$K_2^*(1430)$

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

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

$K_2^*(1430)$ T-MATRIX POLE $\sqrt{s}$

Note that $\Gamma = -2\ \mathrm{Im}(\sqrt{s})$.

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
(1424 ± 4)− i (66 ± 2) OUR ESTIMATE				
(1424 ± 4)− i (66 ± 2)	[1] PELAEZ	17	RVUE	$\pi K \to \pi K$

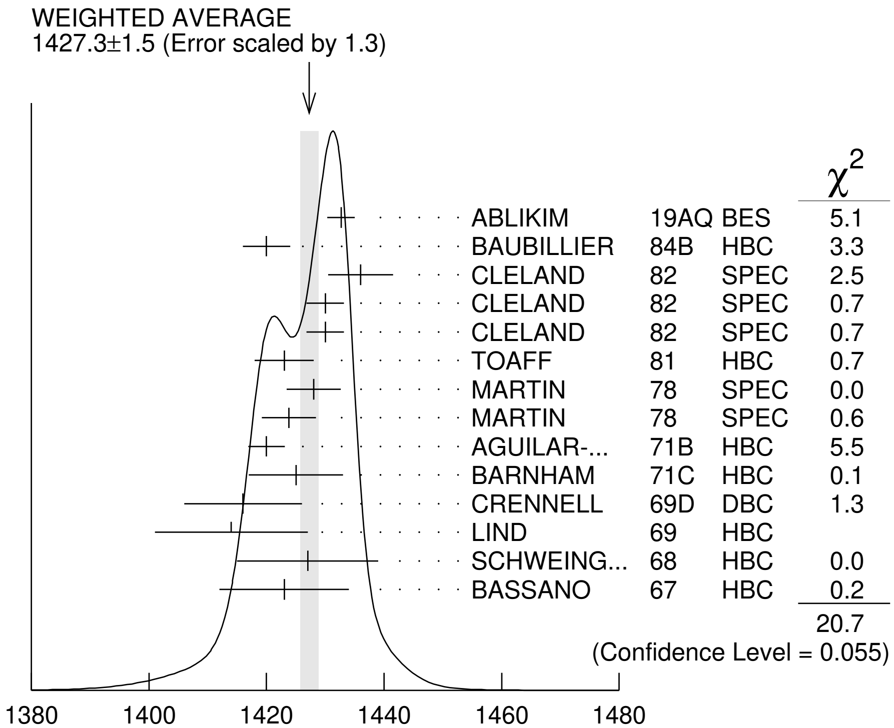
[1] Reanalysis of ESTABROOKS 78 and ASTON 88 satisfying Forward Dispersion Relations and using sequences of Pade approximants.

$K_2^*(1430)$ MASS

CHARGED ONLY, WITH FINAL STATE $K\pi$

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1427.3± 1.5 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.				
1432.7± $0.7^{+2.2}_{-2.3}$	183k	ABLIKIM	19AQ	BES	±	$J/\psi \to K^+ K^- \pi^0$
1420 ± 4	1587	BAUBILLIER	84B	HBC	−	8.25 $K^- p \to \overline{K}^0 \pi^- p$
1436 ± 5.5	400	[1,2] CLELAND	82	SPEC	+	30 $K^+ p \to K^0_S \pi^+ p$
1430 ± 3.2	1500	[1,2] CLELAND	82	SPEC	+	50 $K^+ p \to K^0_S \pi^+ p$
1430 ± 3.2	1200	[1,2] CLELAND	82	SPEC	−	50 $K^+ p \to K^0_S \pi^- p$
1423 ± 5	935	TOAFF	81	HBC	−	6.5 $K^- p \to \overline{K}^0 \pi^- p$
1428.0± 4.6		[3] MARTIN	78	SPEC	+	10 $K^\pm p \to K^0_S \pi p$
1423.8± 4.6		[3] MARTIN	78	SPEC	−	10 $K^\pm p \to K^0_S \pi p$
1420.0± 3.1	1400	AGUILAR-...	71B	HBC	−	3.9,4.6 $K^- p$
1425 ± 8.0	225	[1,2] BARNHAM	71C	HBC	+	$K^+ p \to K^0 \pi^+ p$
1416 ±10	220	CRENNELL	69D	DBC	−	3.9 $K^- N \to \overline{K}^0 \pi^- N$
1414 ±13.0	60	[1] LIND	69	HBC	+	9 $K^+ p \to K^0 \pi^+ p$
1427 ±12	63	[1] SCHWEING...	68	HBC	−	5.5 $K^- p \to \overline{K} \pi N$
1423 ±11.0	39	[1] BASSANO	67	HBC	−	4.6–5.0 $K^- p \to \overline{K}^0 \pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1428 ± 2	4300	[4] ABLIKIM	22L	BES3		2.0–3.08 $e^+ e^- \to K^+ K^- \pi^0$
1423.4± 2 ±3	24809± 820	[5] BIRD	89	LASS	−	11 $K^- p \to \overline{K}^0 \pi^- p$

