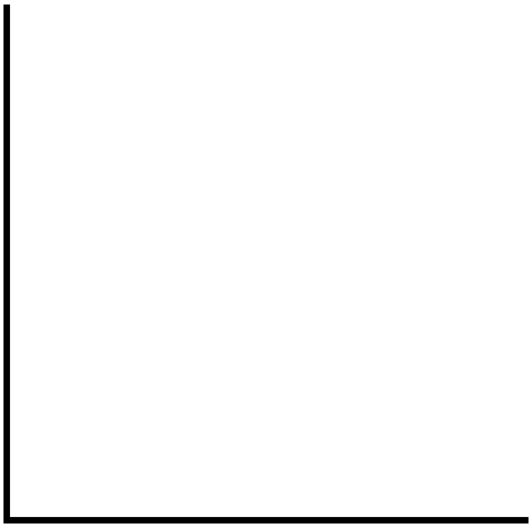
$K_2^*(1430)$ WIDTH

CHARGED ONLY, WITH FINAL STATE $K\pi$

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
98.4± 2.3 OUR FIT						
98.4± 2.4 OUR AVERAGE						
98 ± 4 ±4	24809± 820	[7] BIRD	89	LASS	−	11 $K^- p \rightarrow \overline{K}^0 \pi^- p$
109 ±22	400	[8,9] CLELAND	82	SPEC	+	30 $K^+ p \rightarrow K^0_S \pi^+ p$
124 ±12.8	1500	[8,9] CLELAND	82	SPEC	+	50 $K^+ p \rightarrow K^0_S \pi^+ p$
113 ±12.8	1200	[8,9] CLELAND	82	SPEC	−	50 $K^+ p \rightarrow K^0_S \pi^- p$
85.0±16.0	935	TOAFF	81	HBC	−	6.5 $K^- p \rightarrow \overline{K}^0 \pi^- p$
96.5± 3.8		MARTIN	78	SPEC	+	10 $K^\pm p \rightarrow K^0_S \pi p$
97.7± 4.0		MARTIN	78	SPEC	−	10 $K^\pm p \rightarrow K^0_S \pi p$
$94.7^{+15.1}_{-12.5}$	1400	AGUILAR-...	71B	HBC	−	3.9,4.6 $K^- p$

NEUTRAL ONLY

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
109 ± 5 OUR AVERAGE	Error includes scale factor of 1.9. See the ideogram below.					
116.5± 3.6± 1.7		[10] ASTON	88	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$
129 ±15 ±15		[10] ASTON	87	LASS	0	11 $K^- p \rightarrow \overline{K}^0 \pi^+ \pi^- n$
131 ±24 ±20		[10] ASTON	84B	LASS	0	11 $K^- p \rightarrow \overline{K}^0 2\pi n$
143 ±34		[10] BAUBILLIER	82B	HBC	0	8.25 $K^- p \rightarrow N K^0_S \pi\pi$
98 ± 8		[10] ASTON	81C	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$
140 ±30		[10] ETKIN	80	SPEC	0	6 $K^- p \rightarrow \overline{K}^0 \pi^+ \pi^- n$
98.0± 5.0		[10] ESTABROOKS	78	ASPK	0	13 $K^\pm p \rightarrow p K \pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
125.0±29.0	300	[8] HENDRICK	76	DBC		8.25 $K^+ N \rightarrow K^+ \pi N$
116 ±18	800	MCCUBBIN	75	HBC	0	3.6 $K^- p \rightarrow K^- \pi^+ n$
61.0±14.0		[11] LINGLIN	73	HBC	0	2–13 $K^+ p \rightarrow K^+ \pi^- X$
$116.6^{+10.3}_{-15.5}$	1800	AGUILAR-...	71B	HBC	0	3.9,4.6 $K^- p$
144 ±24.0	600	[8] CORDS	71	DBC	0	9 $K^+ n \rightarrow K^+ \pi^- p$
101 ±10	2200	DAVIS	69	HBC	0	12 $K^+ p \rightarrow K^+ \pi^- \pi^+ p$



$K_2^*(1430)^0$ width (MeV)

[7] From a partial wave amplitude analysis.
[8] Errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.
[9] Number of events in peak re-evaluated by us.
[10] From phase shift or partial-wave analysis.
[11] From pole extrapolation, using world $K^+ p$ data summary tape.

$K_2^*(1430)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	$K\pi$	(49.7 ± 1.2) %	
Γ_2	$K^*(892)\pi$	(25.2 ± 1.7) %	
Γ_3	$K^*(892)\pi\pi$	(13.0 ± 2.3) %	
Γ_4	$K\rho$	(8.8 ± 0.8) %	S=1.2
Γ_5	$K\omega$	(2.9 ± 0.8) %	
Γ_6	$K^+\gamma$	$(2.4\pm0.5)\times10^{-3}$	
Γ_7	$K\eta$	$(1.4^{+2.8}_{-0.9})\times10^{-3}$	S=1.1
Γ_8	$K\omega\pi$	$<7.2\times10^{-4}$	CL=95%
Γ_9	$K^0\gamma$	$<9\times10^{-4}$	CL=90%

CONSTRAINED FIT INFORMATION

An overall fit to the total width, a partial width, and 10 branching ratios uses 28 measurements and one constraint to determine 8 parameters. The overall fit has a $\chi^2 = 19.5$ for 21 degrees of freedom.

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

x_2	−16						
x_3	−33	−75					
x_4	−12	39	−54				
x_5	−11	−3	−25	−8			
x_6	−1	−1	−1	−1	0		
x_7	−3	−6	−4	−4	−2	0	
Γ	0	0	0	0	0	−13	0
	x_1	x_2	x_3	x_4	x_5	x_6	x_7

	Mode	Rate (MeV)	Scale factor
Γ_1	$K\pi$	48.9 ± 1.7	
Γ_2	$K^*(892)\pi$	24.8 ± 1.7	
Γ_3	$K^*(892)\pi\pi$	12.8 ± 2.3	
Γ_4	$K\rho$	8.7 ± 0.8	1.2
Γ_5	$K\omega$	2.9 ± 0.8	
Γ_6	$K^+\gamma$	0.24 ± 0.04	
Γ_7	$K\eta$	$0.14^{+0.28}_{-0.09}$	1.1

$K_2^*(1430)$ PARTIAL WIDTHS

$\Gamma(K^+\gamma)$ — Γ_6

VALUE (keV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
240±40 OUR FIT					
240±45	CIHANGIR	82	SPEC	+	200 $K^+ Z \to Z K^+ \pi^0$, $Z K_S^0 \pi^+$

$\Gamma(K^0\gamma)$ — Γ_9

VALUE (keV)	*CL%*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
<84	90	CARLSMITH	87	SPEC	0	60–200 $K_L^0 A \to K_S^0 \pi^0 A$

$K_2^*(1430)$ BRANCHING RATIOS

$\Gamma(K\pi)/\Gamma_{\rm total}$ — Γ_1/Γ

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
0.497±0.012 OUR FIT					
0.488±0.014 OUR AVERAGE					
0.485±0.006±0.020	[12] ASTON	88	LASS	0	11 $K^- p \to K^- \pi^+ n$
0.49 ±0.02	[12] ESTABROOKS	78	ASPK	±	13 $K^\pm p \to p K \pi$

$\Gamma(K^*(892)\pi)/\Gamma(K\pi)$ — $\Gamma_2/\Gamma_1 = \Gamma_2/(\Gamma_1+\Gamma_2+\Gamma_4)$

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.47±0.10	BASSANO	67	HBC	−0	4.6,5.0 $K^- p$
0.45±0.13	[13] BADIER	65C	HBC	−	3 $K^- p$

$\Gamma(K\rho)/\Gamma(K\pi)$ — $\Gamma_4/\Gamma_1 = \Gamma_4/(\Gamma_1+\Gamma_2+\Gamma_4)$

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.14±0.10	BASSANO	67	HBC	−0	4.6,5.0 $K^- p$
0.14±0.07	[13] BADIER	65C	HBC	−	3 $K^- p$

$\Gamma(K^*(892)\pi)/\Gamma(K\pi)$ Γ_2/Γ_1

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.51±0.04 OUR FIT					
0.48±0.05 OUR AVERAGE					
0.44±0.09	ASTON	84B	LASS	0	11 $K^- p \to \overline{K}^0 2\pi n$
0.62±0.19	LAUSCHER	75	HBC	0	10,16 $K^- p \to K^- \pi^+ n$
0.54±0.16	DEHM	74	DBC	0	4.6 $K^+ N$
0.47±0.08	AGUILAR-...	71B	HBC		3.9,4.6 $K^- p$

