$K_0^*(1430)$

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

See our minireview in the 1994 edition and in this edition under the $f_0(500)$.

$K_0^*(1430)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1425 ±50 OUR ESTIMATE					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1438 ± 8 ± 4	5.4k	[1] LEES	14E	BABR	$\eta_c(1S) \to K^+ K^- \eta/\pi^0$
1427 ± 4 ±13		[2] BUGG	10	RVUE	S-matrix pole
1466.6 ± 0.7 ± 3.4	141k	[3] BONVICINI	08A	CLEO	$D^+ \to K^- \pi^+ \pi^+$
∼ 1412		[4] LINK	07	FOCS	$D^+ \to K^- K^+ \pi^+$
1461.0 ± 4.0 ± 2.1	54k	[5] LINK	07B	FOCS	$D^+ \to K^- \pi^+ \pi^+$
1406 ±29		[6] BUGG	06	RVUE	
1435 ± 6		[7] ZHOU	06	RVUE	$K p \to K^- \pi^+ n$
1455 ±20 ±15		ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma \pi^+ \pi^- K^+ K^-$
1456 ± 8		[8] ZHENG	04	RVUE	$K^- p \to K^- \pi^+ n$
∼ 1419		[9] BUGG	03	RVUE	11 $K^- p \to K^- \pi^+ n$
∼ 1440		[10] LI	03	RVUE	11 $K^- p \to K^- \pi^+ n$
1459 ± 9	15k	[11] AITALA	02	E791	$D^+ \to K^- \pi^+ \pi^+$
∼ 1440		[12] JAMIN	00	RVUE	$K p \to K p$
1436 ± 8		[13] BARBERIS	98E	OMEG	450 $p p \to p_f p_s K^+ K^- \pi^+ \pi^-$
1415 ±25		[9] ANISOVICH	97C	RVUE	11 $K^- p \to K^- \pi^+ n$
∼ 1450		[14] TORNQVIST	96	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $K\pi$
1412 ± 6		[15] ASTON	88	LASS	11 $K^- p \to K^- \pi^+ n$
∼ 1430		BAUBILLIER	84B	HBC	8.25 $K^- p \to \overline{K}^0 \pi^- p$
∼ 1425		[16] ESTABROOKS	78	ASPK	13 $K^\pm p \to K^\pm \pi^\pm (n, \Delta)$
∼ 1450.0		MARTIN	78	SPEC	10 $K^\pm p \to K_S^0 \pi p$

[1] Using both $\eta \to \gamma\gamma$ and $\eta \to \pi^+ \pi^- \pi^0$. From a likelihood scan in the presence of several interfering scalar-meson resonances with fixed width $\Gamma(K_0^*(1430)) = 210$ MeV.

[2] S-Matrix pole. Supersedes BUGG 06. Combined analysis of ASTON 88, ABLIKIM 06C, AITALA 06, and LINK 09 using an s-dependent width with couplings to $K\pi$ and $K\eta'$, and the Adler zero near thresholds.

[3] From the isobar model with a complex pole for the κ.

[4] From a non-parametric analysis.

[5] A Breit-Wigner mass and width.

[6] S-matrix pole. Reanalysis of ASTON 88, AITALA 02, and ABLIKIM 06C including the κ with an s-dependent width and an Adler zero near threshold.

[7] S-matrix pole. Using ASTON 88 and assuming $K_0^*(800)$, $K_0^*(1950)$.

[8] Using ASTON 88 and assuming $K_0^*(800)$.

[9] T-matrix pole. Reanalysis of ASTON 88 data.

[10] Breit-Wigner fit. Using ASTON 88.

[11] Assuming a low-mass scalar $K\pi$ resonance, $\kappa(800)$.

[12] T-matrix pole. Using data from ESTABROOKS 78 and ASTON 88.

13 J^P not determined, could be $K_2^*(1430)$.
14 T-matrix pole.
15 Uses a model for the background, without this background they get a mass 1340 MeV, where the phase shift passes 90°.
16 Mass defined by pole position. From elastic $K\pi$ partial-wave analysis.

$K_0^*(1430)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
270 ±80 OUR ESTIMATE					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
210 ±20 ±12	5.4k	[1] LEES	14E	BABR	$\eta_c(1S) \to K^+K^-\eta/\pi^0$
270 ±10 ±40		[2] BUGG	10	RVUE	S-matrix pole
174.2± 1.9± 3.2	141k	[3] BONVICINI	08A	CLEO	$D^+ \to K^-\pi^+\pi^+$
∼ 500		[4] LINK	07	FOCS	$D^+ \to K^-K^+\pi^+$
177.0± 8.0± 3.4	54k	[5] LINK	07B	FOCS	$D^+ \to K^-\pi^+\pi^+$
350 ±40		[6] BUGG	06	RVUE	
288 ±22		[7] ZHOU	06	RVUE	$K p \to K^-\pi^+ n$
270 ±45 $^{+30}_{-35}$		ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^-K^+K^-$
217 ±31		[8] ZHENG	04	RVUE	$K^-p \to K^-\pi^+ n$
∼ 316		[9] BUGG	03	RVUE	11 $K^-p \to K^-\pi^+ n$
∼ 350		[10] LI	03	RVUE	11 $K^-p \to K^-\pi^+ n$
175 ±17	15k	[11] AITALA	02	E791	$D^+ \to K^-\pi^+\pi^+$
∼ 300		[12] JAMIN	00	RVUE	$K p \to K p$
196 ±45		[13] BARBERIS	98E	OMEG	450 $pp \to p_f p_s K^+K^-\pi^+\pi^-$
330 ±50		[9] ANISOVICH	97C	RVUE	11 $K^-p \to K^-\pi^+ n$
∼ 320		[14] TORNQVIST	96	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $K\pi$
294 ±23		ASTON	88	LASS	11 $K^-p \to K^-\pi^+ n$
∼ 200		BAUBILLIER	84B	HBC	8.25 $K^-p \to \overline{K}^0\pi^-p$
200 to 300		[15] ESTABROOKS	78	ASPK	13 $K^\pm p \to K^\pm\pi^\pm(n,\Delta)$