[1] Errors enlarged by us to $\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.
[2] Number of events in peak re-evaluated by us.
[3] Systematic error added by us.
[4] From a partial wave amplitude analysis at $\sqrt{s} = 2.125$ GeV which includes all the possible intermediate states that match J^{PC} conservation in the subsequent two-body decay. The intermediate states are parameterized with the relativistic Breit-Wigner functions. Statistical error only.
[5] From a partial wave amplitude analysis.



$K_2^*(1430)$ mass, combined neutral and charged (MeV)

NEUTRAL ONLY

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1432.4± 1.3 OUR AVERAGE					
1431.2± 1.8± 0.7		[1] ASTON	88	LASS	11 $K^- p \to K^- \pi^+ n$
1434 ± 4 ± 6		[1] ASTON	87	LASS	11 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
1433 ± 6 ±10		[1] ASTON	84B	LASS	11 $K^- p \to \overline{K}^0 2\pi n$
1471 ±12		[1] BAUBILLIER	82B	HBC	8.25 $K^- p \to N K^0_S \pi\pi$
1428 ± 3		[1] ASTON	81C	LASS	11 $K^- p \to K^- \pi^+ n$
1434 ± 2		[1] ESTABROOKS	78	ASPK	13 $K^\pm p \to p K \pi$
1440 ±10		[1] BOWLER	77	DBC	5.5 $K^+ d \to K \pi p p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1428.5± 3.9	1786± 127	[2] AUBERT	07AK	BABR	10.6 $e^+ e^- \to K^{*0} K^\pm \pi^\mp \gamma$
1420 ± 7	300	HENDRICK	76	DBC	8.25 $K^+ N \to K^+ \pi N$
1421.6± 4.2	800	MCCUBBIN	75	HBC	3.6 $K^- p \to K^- \pi^+ n$
1420.1± 4.3		[3] LINGLIN	73	HBC	2–13 $K^+ p \to K^+ \pi^- X$

1419.1± 3.7	1800	AGUILAR-...	71B	HBC	3.9,4.6 $K^- p$
1416 ± 6	600	CORDS	71	DBC	9 $K^+ n \rightarrow K^+ \pi^- p$
1421.1± 2.6	2200	DAVIS	69	HBC	12 $K^+ p \rightarrow K^+ \pi^- X$

[1] From phase shift or partial-wave analysis.
[2] Systematic errors not estimated.
[3] 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
100.0± 2.2 OUR FIT Error includes scale factor of 1.1.						
100.0± 2.2 OUR AVERAGE Error includes scale factor of 1.1.						
102.5± $1.6^{+3.1}_{-2.8}$	183k	ABLIKIM	19AQ	BES	±	$J/\psi \rightarrow K^+ K^- \pi^0$
109 ±22	400	[1,2] CLELAND	82	SPEC	+	30 $K^+ p \rightarrow K^0_S \pi^+ p$
124 ±12.8	1500	[1,2] CLELAND	82	SPEC	+	50 $K^+ p \rightarrow K^0_S \pi^+ p$
113 ±12.8	1200	[1,2] CLELAND	82	SPEC	−	50 $K^+ p \rightarrow K^0_S \pi^- p$
85 ±16	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 $K^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
107 ± 4	4300	[3] ABLIKIM	22L	BES3		2.0–3.08 $e^+ e^- \rightarrow K^+ K^- \pi^0$
98 ± 4 ±4	25k	[4] BIRD	89	LASS	−	11 $K^- p \rightarrow \overline{K}^0 \pi^- p$

