

$K_0^*(1430)$

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

See our minireview in the 1994 edition and in this edition under the $f_0(500)$. **$K_0^*(1430)$ T-MATRIX POLE \sqrt{s}**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
$(1431 \pm 6) - i(110 \pm 19)$	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			
1438 ± 8 ± 4	5.4k	¹ LEES	14E	BABR $\eta_c(1S) \rightarrow K^+ K^- \eta/\pi^0$
1427 ± 4 ± 13		² BUGG	10	RVUE S-matrix pole
1466.6 ± 0.7 ± 3.4	141k	³ BONVICINI	08A	CLEO $D^+ \rightarrow K^- \pi^+ \pi^+$
~ 1412		⁴ LINK	07	FOCS $D^+ \rightarrow K^- K^+ \pi^+$
1461.0 ± 4.0 ± 2.1	54k	⁵ LINK	07B	FOCS $D^+ \rightarrow K^- \pi^+ \pi^+$
1406 ± 29		⁶ BUGG	06	RVUE
1435 ± 6		⁷ 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		⁸ ZHENG	04	RVUE $K^- p \rightarrow K^- \pi^+ n$
~ 1419		⁹ BUGG	03	RVUE $11 K^- p \rightarrow K^- \pi^+ n$
~ 1440		¹⁰ LI	03	RVUE $11 K^- p \rightarrow K^- \pi^+ n$
1459 ± 9	15k	¹¹ AITALA	02	E791 $D^+ \rightarrow K^- \pi^+ \pi^+$
~ 1440		¹² JAMIN	00	RVUE $K p \rightarrow K p$
1436 ± 8		¹³ BARBERIS	98E	OMEG 450 $p p \rightarrow$ $p_f p_s K^+ K^- \pi^+ \pi^-$
1415 ± 25		⁹ ANISOVICH	97C	RVUE $11 K^- p \rightarrow K^- \pi^+ n$
~ 1450		¹⁴ TORNQVIST	96	RVUE $\pi \pi \rightarrow \pi \pi, K \bar{K}, K \pi$
1412 ± 6		¹⁵ 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		¹⁶ 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 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 $\Gamma(K_0^*(1430)) = 210$ 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

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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	$\eta_c(1S) \rightarrow K^+ K^- \eta/\pi^0$
270 ± 10 ± 40		² BUGG	10 RVUE	S-matrix pole
174.2 ± 1.9 ± 3.2	141k	³ BONVICINI	08A CLEO	$D^+ \rightarrow K^- \pi^+ \pi^+$
~ 500		⁴ LINK	07 FOCS	$D^+ \rightarrow K^- K^+ \pi^+$
177.0 ± 8.0 ± 3.4	54k	⁵ LINK	07B FOCS	$D^+ \rightarrow K^- \pi^+ \pi^+$
350 ± 40		⁶ BUGG	06 RVUE	
288 ± 22		⁷ ZHOU	06 RVUE	$Kp \rightarrow K^- \pi^+ n$
270 ± 45 ⁺³⁰ ₋₃₅		ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$
217 ± 31		⁸ ZHENG	04 RVUE	$K^- p \rightarrow K^- \pi^+ n$
~ 316		⁹ BUGG	03 RVUE	11 $K^- p \rightarrow K^- \pi^+ n$
~ 350		¹⁰ LI	03 RVUE	11 $K^- p \rightarrow K^- \pi^+ n$
175 ± 17	15k	¹¹ AITALA	02 E791	$D^+ \rightarrow K^- \pi^+ \pi^+$
~ 300		¹² JAMIN	00 RVUE	$Kp \rightarrow Kp$
196 ± 45		¹³ BARBERIS	98E OMEG	450 $pp \rightarrow$ $p_f p_s K^+ K^- \pi^+ \pi^-$
330 ± 50		⁹ ANISOVICH	97C RVUE	11 $K^- p \rightarrow K^- \pi^+ n$
~ 320		¹⁴ TORNQVIST	96 RVUE	$\pi\pi \rightarrow \pi\pi, K\bar{K}, K\pi$
294 ± 23		ASTON	88 LASS	11 $K^- p \rightarrow K^- \pi^+ n$
~ 200		BAUBILLIER	84B HBC	8.25 $K^- p \rightarrow \bar{K}^0 \pi^- p$
200 to 300		¹⁵ ESTABROOKS 78	ASPK	13 $K^\pm p \rightarrow K^\pm \pi^\pm (n, \Delta)$

¹ 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.

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

$\Gamma(K\eta)/\Gamma(K\pi)$	Γ_2/Γ_1
<u>VALUE (%)</u>	<u>EVTS</u> <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>
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.

$\Gamma(K\eta'(958))/\Gamma_{\text{total}}$	Γ_3/Γ
<u>VALUE</u>	<u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>
seen	ABLIKIM 14J BES3 $\psi(2S) \rightarrow \gamma K^+ K^- \eta'(958)$

$K_0^*(1430)$ REFERENCES

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)