$\Gamma(K\omega)/\Gamma(K\pi)$ Γ_5/Γ_1

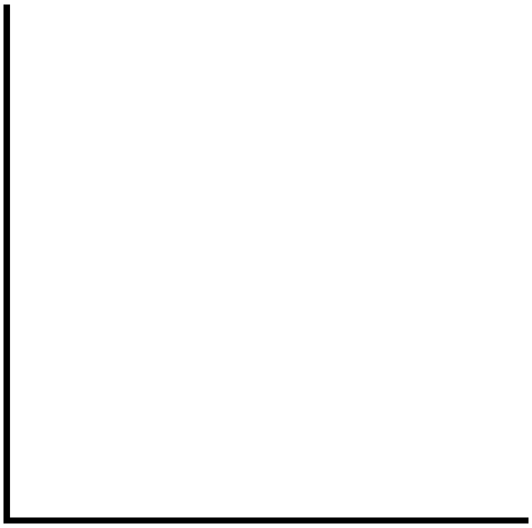
VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.059±0.017 OUR FIT					
0.070±0.035 OUR AVERAGE					
0.05 ±0.04	AGUILAR-...	71B	HBC		3.9,4.6 $K^- p$
0.13 ±0.07	BASSOMPIE...	69	HBC	0	5 $K^+ p$

$\Gamma(K\rho)/\Gamma(K\pi)$ Γ_4/Γ_1

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.178±0.018 OUR FIT	Error includes scale factor of 1.2.				
$0.153^{+0.034}_{-0.018}$ OUR AVERAGE					
0.18 ±0.05	ASTON	84B	LASS	0	11 $K^- p \to \overline{K}^0 2\pi n$
$0.02\ ^{+0.10}_{-0.02}$	DEHM	74	DBC	0	4.6 $K^+ N$
0.16 ±0.05	AGUILAR-...	71B	HBC		3.9,4.6 $K^- p$

$\Gamma(K\rho)/\Gamma(K^*(892)\pi)$ Γ_4/Γ_2

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.351±0.032 OUR FIT	Error includes scale factor of 1.5.				
0.354±0.033 OUR AVERAGE	Error includes scale factor of 1.4. See the ideogram below.				
0.293±0.032±0.020	ASTON	87	LASS	0	11 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
0.38 ±0.09	BAUBILLIER	82B	HBC	0	8.25 $K^- p \to N K^0_S \pi\pi$
0.39 ±0.03	DAUM	81C	CNTR		63 $K^- p \to K^- 2\pi p$



$\Gamma\left(K\rho\right)/\Gamma\left(K^*(892)\pi\right)$

$\Gamma(K\omega)/\Gamma(K^*(892)\pi)$ Γ_5/Γ_2

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.116±0.034 OUR FIT					
0.10 ±0.04	FIELD	67	HBC	–	3.8 $K^- p$

*CITATION: L. Montanet et al., Physical Review D50, 1173 (1994) and 1995 off-year partial update for the 1996 edition (URL: http://pdg.lbl.gov/)

$\Gamma(K\eta)/\Gamma(K^*(892)\pi)$ Γ_7/Γ_2

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
$0.006^{+0.011}_{-0.004}$ OUR FIT					
0.07 ±0.04	FIELD	67	HBC	−	3.8 $K^- p$

$\Gamma(K\eta)/\Gamma(K\pi)$ Γ_7/Γ_1

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
$0.0028^{+0.0057}_{-0.0019}$ OUR FIT Error includes scale factor of 1.1.						
0 ±0.0056		[14] ASTON	88B	LASS	−	11 $K^- p \rightarrow K^- \eta p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.04	95	AGUILAR-...	71B	HBC		3.9,4.6 $K^- p$
<0.065		[13] BASSOMPIE...	69	HBC		5.0 $K^+ p$
<0.02		BISHOP	69	HBC		3.5 $K^+ p$

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

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.130±0.023 OUR FIT					
0.12 ±0.04	[15] GOLDBERG	76	HBC	−	3 $K^- p \rightarrow p\overline{K}^0 \pi\pi\pi$

$\Gamma(K^*(892)\pi\pi)/\Gamma(K\pi)$ Γ_3/Γ_1

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.26±0.05 OUR FIT					
0.21±0.08	[13,15] JONGEJANS	78	HBC	−	4 $K^- p \rightarrow p\overline{K}^0 \pi\pi\pi$

$\Gamma(K\omega\pi)/\Gamma_{total}$ Γ_8/Γ

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.72	95	0	JONGEJANS	78	HBC	4 $K^- p \rightarrow p\overline{K}^0 4\pi$

[12] From phase shift analysis.
[13] Restated by us.
[14] ASTON 88B quote < 0.0092 at CL=95%. We convert this to a central value and 1 sigma error in order to be abe to use it in our constrained fit.
[15] Assuming $\pi\pi$ system has isospin 1, which is supported by the data.

$K_2^*(1430)$ REFERENCES

BIRD	89	SLAC-332		(SLAC)
ASTON	88	NP B296 493	+Awaji, Bienz, Bird+	(SLAC, NAGO, CINC, INUS)
ASTON	88B	PL B201 169	+Awaji, Bienz+	(SLAC, NAGO, CINC, INUS)
ASTON	87	NP B292 693	+Awaji, D'Amore+	(SLAC, NAGO, CINC, INUS)
CARLSMITH	87	PR D36 3502	+Bernstein, Bock, Coupal, Peyaud, Turlay+	(EFI, SACL)
ASTON	84B	NP B247 261	+Carnegie, Dunwoodie+	(SLAC, CARL, OTTA)
BAUBILLIER	84B	ZPHY C26 37	+	(BIRM, CERN, GLAS, MICH, CURIN)
BAUBILLIER	82B	NP B202 21	+	(BIRM, CERN, GLAS, MSU, CURIN)
CIHANGIR	82	PL 117B 123	+Berg, Biel, Chandlee+	(FNAL, MINN, ROCH)
CLELAND	82	NP B208 189	+Delfosse, Dorsaz, Gloor	(DURH, GEVA, LAUS, PITT)
ASTON	81C	PL 106B 235	+Carnegie, Dunwoodie+	(SLAC, CARL, OTTA) JP
DAUM	81C	NP B187 1	+Hertzberger+	(AMST, CERN, CRAC, MPIM, OXF+)
TOAFF	81	PR D23 1500	+Musgrave, Ammar, Davis, Ecklund+	(ANL, KANS)
ETKIN	80	PR D22 42	+Foley, Lindenbaum, Kramer+	(BNL, CUNY) JP
ESTABROOKS	78	NP B133 490	+Carnegie+	(MCGI, CARL, DURH, SLAC)
Also	78B	PR D17 658	Estabrooks, Carnegie+	(MCGI, CARL, DURH+)
JONGEJANS	78	NP B139 383	+Cerrada+	(ZEEM, CERN, NIJM, OXF)
MARTIN	78	NP B134 392	+Shimada, Baldi, Bohringer+	(DURH, GEVA)
BOWLER	77	NP B126 31	+Dainton, Drake, Williams	(OXF)
GOLDBERG	76	LNC 17 253		(HAIF)
HENDRICK	76	NP B112 189	+Vignaud, Burlaud+	(MONS, SACL, PARIS, BELG)
LAUSCHER	75	NP B86 189	+Otter, Wieczorek+	(ABCLV Collab.) JP
MCCUBBIN	75	NP B86 13	+Lyons	(OXF)
DEHM	74	NP B75 47	+Goebel, Wittek+	(MPIM, BRUX, MONS, CERN)
LINGLIN	73	NP B55 408		(CERN)
AGUILAR-...	71B	PR D4 2583	Aguilar-Benitez, Eisner, Kinson	(BNL)
BARNHAM	71C	NP B28 171	+Colley, Jobes, Griffiths, Hughes+	(BIRM, GLAS)
CORDS	71	PR D4 1974	+Carmony, Erwin, Meiere+	(PURD, UCD, IUPU)
BASSOMPIE...	69	NP B13 189	Bassompierre+	(CERN, BRUX) JP
BISHOP	69	NP B9 403	+Goshaw, Erwin, Walker	(WISC)
CRENNELL	69D	PRL 22 487	+Karshon, Lai, O'Neall, Scarr	(BNL)
DAVIS	69	PRL 23 1071	+Derenzo, Flatte, Garnjost, Lynch, Solmitz	(LRL)
LIND	69	NP B14 1	+Alexander, Firestone, Fu, Goldhaber	(LRL) JP
SCHWEING...	68	PR 166 1317	Schweingruber, Derrick, Fields+	(ANL, NWES)
Also	67	Thesis	Schweingruber	(NWES, NWES)
BASSANO	67	PRL 19 968	+Goldberg, Goz, Barnes, Leitner+	(BNL, SYRA)
FIELD	67	PL 24B 638	+Hendricks, Piccioni, Yager	(UCSD)
BADIER	65C	PL 19 612	+Demoulin, Goldberg+	(EPOL, SACL, AMST)

OTHER RELATED PAPERS

ATKINSON	86	ZPHY C30 521	+	(BONN, CERN, GLAS, LANC, MCHS, CURIN+)
BAUBILLIER	82B	NP B202 21	+	(BIRM, CERN, GLAS, MSU, CURIN)
CHUNG	65	PRL 15 325	+Dahl, Hardy, Hess, Jacobs, Kirz	(LRL)
FOCARDI	65	PL 16 351	+Ranzi, Serra+	(BGNA, SACL)
HAQUE	65	PL 14 338	Hague+	
HARDY	65	PRL 14 401	+Chung, Dahl, Hess, Kirz, Miller	(LRL)

$K(1460)$

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

OMITTED FROM SUMMARY TABLE

Observed in $K\pi\pi$ partial-wave analysis. Not seen by VERGEEST 79. Needs confirmation.