[1] Errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.
[2] Number of events in peak re-evaluated by us.
[3] From a partial wave amplitude analysis at $\sqrt{s} = 2.125$ GeV which includes all the possible intermediate states that match J^{PC} conservation in the subsequent two-body decay. The intermediate states are parameterized with the relativistic Breit-Wigner functions. Statistical error only.
[4] From a partial wave amplitude analysis.

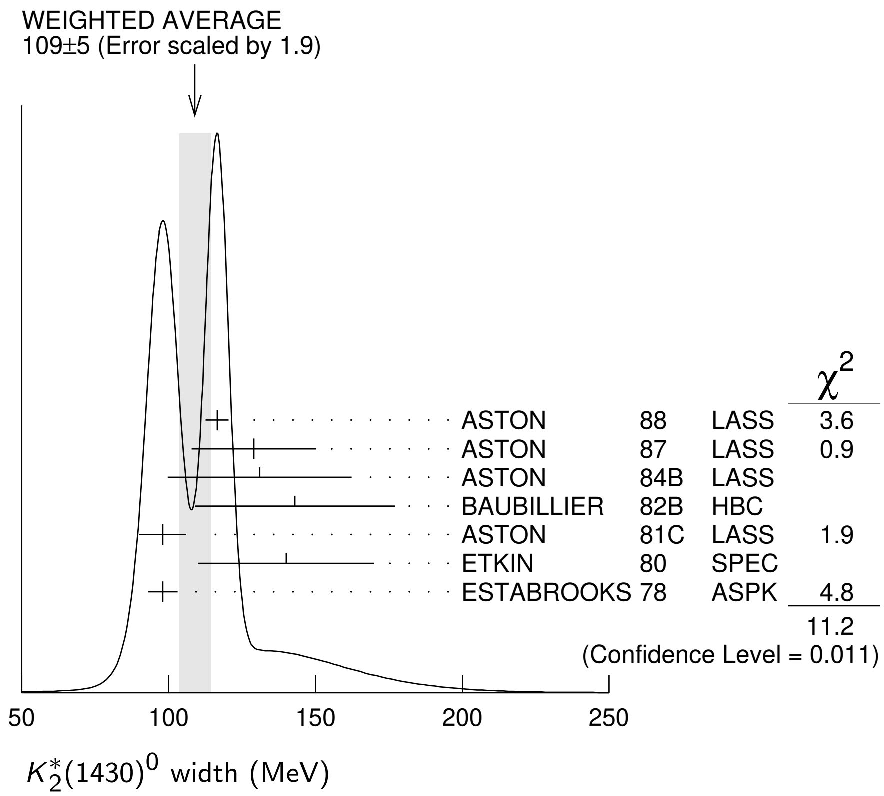
NEUTRAL ONLY

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
109 ± 5 OUR AVERAGE Error includes scale factor of 1.9. See the ideogram below.					
116.5± 3.6± 1.7		[1] ASTON	88	LASS	11 $K^- p \rightarrow K^- \pi^+ n$
129 ±15 ±15		[1] ASTON	87	LASS	11 $K^- p \rightarrow \overline{K}^0 \pi^+ \pi^- n$
131 ±24 ±20		[1] ASTON	84B	LASS	11 $K^- p \rightarrow \overline{K}^0 2\pi n$
143 ±34		[1] BAUBILLIER	82B	HBC	8.25 $K^- p \rightarrow N K^0_S \pi\pi$
98 ± 8		[1] ASTON	81C	LASS	11 $K^- p \rightarrow K^- \pi^+ n$
140 ±30		[1] ETKIN	80	SPEC	6 $K^- p \rightarrow \overline{K}^0 \pi^+ \pi^- n$
98 ± 5		[1] ESTABROOKS	78	ASPK	13 $K^\pm p \rightarrow p K \pi$

