

$K_0^*(1430)$

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

 $K_0^*(1430)$ T-MATRIX POLE $\sqrt{s}$ Note that $\Gamma = -2 \operatorname{Im}(\sqrt{s})$.

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
(1431 ± 6) − i (110 ± 19) OUR ESTIMATE			
(1431 ± 6) − i (110 ± 19)	¹ PELAEZ	17	RVUE $\pi K \rightarrow \pi K$
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	$B^+ \rightarrow K^+(K_S^0 K \pi)$
1449 ± 17 ± 2		² LEES	21A BABR	$\eta_c(1S) \rightarrow \eta' K^+ K^-$
1438 ± 8 ± 4	5.4k	³ LEES	14E BABR	$\eta_c(1S) \rightarrow K^+ K^- \eta/\pi^0$
1427 ± 4 ± 13		⁴ BUGG	10 RVUE	S-matrix pole
1466.6 ± 0.7 ± 3.4	141k	⁵ BONVICINI	08A CLEO	$D^+ \rightarrow K^- \pi^+ \pi^+$
~ 1412		⁶ LINK	07 FOCS	$D^+ \rightarrow K^- K^+ \pi^+$
1461.0 ± 4.0 ± 2.1	54k	⁷ LINK	07B FOCS	$D^+ \rightarrow K^- \pi^+ \pi^+$
1406 ± 29		⁸ BUGG	06 RVUE	
1435 ± 6		⁹ ZHOU	06 RVUE	$K p \rightarrow K^- \pi^+ n$
1455 ± 20 ± 15		ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$
1456 ± 8		¹⁰ ZHENG	04 RVUE	$K^- p \rightarrow K^- \pi^+ n$
~ 1419		¹¹ BUGG	03 RVUE	$11 K^- p \rightarrow K^- \pi^+ n$
~ 1440		¹² LI	03 RVUE	$11 K^- p \rightarrow K^- \pi^+ n$
1459 ± 9	15k	¹³ AITALA	02 E791	$D^+ \rightarrow K^- \pi^+ \pi^+$
~ 1440		¹⁴ JAMIN	00 RVUE	$K p \rightarrow K p$
1436 ± 8		¹⁵ BARBERIS	98E OMEG	$450 p p \rightarrow p_f p_s K^+ K^- \pi^+ \pi^-$
1415 ± 25		¹¹ ANISOVICH	97C RVUE	$11 K^- p \rightarrow K^- \pi^+ n$
~ 1450		¹⁶ TORNQVIST	96 RVUE	$\pi \pi \rightarrow \pi \pi, K \bar{K}, K \pi$
1412 ± 6		¹⁷ ASTON	88 LASS	$11 K^- p \rightarrow K^- \pi^+ n$
~ 1430		BAUBILLIER	84B HBC	$8.25 K^- p \rightarrow \bar{K}^0 \pi^- p$
~ 1425		¹⁸ ESTABROOKS	78 ASPK	$13 K^\pm p \rightarrow K^\pm \pi^\pm (n, \Delta)$
~ 1450.0		MARTIN	78 SPEC	$10 K^\pm p \rightarrow K_S^0 \pi p$

¹ From Dalitz plot analyses of $\eta_c(1S, 2S) \rightarrow K_S^0 K^+ \pi^- + \text{c.c.}$.² Using a $K \pi - K \eta'$ coupled channel Breit-Wigner function.³ 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 width $\Gamma(K_0^*(1430)) = 210 \text{ MeV}$.