$K(1460)$ MASS

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 1460	DAUM 81C	CNTR	−	63 $K^- p \to K^- 2\pi p$
~ 1400	[1] BRANDENB... 76B	ASPK	±	13 $K^\pm p \to K\pi\pi N$

[1] Coupled mainly to $K f_0(1300)$. Decay into $K^*(892)\pi$ seen.

$K(1460)$ WIDTH

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 260	DAUM 81C	CNTR	−	63 $K^- p \to K^- 2\pi p$
~ 250	[2] BRANDENB... 76B	ASPK	±	13 $K^\pm p \to K\pi\pi N$

[2] Coupled mainly to $K f_0(1300)$. Decay into $K^*(892)\pi$ seen.

$K(1460)$ DECAY MODES

	Mode
Γ_1	$K^*(892)\pi$
Γ_2	$K\rho$
Γ_3	$K_0^*(1430)\pi$

$K(1460)$ PARTIAL WIDTHS

$\Gamma(K^*(892)\pi)$ — Γ_1

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
~ 109	DAUM 81C	CNTR	63 $K^- p \to K^- 2\pi p$

$\Gamma(K\rho)$ — Γ_2

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
~ 34	DAUM 81C	CNTR	63 $K^- p \to K^- 2\pi p$

$\Gamma(K_0^*(1430)\pi)$ — Γ_3

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
~ 117	DAUM 81C	CNTR	63 $K^- p \to K^- 2\pi p$

$K(1460)$ REFERENCES

DAUM	81C	NP B187 1	+Hertzberger+	(AMST, CERN, CRAC, MPIM, OXF+)
VERGEEST	79	NP B158 265	+Jongejans, Dionisi+	(NIJM, AMST, CERN, OXF)
BRANDENB...	76B	PRL 36 1239	Brandenburg, Carnegie, Cashmore+	(SLAC) JP

OTHER RELATED PAPERS

BARNES	82	PL B116 365	+Close	(RHEL)
TANIMOTO	82	PL 116B 198		(BIEL)
VERGEEST	79	NP B158 265	+Jongejans, Dionisi+	(NIJM, AMST, CERN, OXF)

$K_2(1580)$

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

OMITTED FROM SUMMARY TABLE

Seen in partial-wave analysis of the $K^- \pi^+ \pi^-$ system. Needs confirmation.

$K_2(1580)$ MASS

VALUE (MeV)	*DOCUMENT ID*		*CHG*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 1580	OTTER	79	$-$	10,14,16 $K^- p$

$K_2(1580)$ WIDTH

VALUE (MeV)	*DOCUMENT ID*		*CHG*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 110	OTTER	79	$-$	10,14,16 $K^- p$

$K_2(1580)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K^*(892)\pi$	seen
Γ_2	$K_2^*(1430)\pi$	possibly seen

$K_2(1580)$ BRANCHING RATIOS

$\Gamma(K^*(892)\pi)/\Gamma_{total}$ **Γ_1/Γ**

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
seen	OTTER	79	HBC	$-$	10,14,16 $K^- p$

$\Gamma(K_2^*(1430)\pi)/\Gamma_{total}$ **Γ_2/Γ**

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
possibly seen	OTTER	79	HBC	$-$	10,14,16 $K^- p$

$K_2(1580)$ REFERENCES

OTTER 79 NP B147 1 +Rudolph+ (AACH3, BERL, CERN, LOIC, WIEN)JP

$K_1(1650)$

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

OMITTED FROM SUMMARY TABLE

This entry contains various peaks in strange meson systems ($K^+\phi$, $K\pi\pi$) reported in partial-wave analysis in the 1600–1900 mass region.

$K_1(1650)$ MASS

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
1650±50	FRAME	86	OMEG	+	13 $K^+ p \to \phi K^+ p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 1840	ARMSTRONG	83	OMEG	−	18.5 $K^- p \to 3K p$
~ 1800	DAUM	81C	CNTR	−	63 $K^- p \to K^- 2\pi p$

$K_1(1650)$ WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
150±50	FRAME	86	OMEG	+	13 $K^+ p \to \phi K^+ p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 250	DAUM	81C	CNTR	−	63 $K^- p \to K^- 2\pi p$

$K_1(1650)$ DECAY MODES

	Mode
Γ_1	$K\pi\pi$
Γ_2	$K\phi$

$K_1(1650)$ REFERENCES

FRAME	86	NP B276 667	+Hughes, Lynch, Minto, McFadzean+	(GLAS)
ARMSTRONG	83	NP B221 1	+	(BARI, BIRM, CERN, MILA, CURIN+)
DAUM	81C	NP B187 1	+Hertzberger+	(AMST, CERN, CRAC, MPIM, OXF+)

$K^*(1680)$

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

$K^*(1680)$ MASS

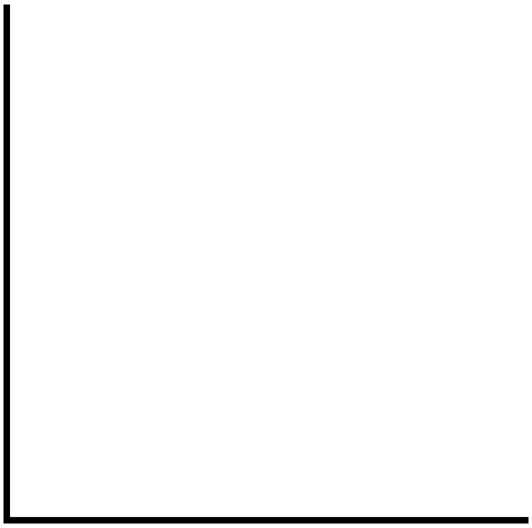
All from partial wave amplitude analyses.

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
1714±20 OUR AVERAGE Error includes scale factor of 1.1.					
1678±64	BIRD	89	LASS	−	11 $K^- p \to \overline{K}^0 \pi^- p$
1677±10±32	ASTON	88	LASS	0	11 $K^- p \to K^- \pi^+ n$
1735±10±20	ASTON	87	LASS	0	11 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1800±70	ETKIN	80	MPS	0	6 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
~ 1650	ESTABROOKS	78	ASPK	0	13 $K^\pm p \to K^\pm \pi^\pm n$

$K^*(1680)$ WIDTH

All from partial wave amplitude analyses.

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
323±110 OUR AVERAGE Error includes scale factor of 4.2. See the ideogram below.					
454±270	BIRD	89	LASS	−	11 $K^- p \to \overline{K}^0 \pi^- p$
205± 16±34	ASTON	88	LASS	0	11 $K^- p \to K^- \pi^+ n$
423± 18±30	ASTON	87	LASS	0	11 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
170± 30	ETKIN	80	MPS	0	6 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
250 to 300	ESTABROOKS	78	ASPK	0	13 $K^\pm p \to K^\pm \pi^\pm n$



$K^*(1680)$ width (MeV)

$K^*(1680)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K\pi$	(38.7 ± 2.5) %
Γ_2	$K\rho$	$(31.4^{+4.7}_{-2.1})$ %
Γ_3	$K^*(892)\pi$	$(29.9^{+2.2}_{-4.7})$ %

CONSTRAINED FIT INFORMATION

An overall fit to 4 branching ratios uses 4 measurements and one constraint to determine 3 parameters. The overall fit has a $\chi^2 =$ 2.9 for 2 degrees of freedom.