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

113.7± 9.2	1786±127	[2] AUBERT	07AK	BABR	10.6 $e^+ e^- \to K^{*0} K^\pm \pi^\mp \gamma$
125 ±29	300	[3] HENDRICK	76	DBC	8.25 $K^+ N \to K^+ \pi N$
116 ±18	800	MCCUBBIN	75	HBC	3.6 $K^- p \to K^- \pi^+ n$
61 ±14		[4] LINGLIN	73	HBC	2–13 $K^+ p \to K^+ \pi^- X$
$116.6^{+10.3}_{-15.5}$	1800	AGUILAR-...	71B	HBC	3.9,4.6 $K^- p$
144 ±24.0	600	[3] CORDS	71	DBC	9 $K^+ n \to K^+ \pi^- p$
101 ±10	2200	DAVIS	69	HBC	12 $K^+ p \to K^+ \pi^- \pi^+ p$

[1] From phase shift or partial-wave analysis.
[2] Systematic errors not estimated.
[3] Errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.
[4] 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	$K\pi$	(49.9±1.2) %	
Γ_2	$K^*(892)\pi$	(24.7±1.5) %	
Γ_3	$K^*(892)\pi\pi$	(13.4±2.2) %	
Γ_4	$K\rho$	(8.7±0.8) %	S=1.2

Γ_5	$K\omega$	(2.9 ± 0.8) %	
Γ_6	$K^+\gamma$	$(2.4\pm0.5)\times10^{-3}$	S=1.1
Γ_7	$K\eta$	$(1.5^{+3.4}_{-1.0})\times10^{-3}$	S=1.3
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 32 measurements and one constraint to determine 8 parameters. The overall fit has a $\chi^2 = 21.1$ for 25 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_2	−9						
x_3	−40	−73					
x_4	−8	36	−52				
x_5	−11	−3	−26	−7			
x_6	−1	−1	−1	−1	0		
x_7	−4	−7	−5	−5	−2	0	
Γ	0	0	0	0	0	−11	0
	x_1	x_2	x_3	x_4	x_5	x_6	x_7

	Mode	Rate (MeV)	Scale factor
Γ_1	$K\pi$	49.9 ± 1.6	
Γ_2	$K^*(892)\pi$	24.7 ± 1.6	
Γ_3	$K^*(892)\pi\pi$	13.5 ± 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 ± 0.05	1.1
Γ_7	$K\eta$	$0.15^{+0.34}_{-0.10}$	1.3

$K_2^*(1430)$ PARTIAL WIDTHS

$\Gamma(K^+\gamma)$ Γ_6

VALUE (keV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
240±50 OUR FIT	Error includes scale factor of 1.1.				
240±45	CIHANGIR	82	SPEC	+	200 $K^+ Z \to Z K^+ \pi^0$, $Z K^0_S \pi^+$

$\Gamma(K^0\gamma)$ — Γ_9

VALUE (keV)	CL%	DOCUMENT ID		TECN	CHG	COMMENT
< 5.4	90	ALAVI-HARATI	02B	KTEV		$K + A \to K^* + A$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<84	90	CARLSMITH	87	SPEC	0	60–200 $K^0_L A \to K^0_S \pi^0 A$

$K_2^*(1430)$ BRANCHING RATIOS

$\Gamma(K\pi)/\Gamma_{total}$ — Γ_1/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.499±0.012 OUR FIT					
0.488±0.014 OUR AVERAGE					
0.485±0.006±0.020	[1] ASTON	88	LASS	0	11 $K^- p \to K^- \pi^+ n$
0.49 ±0.02	[1] ESTABROOKS	78	ASPK	±	13 $K^\pm p \to p K \pi$

[1] From phase shift analysis.