1 Using both $\eta \to \gamma\gamma$ and $\eta \to \pi^+\pi^-\pi^0$. From a likelihood scan in the presence of several interfering scalar-meson resonances with fixed mass $M(K_0^*(1430)) = 1435$ MeV.
2 S-Matrix pole. Supersedes BUGG 06. Combined analysis of ASTON 88, ABLIKIM 06C, AITALA 06, and LINK 09 using an s-dependent width with couplings to $K\pi$ and $K\eta'$, and the Adler zero near thresholds.
3 From the isobar model with a complex pole for the κ.
4 From a non-parametric analysis.
5 A Breit-Wigner mass and width.
6 S-matrix pole. Reanalysis of ASTON 88, AITALA 02, and ABLIKIM 06C including the κ with an s-dependent width and an Adler zero near threshold.
7 S-matrix pole. Using ASTON 88 and assuming $K_0^*(800)$, $K_0^*(1950)$.
8 Using ASTON 88 and assuming $K_0^*(800)$.
9 T-matrix pole. Reanalysis of ASTON 88 data.
10 Breit-Wigner fit. Using ASTON 88.
11 Assuming a low-mass scalar $K\pi$ resonance, $\kappa(800)$.
12 T-matrix pole. Using data from ESTABROOKS 78 and ASTON 88.
13 J^P not determined, could be $K_2^*(1430)$.
14 T-matrix pole.
15 From elastic $K\pi$ partial-wave analysis.

$K_0^*(1430)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K\pi$	(93 ± 10) %
Γ_2	$K\eta$	$(8.6^{+2.7}_{-3.4})$ %

$K_0^*(1430)$ BRANCHING RATIOS

$\Gamma(K\pi)/\Gamma_{total}$ — Γ_1/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
$0.93\pm0.04\pm0.09$	ASTON	88	LASS	0	11 $K^- p \to K^- \pi^+ n$

$\Gamma(K\eta)/\Gamma(K\pi)$ — Γ_2/Γ_1

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
$9.2\pm2.5^{+1.0}_{-2.5}$	5.4k	[1] LEES	14E	BABR	$\eta_c(1S) \to K^+ K^- \eta/\pi^0$

[1] Using both $\eta \to \gamma\gamma$ and $\eta \to \pi^+\pi^-\pi^0$. From a Dalitz analysis in the presence of several interfering scalar-meson resonances.

$K_0^*(1430)$ REFERENCES

LEES	14E	PR D89 112004	J.P. Lees et al.	(BABAR Collab.)
BUGG	10	PR D81 014002	D.V. Bugg	(LOQM)
LINK	09	PL B681 14	J.M. Link et al.	(FNAL FOCUS Collab.)
BONVICINI	08A	PR D78 052001	G. Bonvicini et al.	(CLEO Collab.)
LINK	07	PL B648 156	J.M. Link et al.	(FNAL FOCUS Collab.)
LINK	07B	PL B653 1	J.M. Link et al.	(FNAL FOCUS Collab.)
ABLIKIM	06C	PL B633 681	M. Ablikim et al.	(BES Collab.)
AITALA	06	PR D73 032004	E.M. Aitala et al.	(FNAL E791 Collab.)
Also		PR D74 059901 (errat.)	E.M. Aitala et al.	(FNAL E791 Collab.)
BUGG	06	PL B632 471	D.V. Bugg	(LOQM)
ZHOU	06	NP A775 212	Z.Y. Zhou, H.Q. Zheng	
ABLIKIM	05Q	PR D72 092002	M. Ablikim et al.	(BES Collab.)
ZHENG	04	NP A733 235	H.Q. Zheng et al.	
BUGG	03	PL B572 1	D.V. Bugg	
LI	03	PR D67 034025	L. Li, B. Zou, G. Li	
AITALA	02	PRL 89 121801	E.M. Aitala et al.	(FNAL E791 Collab.)
JAMIN	00	NP B587 331	M. Jamin et al.	
BARBERIS	98E	PL B436 204	D. Barberis et al.	(Omega Expt.)
ANISOVICH	97C	PL B413 137	A.V. Anisovich, A.V. Sarantsev	
TORNQVIST	96	PRL 76 1575	N.A. Tornqvist, M. Roos	(HELS)
ASTON	88	NP B296 493	D. Aston et al.	(SLAC, NAGO, CINC, INUS)
BAUBILLIER	84B	ZPHY C26 37	M. Baubillier et al.	(BIRM, CERN, GLAS+)
ESTABROOKS	78	NP B133 490	P.G. Estabrooks et al.	(MCGI, CARL, DURH+)
MARTIN	78	NP B134 392	A.D. Martin et al.	(DURH, GEVA)