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

$$\begin{array}{c|cc} x_2 & -36 & \\ x_3 & -39 & -72 \\ \hline & x_1 & x_2 \end{array}$$

$K^*(1680)$ BRANCHING RATIOS

$\Gamma(K\pi)/\Gamma_{\rm total}$ $\qquad$ **Γ_1/Γ**

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
0.387±0.026 OUR FIT					
0.388±0.014±0.022	ASTON	88	LASS	0	11 $K^-p \rightarrow K^-\pi^+n$

$\Gamma(K\pi)/\Gamma(K^*(892)\pi)$ $\qquad$ **Γ_1/Γ_3**

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
$1.30^{+0.23}_{-0.14}$ OUR FIT					
2.8 ±1.1	ASTON	84	LASS	0	11 $K^-p \rightarrow \overline{K}^0 2\pi n$

$\Gamma(K\rho)/\Gamma(K\pi)$ Γ_2/Γ_1

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
$0.81^{+0.14}_{-0.09}$ OUR FIT					
1.2 ±0.4	ASTON	84	LASS	0	11 $K^- p \rightarrow \overline{K}^0 2\pi n$

$\Gamma(K\rho)/\Gamma(K^*(892)\pi)$ Γ_2/Γ_3

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
$1.05^{+0.27}_{-0.11}$ OUR FIT					
$0.97\pm0.09^{+0.30}_{-0.10}$	ASTON	87	LASS	0	11 $K^- p \rightarrow \overline{K}^0 \pi^+ \pi^- n$

$K^*(1680)$ REFERENCES

BIRD	89	SLAC-332		(SLAC)
ASTON	88	NP B296 493	+Awaji, Bienz, Bird+	(SLAC, NAGO, CINC, INUS)
ASTON	87	NP B292 693	+Awaji, D'Amore+	(SLAC, NAGO, CINC, INUS)
ASTON	84	PL 149B 258	+Carnegie, Dunwoodie+	(SLAC, CARL, OTTA) JP
ETKIN	80	PR D22 42	+Foley, Lindenbaum, Kramer+	(BNL, CUNY) JP
ESTABROOKS	78	NP B133 490	+Carnegie+	(MCGI, CARL, DURH, SLAC) JP

$K_2(1770)$
was $L(1770)$

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

MINIREVIEW GOES HERE

$K_2(1770)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1773 ± 8		[1] ASTON	93	LASS		$11 K^- p \rightarrow K^- \omega p$
~ 1780		[2] DAUM	81C	CNTR	−	63 $K^- p \rightarrow K^- 2\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1810 ±20		FRAME	86	OMEG	+	13 $K^+ p \rightarrow \phi K^+ p$
~ 1730		ARMSTRONG	83	OMEG	−	18.5 $K^- p \rightarrow 3K p$
1710 ±15	60	CHUNG	74	HBC	−	7.3 $K^- p \rightarrow K^- \omega p$
1767 ± 6		BLIEDEN	72	MMS	−	11–16 $K^- p$
1730 ±20	306	[3] FIRESTONE	72B	DBC	+	12 $K^+ d$
1765.0±40.0		[4] COLLEY	71	HBC	+	10 $K^+ p \rightarrow K 2\pi N$
1740.0		DENEGRI	71	DBC	−	12.6 $K^- d \rightarrow \overline{K} 2\pi d$
1745.0±20.0		AGUILAR-...	70C	HBC	−	4.6 $K^- p$
1780.0±15.0		BARTSCH	70C	HBC	−	10.1 $K^- p$
1760.0±15.0		LUDLAM	70	HBC	−	12.6 $K^- p$

[1] From a partial wave analysis of the $K^- \omega$ system.
[2] From a partial wave analysis of the $K^- 2\pi$ system.
[3] Produced in conjunction with excited deuteron.
[4] Systematic errors added correspond to spread of different fits.

$K_2(1770)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
186 ±14		[5] ASTON	93	LASS		$11 K^- p \rightarrow K^- \omega p$
~ 210		[6] DAUM	81C	CNTR	−	63 $K^- p \rightarrow K^- 2\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
140 ±40		FRAME	86	OMEG	+	13 $K^+ p \rightarrow \phi K^+ p$
~ 220		ARMSTRONG	83	OMEG	−	18.5 $K^- p \rightarrow 3K p$
110 ±50	60	CHUNG	74	HBC	−	7.3 $K^- p \rightarrow K^- \omega p$
100 ±26		BLIEDEN	72	MMS	−	11–16 $K^- p$
210 ±30	306	[7] FIRESTONE	72B	DBC	+	12 $K^+ d$
90 ±70		[8] COLLEY	71	HBC	+	10 $K^+ p \rightarrow K 2\pi N$
130.0		DENEGRI	71	DBC	−	12.6 $K^- d \rightarrow \overline{K} 2\pi d$
100.0±50.0		AGUILAR-...	70C	HBC	−	4.6 $K^- p$
138.0±40.0		BARTSCH	70C	HBC	−	10.1 $K^- p$
$50.0^{+40.0}_{-20.0}$		LUDLAM	70	HBC	−	12.6 $K^- p$

[5] From a partial wave analysis of the $K^- \omega$ system.
[6] From a partial wave analysis of the $K^- 2\pi$ system.
[7] Produced in conjunction with excited deuteron.
[8] Systematic errors added correspond to spread of different fits.

$K_2(1770)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K\pi\pi$	
Γ_2	$K_2^*(1430)\pi$	dominant
Γ_3	$K^*(892)\pi$	seen
Γ_4	$K f_2(1270)$	seen
Γ_5	$K\phi$	seen
Γ_6	$K\omega$	seen

$K_2(1770)$ BRANCHING RATIOS

For discussion of the experimental evidence on other decay modes, see HUGHES 71, SLATTERY 71, EISNER 74.

$\Gamma(K_2^*(1430)\pi)/\Gamma(K\pi\pi)$ — Γ_2/Γ_1

($K_2^*(1430) \to K\pi$)

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 0.03	DAUM	81C	CNTR		63 $K^- p \to K^- 2\pi p$
~ 1.0	[9] FIRESTONE	72B	DBC	+	12 $K^+ d$
<1.0	COLLEY	71	HBC		10 $K^+ p$
0.2 ± 0.2	AGUILAR-...	70C	HBC	−	4.6 $K^- p$
<1.0	BARTSCH	70C	HBC	−	10.1 $K^- p$
1.0	BARBARO-...	69	HBC	+	12.0 $K^+ p$

[9] Produced in conjunction with excited deuteron.

$\Gamma(K^*(892)\pi)/\Gamma(K\pi\pi)$ — Γ_3/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 0.23	DAUM	81C	CNTR	63 $K^- p \to K^- 2\pi p$

$\Gamma(K f_2(1270))/\Gamma(K\pi\pi)$ — Γ_4/Γ_1

($f_2(1270) \to \pi\pi$)

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 0.74	DAUM	81C	CNTR	63 $K^- p \to K^- 2\pi p$

$\Gamma(K\phi)/\Gamma_{\text{total}}$ — Γ_5/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
seen	ARMSTRONG	83	OMEG	−	18.5 $K^- p \to K^- \phi N$

$\Gamma(K\omega)/\Gamma_{\text{total}}$ — Γ_6/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
seen	OTTER	81	HBC	±	8.25,10,16 $K^{\pm} p$
seen	CHUNG	74	HBC	−	7.3 $K^- p \to K^- \omega p$

$K_2(1770)$ REFERENCES

ASTON	93	PL B308 186	+Bienz, Bird+	(SLAC, NAGO, CINC, INUS)
FRAME	86	NP B276 667	+Hughes, Lynch, Minto, McFadzean+	(GLAS)
ARMSTRONG	83	NP B221 1	+	(BARI, BIRM, CERN, MILA, CURIN+)
DAUM	81C	NP B187 1	+Hertzberger+	(AMST, CERN, CRAC, MPIM, OXF+)
OTTER	81	NP B181 1		(AACH3, BERL, LOIC, VIEN, BIRM, BELG, CERN+)
CHUNG	74	PL 51B 413	+Eisner, Protopopescu, Samios, Strand	(BNL)
EISNER	74	Boston Conf. 140		(BNL)
BLIEDEN	72	PL 39B 668	+Finocchiaro, Bowen, Earles+	(STON, NEAS)
FIRESTONE	72B	PR D5 505	+Goldhaber, Lissauer, Trilling	(LBL)
COLLEY	71	NP B26 71	+Jobes, Kenyon, Pathak, Hughes+	(BIRM, GLAS)
DENEGRI	71	NP B28 13	+Antich, Callahan, Carson, Chien, Cox+	(JHU) JP
HUGHES	71	Bologna Conf. 293		(GLAS)
SLATTERY	71	UR-875-332		(ROCH)
AGUILAR-...	70C	PRL 25 54	Aguilar-Benitez, Barnes, Bassano, Chung+	(BNL)
BARTSCH	70C	PL 33B 186	+Deutschmann+	(AACH, BERL, CERN, LOIC, VIEN)
LUDLAM	70	PR D2 1234	+Sandweiss, Slaughter	(YALE)
BARBARO-...	69	PRL 22 1207	Barbaro-Galtieri, Davis, Flatte+	(LRL)