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

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.496±0.034 OUR FIT					
0.47 ±0.04 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 $K^- p$
0.47 ±0.10	BASSANO	67	HBC	−0	4.6,5.0 $K^- p$
0.45 ±0.13	BADIER	65C	HBC	−	3 $K^- p$

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

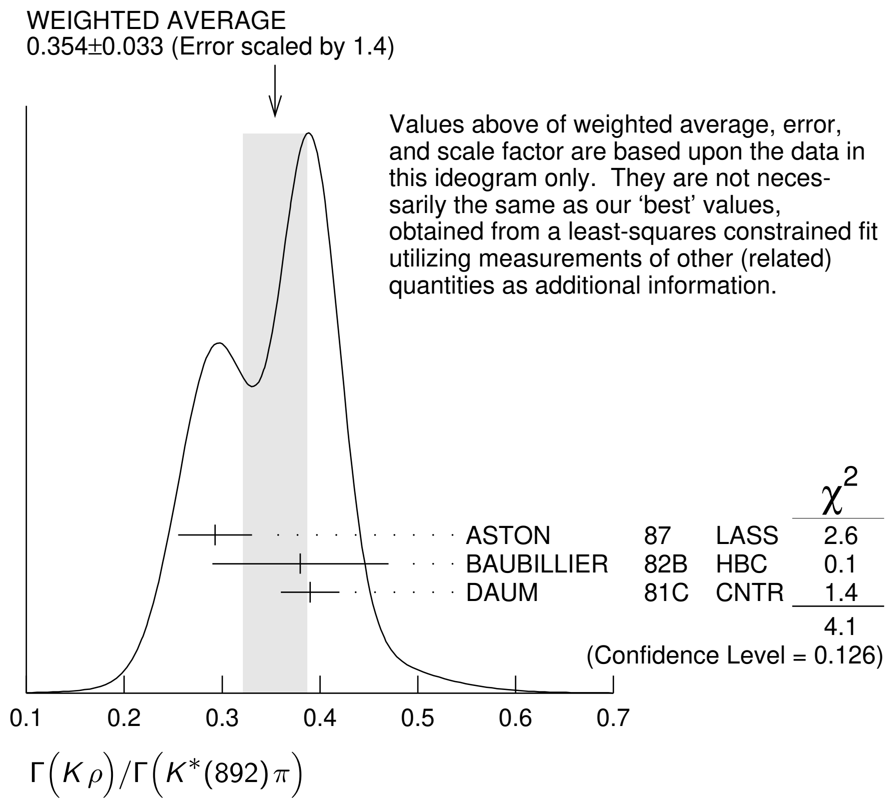
VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.059±0.017 OUR FIT					
0.070±0.035 OUR AVERAGE					
0.05 ±0.04	AGUILAR-...	71B	HBC		3.9,4.6 $K^- p$
0.13 ±0.07	BASSOMPIE...	69	HBC	0	5 $K^+ p$

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

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.174±0.017 OUR FIT	Error includes scale factor of 1.2.				
$0.150^{+0.029}_{-0.017}$ 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 $K^- p$
0.14 ±0.10	BASSANO	67	HBC	−0	4.6,5.0 $K^- p$
0.14 ±0.07	BADIER	65C	HBC	−	3 $K^- p$

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

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.350±0.031 OUR FIT	Error includes scale factor of 1.4.				
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 $K^- p \to K^- 2\pi p$



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

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.118±0.034 OUR FIT					
0.10 ±0.04	FIELD	67	HBC	−	3.8 $K^- p$

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

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
$0.006^{+0.014}_{-0.004}$ OUR FIT	Error includes scale factor of 1.2.				
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
$0.0030^{+0.0070}_{-0.0020}$ OUR FIT		Error includes scale factor of 1.3.				
0 ±0.0056		[1] ASTON	88B	LASS	−	11 $K^- p \to K^- \eta p$

• • • 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		[2] BASSOMPIE...	69	HBC	5.0 $K^+ p$
<0.02		BISHOP	69	HBC	3.5 $K^+ p$

[1] ASTON 88B quote < 0.0092 at CL=95%. We convert this to a central value and 1 sigma error in order to be able to use it in our constrained fit.
[2] Restated by us.

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

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.134±0.022 OUR FIT					
0.12 ±0.04	[1] GOLDBERG	76	HBC	−	3 $K^- p \to p \overline{K}^0 \pi\pi\pi$

[1] Assuming $\pi\pi$ system has isospin 1, which is supported by the data.

