$K_0^*(1430)$

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

$K_0^*(1430)$ T-MATRIX POLE $\sqrt{s}$

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

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
$(1431 \pm 6) - i\,(110 \pm 19)$ OUR ESTIMATE				
$(1431 \pm 6) - i\,(110 \pm 19)$	[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.

$K_0^*(1430)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1425 ±50 OUR ESTIMATE					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1493 ± 4 ± 7		[1] AAIJ	23AH	LHCB	$B^+ \to K^+ (K_S^0 K \pi)$
1449 ±17 ± 2		[2] LEES	21A	BABR	$\eta_c(1S) \to \eta' K^+ K^-$
1438 ± 8 ± 4	5.4k	[3] LEES	14E	BABR	$\eta_c(1S) \to K^+ K^- \eta/\pi^0$
1427 ± 4 ±13		[4] BUGG	10	RVUE	S-matrix pole
1466.6± 0.7± 3.4	141k	[5] BONVICINI	08A	CLEO	$D^+ \to K^- \pi^+ \pi^+$
~ 1412		[6] LINK	07	FOCS	$D^+ \to K^- K^+ \pi^+$
1461.0± 4.0± 2.1	54k	[7] LINK	07B	FOCS	$D^+ \to K^- \pi^+ \pi^+$
1406 ±29		[8] BUGG	06	RVUE	
1435 ± 6		[9] 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		[10] ZHENG	04	RVUE	$K^- p \to K^- \pi^+ n$
~ 1419		[11] BUGG	03	RVUE	11 $K^- p \to K^- \pi^+ n$
~ 1440		[12] LI	03	RVUE	11 $K^- p \to K^- \pi^+ n$
1459 ± 9	15k	[13] AITALA	02	E791	$D^+ \to K^- \pi^+ \pi^+$
~ 1440		[14] JAMIN	00	RVUE	$K p \to K p$
1436 ± 8		[15] BARBERIS	98E	OMEG	450 $p p \to p_f p_s K^+ K^- \pi^+ \pi^-$
1415 ±25		[11] ANISOVICH	97C	RVUE	11 $K^- p \to K^- \pi^+ n$
~ 1450		[16] TORNQVIST	96	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $K\pi$
1412 ± 6		[17] 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		[18] 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] From Dalitz plot analyses of $\eta_c(1S, 2S) \to K_S^0 K^+ \pi^- +$ c.c..

[2] Using a $K\pi - K\eta'$ coupled channel Breit-Wigner function.

[3] 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.

[4] 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.
[5] From the isobar model with a complex pole for the κ.
[6] From a non-parametric analysis.
[7] A Breit-Wigner mass and width.
[8] 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.
[9] S-matrix pole. Using ASTON 88 and assuming $K_0^*(700)$, $K_0^*(1950)$.
[10] Using ASTON 88 and assuming $K_0^*(700)$.
[11] T-matrix pole. Reanalysis of ASTON 88 data.
[12] Breit-Wigner fit. Using ASTON 88.
[13] Assuming a low-mass scalar $K\pi$ resonance, $\kappa(700)$.
[14] T-matrix pole. Using data from ESTABROOKS 78 and ASTON 88.
[15] J^P not determined, could be $K_2^*(1430)$.
[16] T-matrix pole.
[17] Uses a model for the background, without this background they get a mass 1340 MeV, where the phase shift passes 90°.
[18] 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. • • •					
215 ± 7 ± 4		[1] AAIJ	23AH	LHCB	$B^+ \to K^+ (K_S^0 K\pi)$
210 ±20 ±12	5.4k	[2] LEES	14E	BABR	$\eta_c(1S) \to K^+ K^- \eta/\pi^0$
270 ±10 ±40		[3] BUGG	10	RVUE	S-matrix pole
174.2± 1.9± 3.2	141k	[4] BONVICINI	08A	CLEO	$D^+ \to K^- \pi^+ \pi^+$
∼ 500		[5] LINK	07	FOCS	$D^+ \to K^- K^+ \pi^+$
177.0± 8.0± 3.4	54k	[6] LINK	07B	FOCS	$D^+ \to K^- \pi^+ \pi^+$
350 ±40		[7] BUGG	06	RVUE	
288 ±22		[8] 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		[9] ZHENG	04	RVUE	$K^- p \to K^- \pi^+ n$
∼ 316		[10] BUGG	03	RVUE	11 $K^- p \to K^- \pi^+ n$
∼ 350		[11] LI	03	RVUE	11 $K^- p \to K^- \pi^+ n$
175 ±17	15k	[12] AITALA	02	E791	$D^+ \to K^- \pi^+ \pi^+$
∼ 300		[13] JAMIN	00	RVUE	$K p \to K p$
196 ±45		[14] BARBERIS	98E	OMEG	450 $p p \to p_f p_s K^+ K^- \pi^+ \pi^-$
330 ±50		[10] ANISOVICH	97C	RVUE	11 $K^- p \to K^- \pi^+ n$
∼ 320		[15] 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		[16] ESTABROOKS	78	ASPK	13 $K^\pm p \to K^\pm \pi^\pm (n, \Delta)$

[1] From Dalitz plot analyses of $\eta_c(1S, 2S) \to K_S^0 K^+ \pi^- +$ c.c..

[2] Using both $\eta \rightarrow \gamma\gamma$ and $\eta \rightarrow \pi^+\pi^-\pi^0$. From a likelihood scan in the presence of several interfering scalar-meson resonances with fixed mass $M(K_0^*(1430)) = 1435$ MeV.
[3] 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.
[4] From the isobar model with a complex pole for the κ.
[5] From a non-parametric analysis.
[6] A Breit-Wigner mass and width.
[7] 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.
[8] S-matrix pole. Using ASTON 88 and assuming $K_0^*(700)$, $K_0^*(1950)$.
[9] Using ASTON 88 and assuming $K_0^*(700)$.
[10] T-matrix pole. Reanalysis of ASTON 88 data.
[11] Breit-Wigner fit. Using ASTON 88.
[12] Assuming a low-mass scalar $K\pi$ resonance, $\kappa(700)$.
[13] T-matrix pole. Using data from ESTABROOKS 78 and ASTON 88.
[14] J^P not determined, could be $K_2^*(1430)$.
[15] T-matrix pole.
[16] 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	$K\eta$	$(8.6^{+2.7}_{-3.4})$ %
Γ_3	$K\eta'(958)$	seen

$K_0^*(1430)$ 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 $K^- p \rightarrow K^-\pi^+ n$

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

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

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

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

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

$\Gamma(K\eta'(958))/\Gamma(K\pi)$ — Γ_3/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
0.397±0.064±0.054	[1] LEES	21A	BABR	$\eta_c(1S) \rightarrow \eta' K^+K^-$

[1] Using $K\pi$ data from LEES 14E.

$K_0^*(1430)$ REFERENCES

AAIJ	23AH	PR D108 032010	R. Aaij *et al.*	(LHCb Collab.)
LEES	21A	PR D104 072002	J.P. Lees *et al.*	(BABAR Collab.)
PELAEZ	17	EPJ C77 91	J.R. Pelaez, A.Rodas, J.R. de Elvira	
ABLIKIM	14J	PR D89 074030	M. Ablikim *et al.*	(BESIII 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)