- 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 $\pm$ 80 OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
215 $\pm$ 7 $\pm$ 4		¹ AAIJ	23AH LHCb	$B^+ \rightarrow K^+ (K_S^0 K\pi)$
210 $\pm$ 20 $\pm$ 12	5.4k	² LEES	14E BABR	$\eta_c(1S) \rightarrow K^+ K^- \eta/\pi^0$
270 $\pm$ 10 $\pm$ 40		³ BUGG	10 RVUE	S-matrix pole
174.2 $\pm$ 1.9 $\pm$ 3.2	141k	⁴ BONVICINI	08A CLEO	$D^+ \rightarrow K^- \pi^+ \pi^+$
$\sim$ 500		⁵ LINK	07 FOCS	$D^+ \rightarrow K^- K^+ \pi^+$
177.0 $\pm$ 8.0 $\pm$ 3.4	54k	⁶ LINK	07B FOCS	$D^+ \rightarrow K^- \pi^+ \pi^+$
350 $\pm$ 40		⁷ BUGG	06 RVUE	
288 $\pm$ 22		⁸ ZHOU	06 RVUE	$Kp \rightarrow K^- \pi^+ n$
270 $\pm$ 45 $\begin{smallmatrix} +30 \\ -35 \end{smallmatrix}$		ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$
217 $\pm$ 31		⁹ ZHENG	04 RVUE	$K^- p \rightarrow K^- \pi^+ n$
$\sim$ 316		¹⁰ BUGG	03 RVUE	$11 K^- p \rightarrow K^- \pi^+ n$
$\sim$ 350		¹¹ LI	03 RVUE	$11 K^- p \rightarrow K^- \pi^+ n$
175 $\pm$ 17	15k	¹² AITALA	02 E791	$D^+ \rightarrow K^- \pi^+ \pi^+$
$\sim$ 300		¹³ JAMIN	00 RVUE	$Kp \rightarrow Kp$
196 $\pm$ 45		¹⁴ BARBERIS	98E OMEG	$450 pp \rightarrow p_f p_s K^+ K^- \pi^+ \pi^-$
330 $\pm$ 50		¹⁰ ANISOVICH	97C RVUE	$11 K^- p \rightarrow K^- \pi^+ n$
$\sim$ 320		¹⁵ TORNQVIST	96 RVUE	$\pi\pi \rightarrow \pi\pi, K\bar{K}, K\pi$
294 $\pm$ 23		ASTON	88 LASS	$11 K^- p \rightarrow K^- \pi^+ n$
$\sim$ 200		BAUBILLIER	84B HBC	$8.25 K^- p \rightarrow \bar{K}^0 \pi^- p$
200 to 300		¹⁶ ESTABROOKS	78 ASPK	$13 K^\pm p \rightarrow K^\pm \pi^\pm (n, \Delta)$

- ¹ From Dalitz plot analyses of $\eta_c(1S, 2S) \rightarrow K_S^0 K^+ \pi^- + \text{c.c.}$.
- 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 $M(K_0^*(1430)) = 1435 \text{ MeV}$.
- 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 $\pm$ 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$\pm$0.04$\pm$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$\pm$2.5$^{+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.

$\Gamma(K\eta'(958))/\Gamma_{\text{total}}$					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	
$0.397 \pm 0.064 \pm 0.054$	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 <i>et al.</i>	(LHCb Collab.)
LEES	21A	PR D104 072002	J.P. Lees <i>et al.</i>	(BABAR Collab.)
PELAEZ	17	EPJ C77 91	J.R. Pelaez, A.Rodas, J.R. de Elvira	
ABLIKIM	14J	PR D89 074030	M. Ablikim <i>et al.</i>	(BESIII Collab.)
LEES	14E	PR D89 112004	J.P. Lees <i>et al.</i>	(BABAR Collab.)
BUGG	10	PR D81 014002	D.V. Bugg	(LOQM)
LINK	09	PL B681 14	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
BONVICINI	08A	PR D78 052001	G. Bonvicini <i>et al.</i>	(CLEO Collab.)
LINK	07	PL B648 156	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
LINK	07B	PL B653 1	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
ABLIKIM	06C	PL B633 681	M. Ablikim <i>et al.</i>	(BES Collab.)
AITALA	06	PR D73 032004	E.M. Aitala <i>et al.</i>	(FNAL E791 Collab.)
Also		PR D74 059901 (errat.)	E.M. Aitala <i>et al.</i>	(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 <i>et al.</i>	(BES Collab.)
ZHENG	04	NP A733 235	H.Q. Zheng <i>et al.</i>	
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 <i>et al.</i>	(FNAL E791 Collab.)
JAMIN	00	NP B587 331	M. Jamin <i>et al.</i>	
BARBERIS	98E	PL B436 204	D. Barberis <i>et al.</i>	(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 <i>et al.</i>	(SLAC, NAGO, CINC, INUS)
BAUBILLIER	84B	ZPHY C26 37	M. Baubillier <i>et al.</i>	(BIRM, CERN, GLAS+)
ESTABROOKS	78	NP B133 490	P.G. Estabrooks <i>et al.</i>	(MCGI, CARL, DURH+)
MARTIN	78	NP B134 392	A.D. Martin <i>et al.</i>	(DURH, GEVA)