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

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.27±0.05 OUR FIT					
0.21±0.08	[1,2] JONGEJANS	78	HBC	−	4 $K^- p \to p \overline{K}^0 \pi\pi\pi$

[1] Restated by us.
[2] Assuming $\pi\pi$ system has isospin 1, which is supported by the data.

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

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

$K_2^*(1430)$ REFERENCES

ABLIKIM	22L	JHEP 2207 045	M. Ablikim et al.	(BESIII Collab.)	
ABLIKIM	19AQ	PR D100 032004	M. Ablikim et al.	(BESIII Collab.)	
PELAEZ	17	EPJ C77 91	J.R. Pelaez, A.Rodas, J.R. de Elvira		
AUBERT	07AK	PR D76 012008	B. Aubert et al.	(BABAR Collab.)	
ALAVI-HARATI	02B	PRL 89 072001	A. Alavi-Harati et al.	(FNAL KTeV Collab.)	
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)	
ASTON	87	NP B292 693	D. Aston et al.	(SLAC, NAGO, CINC, INUS)	
CARLSMITH	87	PR D36 3502	D. Carlsmith et al.	(EFI, SACL)	
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+)	
CIHANGIR	82	PL 117B 123	S. Cihangir et al.	(FNAL, MINN, ROCH)	
CLELAND	82	NP B208 189	W.E. Cleland et al.	(DURH, GEVA, LAUS+)	
ASTON	81C	PL 106B 235	D. Aston et al.	(SLAC, CARL, OTTA)	JP
DAUM	81C	NP B187 1	C. Daum et al.	(AMST, CERN, CRAC, MPIM+)	
TOAFF	81	PR D23 1500	S. Toaff et al.	(ANL, KANS)	
ETKIN	80	PR D22 42	A. Etkin et al.	(BNL, CUNY)	JP
ESTABROOKS	78	NP B133 490	P.G. Estabrooks et al.	(MCGI, CARL, DURH+)	
Also		PR D17 658	P.G. Estabrooks et al.	(MCGI, CARL, DURH+)	
JONGEJANS	78	NP B139 383	B. Jongejans et al.	(ZEEM, CERN, NIJM+)	
MARTIN	78	NP B134 392	A.D. Martin et al.	(DURH, GEVA)	
BOWLER	77	NP B126 31	M.G. Bowler et al.	(OXF)	
GOLDBERG	76	LNC 17 253	J. Goldberg	(HAIF)	
HENDRICK	76	NP B112 189	K. Hendrickx et al.	(MONS, SACL, PARIS+)	
LAUSCHER	75	NP B86 189	P. Lauscher et al.	(ABCLV Collab.)	JP
MCCUBBIN	75	NP B86 13	N.A. McCubbin, L. Lyons	(OXF)	
DEHM	74	NP B75 47	G. Dehm et al.	(MPIM, BRUX, MONS, CERN)	

LINGLIN	73	NP B55 408	D. Linglin	(CERN)
AGUILAR-...	71B	PR D4 2583	M. Aguilar-Benitez, R.L. Eisner, J.B. Kinson	(BNL)
BARNHAM	71C	NP B28 171	K.W.J. Barnham *et al.*	(BIRM, GLAS)
CORDS	71	PR D4 1974	D. Cords *et al.*	(PURD, UCD, IUPU)
BASSOMPIE...	69	NP B13 189	G. Bassompierre *et al.*	(CERN, BRUX) JP
BISHOP	69	NP B9 403	J.M. Bishop *et al.*	(WISC)
CRENNELL	69D	PRL 22 487	D.J. Crennell *et al.*	(BNL)
DAVIS	69	PRL 23 1071	P.J. Davis *et al.*	(LRL)
LIND	69	NP B14 1	V.G. Lind *et al.*	(LRL) JP
SCHWEING...	68	PR 166 1317	F. Schweingruber *et al.*	(ANL, NWES)
Also		Thesis	F.L. Schweingruber	(NWES, NWES)
BASSANO	67	PRL 19 968	D. Bassano *et al.*	(BNL, SYRA)
FIELD	67	PL 24B 638	J.H. Field *et al.*	(UCSD)
BADIER	65C	PL 19 612	J. Badier *et al.*	(EPOL, SACL, AMST)