OTHER RELATED PAPERS

BERLINGHIERI	67	PRL 18 1087	+Farber, Ferbel, Forman	(ROCH)I
CARMONY	67	PRL 18 615	+Hendricks, Lander	(UCSD)
JOBES	67	PL 26B 49	+Bassompierre, DeBaere+	(BIRM, CERN, BRUX)
BARTSCH	66	PL 22 357	+Deutschmann+	(AACH, BERL, CERN+)

$K_3^*(1780)$

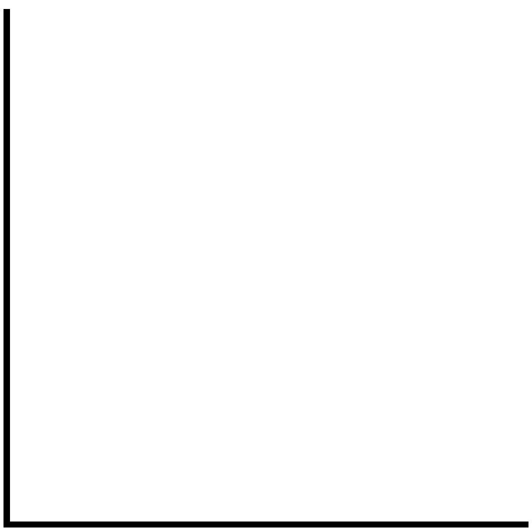
$I(J^P) = \frac{1}{2}(3^-)$

Our latest mini-review on this particle can be found in the 1984 edition.

$K_3^*(1780)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1770 ±10 OUR AVERAGE		Error includes scale factor of 1.7. See the ideogram below.				
1720 ±10 ±15	6111±780	[1] BIRD	89	LASS	−	11 $K^- p \to \overline{K}^0 \pi^- p$
1781 ± 8 ± 4		[2] ASTON	88	LASS	0	11 $K^- p \to K^- \pi^+ n$
1740 ±14 ±15		[2] ASTON	87	LASS	0	11 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
1779.0±11.0		[3] BALDI	76	SPEC	+	10 $K^+ p \to K^0 \pi^+ p$
1776 ±26		[4] BRANDENB...	76D	ASPK	0	13 $K^\pm p \to K^\pm \pi^\mp N$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1749 ±10		ASTON	88B	LASS	−	11 $K^- p \to K^- \eta p$
1780.0± 9.0	300	BAUBILLIER	84B	HBC	−	8.25 $K^- p \to \overline{K}^0 \pi^- p$
1790.0±15.0		BAUBILLIER	82B	HBC	0	8.25 $K^- p \to K_S^0 2\pi N$
1784.0± 9.0	2060	CLELAND	82	SPEC	±	50 $K^+ p \to K_S^0 \pi^\pm p$
1786 ±15		[5] ASTON	81D	LASS	0	11 $K^- p \to K^- \pi^+ n$
1762.0± 9.0	190	TOAFF	81	HBC	−	6.5 $K^- p \to \overline{K}^0 \pi^- p$
1850 ±50		ETKIN	80	MPS	0	6 $K^- p \to \overline{K}^0 \pi^+ \pi^-$
1812.0±28.0		BEUSCH	78	OMEG		10 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
1786.0± 8.0		CHUNG	78	MPS	0	6 $K^- p \to K^- \pi^+ n$

[1] From a partial wave amplitude analysis.
[2] From energy-independent partial-wave analysis.
[3] From a fit to Y_6^2 moment. $J^P = 3^-$ found.
[4] Confirmed by phase shift analysis of ESTABROOKS 78, yields $J^P = 3^-$.
[5] From a fit to the Y_6^0 moment.



$K_3^*(1780)$ mass (MeV)

*CITATION: L. Montanet et al., Physical Review D50, 1173 (1994) and 1995 off-year partial update for the 1996 edition (URL: http://pdg.lbl.gov/)

$K_3^*(1780)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
164 ±17 OUR AVERAGE	Error includes scale factor of 1.1.					
187 ±31 ±20	6111±780	[6] BIRD	89	LASS	−	11 $K^- p \to \overline{K}^0 \pi^- p$
203 ±30 ± 8		[7] ASTON	88	LASS	0	11 $K^- p \to K^- \pi^+ n$
171 ±42 ±20		[7] ASTON	87	LASS	0	11 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
135.0±22.0		[8] BALDI	76	SPEC	+	10 $K^+ p \to K^0 \pi^+ p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
193 $^{+51}_{-37}$		ASTON	88B	LASS	−	11 $K^- p \to K^- \eta p$
99.0±30.0	300	BAUBILLIER	84B	HBC	−	8.25 $K^- p \to \overline{K}^0 \pi^- p$
∼ 130.0		BAUBILLIER	82B	HBC	0	8.25 $K^- p \to K^0_S 2\pi N$
191.0±24.0	2060	CLELAND	82	SPEC	±	50 $K^+ p \to K^0_S \pi^\pm p$
225 ±60		[9] ASTON	81D	LASS	0	11 $K^- p \to K^- \pi^+ n$
∼ 80	190	TOAFF	81	HBC	−	6.5 $K^- p \to \overline{K}^0 \pi^- p$
240 ±50		ETKIN	80	MPS	0	6 $K^- p \to \overline{K}^0 \pi^+ \pi^-$
181.0±44.0		[10] BEUSCH	78	OMEG		10 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
96.0±31.0		CHUNG	78	MPS	0	6 $K^- p \to K^- \pi^+ n$
270 ±70		[11] BRANDENB...	76D	ASPK	0	13 $K^\pm p \to K^\pm \pi^\mp N$

[6] From a partial wave amplitude analysis.
[7] From energy-independent partial-wave analysis.
[8] From a fit to Y_6^2 moment. $J^P = 3^-$ found.
[9] From a fit to Y_6^0 moment.
[10] Errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.
[11] ESTABROOKS 78 find that BRANDENBURG 76D data are consistent with 175 MeV width. Not averaged.

$K_3^*(1780)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	$K\rho$	(45 ±4) %	S=1.4
Γ_2	$K^*(892)\pi$	(27.3±3.2) %	S=1.5
Γ_3	$K\pi$	(19.3±1.0) %	
Γ_4	$K\eta$	(8.0±1.5) %	S=1.4
Γ_5	$K_2^*(1430)\pi$	< 21 %	CL=95%

CONSTRAINED FIT INFORMATION

An overall fit to 4 branching ratios uses 5 measurements and one constraint to determine 4 parameters. The overall fit has a $\chi^2 =$ 2.2 for 2 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\langle \delta x_i \delta x_j \rangle / (\delta x_i \cdot \delta x_j)$, 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_2	−84		
x_3	−33	−4	
x_4	−35	−14	26
	x_1	x_2	x_3

$K_3^*(1780)$ BRANCHING RATIOS

$\Gamma(K\rho)/\Gamma(K^*(892)\pi)$ — Γ_1/Γ_2

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
1.66±0.31 OUR FIT	Error includes scale factor of 1.5.				
1.52±0.21±0.10	ASTON	87	LASS	0	11 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$

$\Gamma(K^*(892)\pi)/\Gamma(K\pi)$ Γ_2/Γ_3

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
1.42±0.19 OUR FIT	Error includes scale factor of 1.4.				
1.09±0.26	ASTON	84B	LASS	0	11 $K^- p \to \overline{K}^0 2\pi n$

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

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.193±0.010 OUR FIT					
0.188±0.010 OUR AVERAGE					
0.187±0.008±0.008	ASTON	88	LASS	0	11 $K^- p \to K^- \pi^+ n$
0.19 ±0.02	ESTABROOKS	78	ASPK	0	13 $K^\pm p \to K \pi N$

$\Gamma(K\eta)/\Gamma(K\pi)$ Γ_4/Γ_3

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.41±0.07 OUR FIT	Error includes scale factor of 1.5.				
0.41±0.050	[12] BIRD	89	LASS	−	11 $K^- p \to \overline{K}^0 \pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.50±0.18	ASTON	88B	LASS	−	11 $K^- p \to K^- \eta p$

[12] This result supersedes ASTON 88B.

