$K_3^*(1780)$

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

$K_3^*(1780)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1776± 7 OUR AVERAGE		Error includes scale factor of 1.1.				
1781± 8± 4		[1] ASTON	88	LASS	0	11 $K^- p \to K^- \pi^+ n$
1740±14±15		[1] ASTON	87	LASS	0	11 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
1779±11		[2] BALDI	76	SPEC	+	10 $K^+ p \to K^0 \pi^+ p$
1776±26		[3] 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. • • •						
1720±10±15	6111	[4] BIRD	89	LASS	−	11 $K^- p \to \overline{K}^0 \pi^- p$
1749±10		ASTON	88B	LASS	−	11 $K^- p \to K^- \eta p$
1780± 9	300	BAUBILLIER	84B	HBC	−	8.25 $K^- p \to \overline{K}^0 \pi^- p$
1790±15		BAUBILLIER	82B	HBC	0	8.25 $K^- p \to K^0_S 2\pi N$
1784± 9	2060	CLELAND	82	SPEC	±	50 $K^+ p \to K^0_S \pi^\pm p$
1786±15		[5] ASTON	81D	LASS	0	11 $K^- p \to K^- \pi^+ n$
1762± 9	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±28		BEUSCH	78	OMEG		10 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
1786± 8		CHUNG	78	MPS	0	6 $K^- p \to K^- \pi^+ n$

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

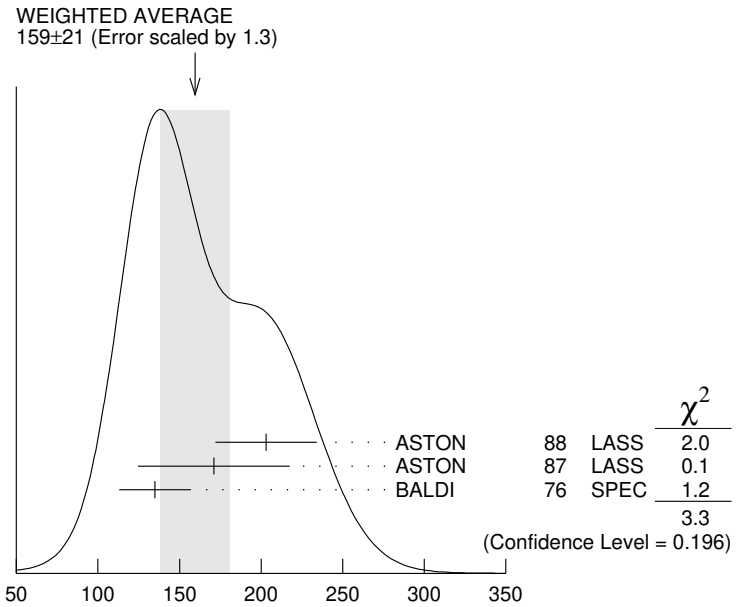
$K_3^*(1780)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
159±21 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.				
203±30± 8		[6] ASTON	88	LASS	0	11 $K^- p \to K^- \pi^+ n$
171±42±20		[6] ASTON	87	LASS	0	11 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
135±22		[7] BALDI	76	SPEC	+	10 $K^+ p \to K^0 \pi^+ p$

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

$187 \pm 31 \pm 20$	6111	[8] BIRD	89	LASS	–	11 $K^- p \to \overline{K}^0 \pi^- p$
193^{+51}_{-37}		ASTON	88B	LASS	–	11 $K^- p \to K^- \eta p$
99 ± 30	300	BAUBILLIER	84B	HBC	–	8.25 $K^- p \to \overline{K}^0 \pi^- p$
~ 130		BAUBILLIER	82B	HBC	0	8.25 $K^- p \to K^0_S 2\pi N$
191 ± 24	2060	CLELAND	82	SPEC	$\pm$	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 ± 44		[10] BEUSCH	78	OMEG		10 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
96 ± 31		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 energy-independent partial-wave analysis.
[7] From a fit to Y^2_6 moment. $J^P = 3^-$ found.
[8] From a partial wave amplitude analysis.
[9] From a fit to Y^0_6 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.



$K^*_3(1780)$ width (MeV)

$K_3^*(1780)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1	$K\rho$	(31 ± 9) %	
Γ_2	$K^*(892)\pi$	(20 ± 5) %	
Γ_3	$K\pi$	(18.8± 1.0) %	
Γ_4	$K\eta$	(30 ±13) %	
Γ_5	$K_2^*(1430)\pi$	< 16 %	95%

CONSTRAINED FIT INFORMATION

An overall fit to 3 branching ratios uses 4 measurements and one constraint to determine 4 parameters. The overall fit has a $\chi^2 =$ 0.0 for 1 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, $x_i \equiv \Gamma_i/\Gamma_{\rm total}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_2	85		
x_3	18	21	
x_4	−98	−94	−27
	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
1.52±0.23 OUR FIT					
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
1.09±0.26 OUR FIT					
1.09±0.26	ASTON	84B	LASS	0	11 $K^- p \to \overline{K}^0 2\pi n$

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

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.188±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
1.6 ±0.7 OUR FIT					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.41±0.050	[12] BIRD	89	LASS	–	11 $K^- p \to \overline{K}^0 \pi^- p$
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	P.F. Bird	(SLAC)
ASTON	88	NP B296 493	D. Aston et al.	(SLAC, NAGO, CINC, INUS)
ASTON	88B	PL B201 169	D. Aston et al.	(SLAC, NAGO, CINC, INUS) JP
ASTON	87	NP B292 693	D. Aston et al.	(SLAC, NAGO, CINC, INUS)
ASTON	84B	NP B247 261	D. Aston et al.	(SLAC, CARL, OTTA)
BAUBILLIER	84B	ZPHY C26 37	M. Baubillier et al.	(BIRM, CERN, GLAS+)
BAUBILLIER	82B	NP B202 21	M. Baubillier et al.	(BIRM, CERN, GLAS+)
CLELAND	82	NP B208 189	W.E. Cleland et al.	(DURH, GEVA, LAUS+)
ASTON	81D	PL 99B 502	D. Aston et al.	(SLAC, CARL, OTTA) JP
TOAFF	81	PR D23 1500	S. Toaff et al.	(ANL, KANS)
ETKIN	80	PR D22 42	A. Etkin et al.	(BNL, CUNY) JP
BEUSCH	78	PL 74B 282	W. Beusch et al.	(CERN, AACH3, ETH) JP
CHUNG	78	PRL 40 355	S.U. Chung et al.	(BNL, BRAN, CUNY+) JP
ESTABROOKS	78	NP B133 490	P.G. Estabrooks et al.	(MCGI, CARL, DURH+) JP
Also	78B	PR D17 658	P.G. Estabrooks et al.	(MCGI, CARL, DURH+)
BALDI	76	PL 63B 344	R. Baldi et al.	(GEVA) JP
BRANDENB...	76D	PL 60B 478	G.W. Brandenburg et al.	(SLAC) JP

OTHER RELATED PAPERS

AGUILAR-...	73	PRL 30 672	M. Aguilar-Benitez et al.	(BNL)
WALUCH	73	PR D8 2837	V. Waluch, S.M. Flatte, J.H. Friedman	(LBL)
CARMONY	71	PRL 27 1160	D.D. Carmony et al.	(PURD, UCD, IUPU)
FIRESTONE	71	PL 36B 513	A. Firestone et al.	(LBL)