$K_0^*(1430)$

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

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 $K_0^*(700)$, $K_0^*(1950)$.

[8] Using ASTON 88 and assuming $K_0^*(700)$.

[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, $\kappa(700)$.

[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 $p p \to p_f p_s K^+ K^- \pi^+ \pi^-$
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 $K_0^*(700)$, $K_0^*(1950)$.
[8] Using ASTON 88 and assuming $K_0^*(700)$.
[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, $\kappa(700)$.
[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 $\pm$10) %
Γ_2	$K\eta$	($8.6^{+2.7}_{-3.4}$) %
Γ_3	$K\eta'(958)$	seen

$K_0^*(1430)$ BRANCHING RATIOS

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

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
0.93±0.04±0.09	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*
$\mathbf{9.2 \pm 2.5^{+1.0}_{-2.5}}$	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.

$\Gamma(K\eta'(958))/\Gamma_{\text{total}}$ — Γ_3/Γ

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
seen	ABLIKIM	14J	BES3	$\psi(2S) \to \gamma K^+ K^- \eta'(958)$

$K_0^*(1430)$ REFERENCES

ABLIKIM	14J	PR D89 074030	M. Ablikim *et al.*	(BES III Collab.)
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)