$\Gamma(K_2^*(1430)\pi)/\Gamma(K^*(892)\pi)$ Γ_5/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
<0.78	95	ASTON	87	LASS	0	11 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$

$K_3^*(1780)$ REFERENCES

BIRD	89	SLAC-332		(SLAC)	
ASTON	88	NP B296 493	+Awaji, Bienz, Bird+	(SLAC, NAGO, CINC, INUS)	
ASTON	88B	PL B201 169	+Awaji, Bienz+	(SLAC, NAGO, CINC, INUS)	JP
ASTON	87	NP B292 693	+Awaji, D'Amore+	(SLAC, NAGO, CINC, INUS)	
ASTON	84B	NP B247 261	+Carnegie, Dunwoodie+	(SLAC, CARL, OTTA)	
BAUBILLIER	84B	ZPHY C26 37	+	(BIRM, CERN, GLAS, MICH, CURIN)	
BAUBILLIER	82B	NP B202 21	+	(BIRM, CERN, GLAS, MSU, CURIN)	
CLELAND	82	NP B208 189	+Delfosse, Dorsaz, Gloor	(DURH, GEVA, LAUS, PITT)	
ASTON	81D	PL 99B 502	+Dunwoodie, Durkin, Fieguth+	(SLAC, CARL, OTTA)	JP
TOAFF	81	PR D23 1500	+Musgrave, Ammar, Davis, Ecklund+	(ANL, KANS)	
ETKIN	80	PR D22 42	+Foley, Lindenbaum, Kramer+	(BNL, CUNY)	JP
BEUSCH	78	PL 74B 282	+Birman, Konigs, Otter+	(CERN, AACH3, ETH)	JP
CHUNG	78	PRL 40 355	+Etkin+	(BNL, BRAN, CUNY, MASA, PENN)	JP
ESTABROOKS	78	NP B133 490	+Carnegie+	(MCGI, CARL, DURH, SLAC)	JP
Also	78B	PR D17 658	Estabrooks, Carnegie+	(MCGI, CARL, DURH+)	
BALDI	76	PL 63B 344	+Boehringer, Dorsaz, Hungerbuhler+	(GEVA)	JP
BRANDENB...	76D	PL 60B 478	Brandenburg, Carnegie, Cashmore+	(SLAC)	JP

OTHER RELATED PAPERS

AGUILAR-...	73	PRL 30 672	Aguilar-Benitez, Chung, Eisner+	(BNL)
WALUCH	73	PR D8 2837	+Flatte, Friedman	(LBL)
CARMONY	71	PRL 27 1160	+Cords, Clopp, Erwin, Meiere+	(PURD, UCD, IUPU)
FIRESTONE	71	PL 36B 513	+Goldhaber, Lissauer, Trilling	(LBL)

$K_2(1820)$

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

Observed by ASTON 93 from a partial wave analysis of the $K^- \omega$ system. See Minireview under $K_2(1770)$. Needs confirmation.

$K_2(1820)$ MASS

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1816±13	[1] ASTON	93	LASS	$11 K^- p \to K^- \omega p$
~ 1840	[2] DAUM	81C	CNTR	$63 K^- p \to K^- 2\pi p$

[1] Fron a partial wave analysis of the $K^- \omega$ system.
[2] From a partial wave analysis of the $K^- 2\pi$ system.

$K_2(1820)$ WIDTH

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
276±35	[3] ASTON	93	LASS	$11 K^- p \to K^- \omega p$
~ 230	[4] DAUM	81C	CNTR	$63 K^- p \to K^- 2\pi p$

[3] Fron a partial wave analysis of the $K^- \omega$ system.
[4] From a partial wave analysis of the $K^- 2\pi$ system.

$K_2(1820)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K \phi$	possibly seen
Γ_2	$K \pi \pi$	
Γ_3	$K_2^*(1430)\pi$	seen
Γ_4	$K^*(892)\pi$	seen
Γ_5	$K f_2(1270)$	seen
Γ_6	$K \omega$	seen

$K_2(1820)$ BRANCHING RATIOS

$\Gamma(K_2^*(1430)\pi)/\Gamma(K\pi\pi)$ — Γ_3/Γ_2

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 0.77	ASTON	93	CNTR	$63 K^- p \to \overline{K} 2\pi p$

$\Gamma(K^*(892)\pi)/\Gamma(K\pi\pi)$ — Γ_4/Γ_2

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 0.05	ASTON	93	CNTR	$63 K^- p \to \overline{K} 2\pi p$

$\Gamma(K f_2(1270))/\Gamma(K\pi\pi)$ — Γ_5/Γ_2

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 0.05	ASTON	93	CNTR	$63 K^- p \to \overline{K} 2\pi p$

$K_2(1820)$ REFERENCES

ASTON	93	PL B308 186	+Bienz, Bird+	(SLAC, NAGO, CINC, INUS)
DAUM	81C	NP B187 1	+Hertzberger+	(AMST, CERN, CRAC, MPIM, OXF+)

$K(1830)$

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

OMITTED FROM SUMMARY TABLE

Seen in partial-wave analysis of $K^- \phi$ system. Needs confirmation.

$K(1830)$ MASS

VALUE (MeV)	*DOCUMENT ID*	*TECN*	*CHG*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 1830.0	ARMSTRONG 83	OMEG	−	18.5 $K^- p \rightarrow 3Kp$

$K(1830)$ WIDTH

VALUE (MeV)	*DOCUMENT ID*	*TECN*	*CHG*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 250.0	ARMSTRONG 83	OMEG	−	18.5 $K^- p \rightarrow 3Kp$

$K(1830)$ DECAY MODES

	Mode
Γ_1	$K \phi$

$K(1830)$ REFERENCES

ARMSTRONG 83 NP B221 1 + (BARI, BIRM, CERN, MILA, CURIN+)JP

$K_0^*(1950)$

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

OMITTED FROM SUMMARY TABLE

Seen in partial-wave analysis of the $K^- \pi^+$ system. Needs confirmation.

$K_0^*(1950)$ MASS

VALUE (MeV)	*DOCUMENT ID*	*TECN*	*CHG*	*COMMENT*
1945±10±20	[1] ASTON 88	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$

[1] We take the central value of the two solutions and the larger error given.

$K_0^*(1950)$ WIDTH

VALUE (MeV)	*DOCUMENT ID*	*TECN*	*CHG*	*COMMENT*
201±34±79	[2] ASTON 88	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$

[2] We take the central value of the two solutions and the larger error given.

$K_0^*(1950)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K \pi$	(52±14) %

$K_0^*(1950)$ BRANCHING RATIOS

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

VALUE	*DOCUMENT ID*	*TECN*	*CHG*	*COMMENT*
0.52±0.08±0.12	[3] ASTON 88	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$

[3] We take the central value of the two solutions and the larger error given.

$K_0^*(1950)$ REFERENCES

ASTON 88 NP B296 493 +Awaji, Bienz, Bird+ (SLAC, NAGO, CINC, INUS)

$K_2^*(1980)$

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

OMITTED FROM SUMMARY TABLE

Seen in the $J^P = 2^+$ wave amplitude of the $K^0 \pi^- \pi^+$ system. Needs confirmation.

$K_2^*(1980)$ MASS

All from partial wave amplitude analyses.

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1975±22 OUR AVERAGE						
1978±40	241±47	BIRD	89	LASS	−	11 $K^- p \rightarrow \overline{K}^0 \pi^- p$
1973± 8±25		ASTON	87	LASS	0	11 $K^- p \rightarrow \overline{K}^0 \pi^+ \pi^- n$

$K_2^*(1980)$ WIDTH

All from partial wave amplitude analyses.

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
373±33±60		ASTON	87	LASS	0	11 $K^- p \rightarrow \overline{K}^0 \pi^+ \pi^- n$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
398±47	241±47	BIRD	89	LASS	−	11 $K^- p \rightarrow \overline{K}^0 \pi^- p$

$K_2^*(1980)$ DECAY MODES

	Mode
Γ_1	$K^*(892)\pi$
Γ_2	$K\rho$

$K_2^*(1980)$ BRANCHING RATIOS

$\Gamma(K\rho)/\Gamma(K^*(892)\pi)$ — Γ_2/Γ_1

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
1.49±0.24±0.09	ASTON	87	LASS	0	11 $K^- p \rightarrow \overline{K}^0 \pi^+ \pi^- n$

$K_2^*(1980)$ REFERENCES

BIRD 89 SLAC-332 (SLAC)

ASTON 87 NP B292 693 +Awaji, D'Amore+ (SLAC, NAGO, CINC, INUS)

OTHER RELATED PAPERS

AMSLER 93C NP A558 3C +Augustin+ (Crystal Barrel Collab.)

*CITATION: L. Montanet et al., Physical Review D50, 1173 (1994) and 1995 off-year partial update for the 1996 edition (URL: http://pdg.lbl.gov/)

$K_4^*(2045)$

$I(J^P) = \frac{1}{2}(4^+)$

$K_4^*(2045)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
2045± 9 OUR AVERAGE		Error includes scale factor of 1.1.				
2062± 14±13		[1] ASTON	86	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$
2039± 10	400	[2,3] CLELAND	82	SPEC	±	50 $K^+ p \rightarrow K_S^0 \pi^\pm p$
2070^{+100}_{-40}		[4] ASTON	81C	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
2079± 7	431	TORRES	86	MPSF		400 $pA \rightarrow 4KX$
2088± 20	650	BAUBILLIER	82	HBC	−	8.25 $K^- p \rightarrow K_S^0 \pi^- p$
2115± 46	488	CARMONY	77	HBC	0	9 $K^+ d \rightarrow K^+ \pi$'s X

[1] From a fit to all moments.
[2] From a fit to 8 moments.
[3] Number of events evaluated by us.
[4] From energy-independent partial-wave analysis.

$K_4^*(2045)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
198± 30 OUR AVERAGE						
221± 48±27		[5] ASTON	86	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$
189± 35	400	[6,7] CLELAND	82	SPEC	±	50 $K^+ p \rightarrow K_S^0 \pi^\pm p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
61± 58	431	TORRES	86	MPSF		400 $pA \rightarrow 4KX$
170^{+100}_{-50}	650	BAUBILLIER	82	HBC	−	8.25 $K^- p \rightarrow K_S^0 \pi^- p$
240^{+500}_{-100}		[8] ASTON	81C	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$
300±200		CARMONY	77	HBC	0	9 $K^+ d \rightarrow K^+ \pi$'s X

[5] From a fit to all moments.
[6] From a fit to 8 moments.
[7] Number of events evaluated by us.
[8] From energy-independent partial-wave analysis.

$K_4^*(2045)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K\pi$	(9.9±1.2) %
Γ_2	$K^*(892)\pi\pi$	(9 ±5) %
Γ_3	$K^*(892)\pi\pi\pi$	(7 ±5) %
Γ_4	$\rho K\pi$	(5.7±3.2) %
Γ_5	$\omega K\pi$	(5.0±3.0) %
Γ_6	$\phi K\pi$	(2.8±1.4) %
Γ_7	$\phi K^*(892)$	(1.4±0.7) %

$K_4^*(2045)$ BRANCHING RATIOS

$\Gamma(K\pi)/\Gamma_{total}$ — Γ_1/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.099±0.012	ASTON	88	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$

$\Gamma(K^*(892)\pi\pi)/\Gamma(K\pi)$ — Γ_2/Γ_1

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.89±0.53	BAUBILLIER	82	HBC	−	8.25 $K^- p \rightarrow p K_S^0 3\pi$

$\Gamma(K^*(892)\pi\pi\pi)/\Gamma(K\pi)$ — Γ_3/Γ_1

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.75±0.49	BAUBILLIER	82	HBC	−	8.25 $K^- p \rightarrow p K_S^0 3\pi$

$\Gamma(\rho K\pi)/\Gamma(K\pi)$ — Γ_4/Γ_1

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.58±0.32	BAUBILLIER	82	HBC	–	8.25 $K^- p \rightarrow pK^0_S 3\pi$

$\Gamma(\omega K\pi)/\Gamma(K\pi)$ — Γ_5/Γ_1

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.50±0.30	BAUBILLIER	82	HBC	–	8.25 $K^- p \rightarrow pK^0_S 3\pi$

$\Gamma(\phi K\pi)/\Gamma_{total}$ — Γ_6/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.028±0.014	[9] TORRES	86	MPSF	400 $pA \rightarrow 4KX$

[9] Error determination is model dependent.

$\Gamma(\phi K^*(892))/\Gamma_{total}$ — Γ_7/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.014±0.007	[10] TORRES	86	MPSF	400 $pA \rightarrow 4KX$

[10] Error determination is model dependent.

$K_4^*(2045)$ REFERENCES

ASTON	88	NP B296 493	+Awaji, Bienz, Bird+	(SLAC, NAGO, CINC, INUS)
ASTON	86	PL B180 308	+Awaji, D'Amore+	(SLAC, NAGO, CINC, INUS)
TORRES	86	PR 34 707	+Lai+	(VPI, ARIZ, FNAL, FSU, NDAM, TUFTS+)
BAUBILLIER	82	PL 118B 447	+Burns+	(BIRM, CERN, GLAS, MSU, CURIN)
CLELAND	82	NP B208 189	+Delfosse, Dorsaz, Gloor	(DURH, GEVA, LAUS, PITT)
ASTON	81C	PL 106B 235	+Carnegie, Dunwoodie+	(SLAC, CARL, OTTA) JP
CARMONY	77	PR D16 1251	+Clopp, Lander, Meiere, Yen+	(PURD, UCD, IUPU)

OTHER RELATED PAPERS

ASTON	87	NP B292 693	+Awaji, D'Amore+	(SLAC, NAGO, CINC, INUS)
BROMBERG	80	PR D22 1513	+Haggerty, Abrams, Dzierba	(CIT, FNAL, ILLC, IND)
CARMONY	71	PRL 27 1160	+Cords, Clopp, Erwin, Meiere+	(PURD, UCD, IUPU)

$K_2(2250)$

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

OMITTED FROM SUMMARY TABLE

This entry contains various peaks in strange meson systems reported in the 2150–2260 MeV region, as well as enhancements seen in the antihyperon-nucleon system, either in the mass spectra or in the $J^P = 2^-$ wave.

$K_2(2250)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
2247 ±17 OUR AVERAGE						
2200.0±40.0		[1] ARMSTRONG	83C	OMEG	–	18 $K^- p \rightarrow \Lambda\overline{p}X$
2235 ±50		[1] BAUBILLIER	81	HBC	–	8 $K^- p \rightarrow \Lambda\overline{p}X$
2260 ±20		[1] CLELAND	81	SPEC	±	50 $K^+ p \rightarrow \Lambda\overline{p}X$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
2147 ± 4	37	CHLIAPNIK...	79	HBC	+	32 $K^+ p \rightarrow \overline{\Lambda}pX$
2240 ±20	20	LISSAUER	70	HBC		9 $K^+ p$

[1] $J^P = 2^-$ from moments analysis.

$K_2(2250)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
180 ±30 OUR AVERAGE Error includes scale factor of 1.4.						
150.0±30.0		[2] ARMSTRONG	83C	OMEG	–	18 $K^- p \rightarrow \Lambda\overline{p}X$
210 ±30		[2] CLELAND	81	SPEC	±	50 $K^+ p \rightarrow \Lambda\overline{p}X$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
~ 200		[2] BAUBILLIER	81	HBC	–	8 $K^- p \rightarrow \Lambda\overline{p}X$
~ 40	37	CHLIAPNIK...	79	HBC	+	32 $K^+ p \rightarrow \overline{\Lambda}pX$
80 ±20	20	LISSAUER	70	HBC		9 $K^+ p$

[2] $J^P = 2^-$ from moments analysis.

$K_2(2250)$ DECAY MODES

	Mode
Γ_1	$K\pi\pi$
Γ_2	$p\overline{\Lambda}$

$K_2(2250)$ REFERENCES

ARMSTRONG	83C	NP B227 365	+	(BARI, BIRM, CERN, MILA, CURIN+)
BAUBILLIER	81	NP B183 1	+	(BIRM, CERN, GLAS, MSU, CURIN)JP
CLELAND	81	NP B184 1	+Nef, Martin+	(PITT, GEVA, LAUS, DURH)JP
CHLIAPNIK...	79	NP B158 253	Chliapnikov, Gerdyukov+	(CERN, BELG, MONS)
LISSAUER	70	NP B18 491	+Alexander, Firestone, Goldhaber	(LBL)

OTHER RELATED PAPERS

ALEXANDER	68B	PRL 20 755	+Firestone, Goldhaber, Shen	(LRL)

$K_3(2320)$

$I(J^P) = \frac{1}{2}(3^+)$

OMITTED FROM SUMMARY TABLE

Seen in the $J^P = 3^+$ wave of the antihyperon-nucleon system. Needs confirmation.

$K_3(2320)$ MASS

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
2324 ±24 OUR AVERAGE					
2330.0±40.0	[1] ARMSTRONG	83C	OMEG	−	18 $K^- p \to \Lambda \overline{p} X$
2320.0±30.0	[1] CLELAND	81	SPEC	±	50 $K^+ p \to \Lambda \overline{p} X$

[1] $J^P = 3^+$ from moments analysis.

$K_3(2320)$ WIDTH

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
150.0±30.0	[2] ARMSTRONG	83C	OMEG	−	18 $K^- p \to \Lambda \overline{p} X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 250.0	[2] CLELAND	81	SPEC	±	50 $K^+ p \to \Lambda \overline{p} X$

[2] $J^P = 3^+$ from moments analysis.

$K_3(2320)$ DECAY MODES

	Mode
Γ_1	$p\overline{\Lambda}$

$K_3(2320)$ REFERENCES

ARMSTRONG	83C	NP B227 365	+	(BARI, BIRM, CERN, MILA, CURIN+)
CLELAND	81	NP B184 1	+Nef, Martin+	(PITT, GEVA, LAUS, DURH)

$K_5^*(2380)$

$I(J^P) = \frac{1}{2}(5^-)$

OMITTED FROM SUMMARY TABLE

Seen in partial wave analysis of the $K^-\pi^+$ system. Needs confirmation.

$K_5^*(2380)$ MASS

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
2382±14±19	[1] ASTON	86	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$

[1] From a fit to all the moments.

$K_5^*(2380)$ WIDTH

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
178±37±32	[2] ASTON	86	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$

[2] From a fit to all the moments.

$K_5^*(2380)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K\pi$	(6.1 ± 1.2) %

$K_5^*(2380)$ BRANCHING RATIOS

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

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
0.061±0.012	ASTON	88	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$

$K_5^*(2380)$ REFERENCES

ASTON 88 NP B296 493 +Awaji, Bienz, Bird+ (SLAC, NAGO, CINC, INUS)
ASTON 86 PL B180 308 +Awaji, D'Amore+ (SLAC, NAGO, CINC, INUS)

$K_4(2500)$

$I(J^P) = \frac{1}{2}(4^-)$

OMITTED FROM SUMMARY TABLE

Seen in the $J^P = 4^-$ wave of the antihyperon-nucleon system. Needs confirmation.

$K_4(2500)$ MASS

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
2490.0±20.0	[1] CLELAND	81	SPEC	±	50 $K^+ p \rightarrow \Lambda \overline{p}$

[1] $J^P = 4^-$ from moments analysis.

$K_4(2500)$ WIDTH

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 250.0	[2] CLELAND	81	SPEC	±	50 $K^+ p \rightarrow \Lambda \overline{p}$

[2] $J^P = 4^-$ from moments analysis.

$K_4(2500)$ DECAY MODES

	Mode
Γ_1	$p\overline{\Lambda}$

$K_4(2500)$ REFERENCES

CLELAND 81 NP B184 1 +Nef, Martin+ (PITT, GEVA, LAUS, DURH)

$K(3100)$

$I^G(J^{PC}) = ?^?(?^{??})$

OMITTED FROM SUMMARY TABLE

Narrow peak observed in several ($\Lambda \overline{p}$ + pions) and ($\overline{\Lambda} p$ + pions) states in Σ^- Be reactions by BOURQUIN 86 and in np and nA reactions by ALEEV 93. Not seen by BOEHNLEIN 91. If due to strong decays, this state has exotic quantum numbers (B=0,Q=+1,S=−1 for $\Lambda\overline{p}\pi^+\pi^+$ and $I \geq 3/2$ for $\Lambda\overline{p}\pi^-$). See also under non-$q\overline{q}$ candidates. Needs confirmation. (See the index for the page number.)

$K(3100)$ MASS

VALUE (MeV)	DOCUMENT ID
≈ 3100 OUR ESTIMATE	

3-BODY DECAYS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
3054±11 OUR AVERAGE				
3060± 7±20	[1] ALEEV	93	BIS2	$K(3100) \to \Lambda\overline{p}\pi^+$
3056± 7±20	[1] ALEEV	93	BIS2	$K(3100) \to \overline{\Lambda}p\pi^-$
3055± 8±20	[1] ALEEV	93	BIS2	$K(3100) \to \Lambda\overline{p}\pi^-$
3045± 8±20	[1] ALEEV	93	BIS2	$K(3100) \to \overline{\Lambda}p\pi^+$

[1] Supersedes ALEEV 90.

4-BODY DECAYS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
3059±11 OUR AVERAGE				
3067± 6±20	[1] ALEEV	93	BIS2	$K(3100) \to \Lambda\overline{p}\pi^+\pi^+$
3060± 8±20	[1] ALEEV	93	BIS2	$K(3100) \to \Lambda\overline{p}\pi^+\pi^-$
3055± 7±20	[1] ALEEV	93	BIS2	$K(3100) \to \overline{\Lambda}p\pi^-\pi^-$
3052± 8±20	[1] ALEEV	93	BIS2	$K(3100) \to \overline{\Lambda}p\pi^-\pi^+$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3105±30	BOURQUIN	86	SPEC	$K(3100) \to \Lambda\overline{p}\pi^+\pi^+$
3115±30	BOURQUIN	86	SPEC	$K(3100) \to \Lambda\overline{p}\pi^+\pi^-$

5-BODY DECAYS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3095±30	BOURQUIN	86	SPEC	$K(3100) \to \Lambda\overline{p}\pi^+\pi^+\pi^-$

$K(3100)$ WIDTH

3-BODY DECAYS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
42±16	[2] ALEEV	93	BIS2	$K(3100) \to \Lambda\overline{p}\pi^+$
36±15	[2] ALEEV	93	BIS2	$K(3100) \to \overline{\Lambda}p\pi^-$
50±18	[2] ALEEV	93	BIS2	$K(3100) \to \Lambda\overline{p}\pi^-$
30±15	[2] ALEEV	93	BIS2	$K(3100) \to \overline{\Lambda}p\pi^+$

[2] Supersedes ALEEV 90.

4-BODY DECAYS

VALUE (MeV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
22± 8		[2] ALEEV	93	BIS2	$K(3100) \to \Lambda\overline{p}\pi^+\pi^+$
28±12		[2] ALEEV	93	BIS2	$K(3100) \to \Lambda\overline{p}\pi^+\pi^-$
32±15		[2] ALEEV	93	BIS2	$K(3100) \to \overline{\Lambda}p\pi^-\pi^-$
30±15		[2] ALEEV	93	BIS2	$K(3100) \to \overline{\Lambda}p\pi^-\pi^+$
<30	90	BOURQUIN	86	SPEC	$K(3100) \to \Lambda\overline{p}\pi^+\pi^+$
<80	90	BOURQUIN	86	SPEC	$K(3100) \to \Lambda\overline{p}\pi^+\pi^-$

5-BODY DECAYS

VALUE (MeV)	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<30	90	BOURQUIN	86	SPEC	$K(3100) \to \Lambda \overline{p} \pi^+ \pi^+ \pi^-$

$K(3100)$ DECAY MODES

	Mode
Γ_1	$K(3100)^0 \to \Lambda \overline{p} \pi^+$
Γ_2	$K(3100)^{--} \to \Lambda \overline{p} \pi^-$
Γ_3	$K(3100)^- \to \Lambda \overline{p} \pi^+ \pi^-$
Γ_4	$K(3100)^+ \to \Lambda \overline{p} \pi^+ \pi^+$
Γ_5	$K(3100)^0 \to \Lambda \overline{p} \pi^+ \pi^+ \pi^-$
Γ_6	$K(3100)^0 \to \Sigma(1385)^+ \overline{p}$

$\Gamma\left(\Sigma(1385)^+ \overline{p}\right)/\Gamma\left(\Lambda \overline{p} \pi^+\right)$ Γ_6/Γ_1

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.04	90	ALEEV	93	BIS2	$K(3100)^0 \to \Sigma(1385)^+ \overline{p}$

$K(3100)$ REFERENCES

ALEEV	93	PAN 56 1358	+Balandin+	(BIS-2 Collab.)
		Translated from YAF 56 100.		
BOEHNLEIN	91	NP B21 174 (suppl)	+Chung+	(FLOR, BNL, IND, RICE, MASD)
ALEEV	90	ZPHY C47 533	+Arefiev, Balandin+	(BIS-2 Collab.)
BOURQUIN	86	PL B172 113	+Brown+	(GEVA, RAL, HEIDP, LAUS, BRIS, CERN)