

$a_0(1450)$

$$I^G(J^{PC}) = 1^-(0^{++})$$

See minireview on scalar mesons under $f_0(500)$. **$a_0(1450)$ MASS**

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1474 ±19	OUR AVERAGE			
1480 ±30		ABELE	98	CBAR $0.0 \bar{p}p \rightarrow K_S^0 K^\pm \pi^\mp$
1470 ±25		¹ AMSLER	95D	CBAR $0.0 \bar{p}p \rightarrow \pi^0 \pi^0 \pi^0, \pi^0 \eta \eta, \pi^0 \pi^0 \eta$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1458 ±14 ±15	190k	² AAIJ	16N	LHCB $D^0 \rightarrow K_S^0 K^\pm \pi^\mp$
1515 ±30		³ ANISOVICH	09	RVUE $0.0 \bar{p}p, \pi N$
$1316.8^{+0.7+24.7}_{-1.0-4.6}$		⁴ UEHARA	09A	BELL $\gamma\gamma \rightarrow \pi^0 \eta$
1432 ±13 ±25		⁵ BUGG	08A	RVUE $\bar{p}p$
1477 ±10	80k	⁶ UMAN	06	E835 $5.2 \bar{p}p \rightarrow \eta \eta \pi^0$
1441 $^{+40}_{-15}$	35280	³ BAKER	03	SPEC $\bar{p}p \rightarrow \omega \pi^+ \pi^- \pi^0$
1303 ±16		⁷ BARGIOTTI	03	OBLX $\bar{p}p$
1296 ±10		⁸ AMSLER	02	CBAR $0.9 \bar{p}p \rightarrow \pi^0 \pi^0 \eta$
1565 ±30		⁸ ANISOVICH	98B	RVUE Compilation
1290 ±10		⁹ BERTIN	98B	OBLX $0.0 \bar{p}p \rightarrow K^\pm K_S^0 \pi^\mp$
1450 ±40		AMSLER	94D	CBAR $0.0 \bar{p}p \rightarrow \pi^0 \pi^0 \eta$
1410 ±25		ETKIN	82C	MPS $23 \pi^- p \rightarrow n 2K_S^0$
~ 1300		MARTIN	78	SPEC $10 K^\pm p \rightarrow K_S^0 \pi p$
1255 ± 5		¹⁰ CASON	76	

¹ Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D.² Using a model with Gaussian constraints to the PDG averaged values .³ From the pole position.⁴ May be a different state.⁵ Using data from AMSLER 94D, ABELE 98, and BAKER 03. Supersedes BUGG 94.⁶ Statistical error only.⁷ Coupled channel analysis of $\pi^+ \pi^- \pi^0$, $K^+ K^- \pi^0$, and $K^\pm K_S^0 \pi^\mp$.⁸ T-matrix pole.⁹ Not confirmed by BUGG 08A.¹⁰ Isospin 0 not excluded. **$a_0(1450)$ WIDTH**

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
265 ±13	OUR AVERAGE			
265 ±15		ABELE	98	CBAR $0.0 \bar{p}p \rightarrow K_S^0 K^\pm \pi^\mp$
265 ±30		¹ AMSLER	95D	CBAR $0.0 \bar{p}p \rightarrow \pi^0 \pi^0 \pi^0, \pi^0 \eta \eta, \pi^0 \pi^0 \eta$

• • • We do not use the following data for averages, fits, limits, etc. • • •

282 ±12 ±13	190k	2	AAIJ	16N	LHCB	$D^0 \rightarrow K_S^0 K^\pm \pi^\mp$
230 ±36		3	ANISOVICH	09	RVUE	$0.0 \bar{p}p, \pi N$
$65.0^{+2.1+99.1}_{-5.4-32.6}$		4	UEHARA	09A	BELL	$\gamma\gamma \rightarrow \pi^0 \eta$
196 ±10 ±10		5	BUGG	08A	RVUE	$\bar{p}p$
267 ±11	80k	6	UMAN	06	E835	$5.2 \bar{p}p \rightarrow \eta\eta\pi^0$
110 ±14	35280	3	BAKER	03	SPEC	$\bar{p}p \rightarrow \omega\pi^+\pi^-\pi^0$
92 ±16		7	BARGIOTTI	03	OBLX	$\bar{p}p$
81 ±21		8	AMSLER	02	CBAR	$0.9 \bar{p}p \rightarrow \pi^0\pi^0\eta$
292 ±40		8	ANISOVICH	98B	RVUE	Compilation
80 ±5		9	BERTIN	98B	OBLX	$0.0 \bar{p}p \rightarrow K^\pm K_S^0 \pi^\mp$
270 ±40			AMSLER	94D	CBAR	$0.0 \bar{p}p \rightarrow \pi^0\pi^0\eta$
230 ±30			ETKIN	82C	MPS	$23 \pi^- p \rightarrow n 2K_S^0$
~ 250			MARTIN	78	SPEC	$10 K^\pm p \rightarrow K_S^0 \pi p$
79 ±10		10	CASON	76		

¹ Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D.

² Using a model with Gaussian constraints to the PDG averaged values .

³ From the pole position.

⁴ May be a different state.

⁵ Using data from AMSLER 94D, ABELE 98, and BAKER 03. Supersedes BUGG 94.

⁶ Statistical error only.

⁷ Coupled channel analysis of $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, and $K^\pm K_S^0 \pi^\mp$.

⁸ T-matrix pole.

⁹ Not confirmed by BUGG 08A.

¹⁰ Isospin 0 not excluded.

$a_0(1450)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 \quad \pi\eta$	0.093 ± 0.020
$\Gamma_2 \quad \pi\eta'(958)$	0.033 ± 0.017
$\Gamma_3 \quad K\bar{K}$	0.082 ± 0.028
$\Gamma_4 \quad \omega\pi\pi$	DEFINED AS 1
$\Gamma_5 \quad a_0(980)\pi\pi$	seen
$\Gamma_6 \quad \gamma\gamma$	seen

$a_0(1450) \Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$\Gamma(\pi\eta) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$	$\Gamma_1\Gamma_6/\Gamma$		
VALUE (eV)	DOCUMENT ID	TECN	COMMENT

• • • We do not use the following data for averages, fits, limits, etc. • • •

$432 \pm 6^{+1073}_{-256}$	¹ UEHARA	09A	BELL	$\gamma\gamma \rightarrow \pi^0 \eta$
----------------------------	---------------------	-----	------	---------------------------------------

¹ May be a different state.

$a_0(1450)$ BRANCHING RATIOS

$\Gamma(\pi\eta'(958))/\Gamma(\pi\eta)$ Γ_2/Γ_1

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.35±0.16	¹ ABELE	98	CBAR 0.0 $\bar{p}p \rightarrow K_L^0 K^\pm \pi^\mp$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.43±0.19	ABELE	97C	CBAR 0.0 $\bar{p}p \rightarrow \pi^0 \pi^0 \eta'$
-----------	-------	-----	---

¹ Using $\pi^0 \eta$ from AMSLER 94D.

$\Gamma(K\bar{K})/\Gamma(\pi\eta)$ Γ_3/Γ_1

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.88±0.23	¹ ABELE	98	CBAR 0.0 $\bar{p}p \rightarrow K_L^0 K^\pm \pi^\mp$

¹ Using $\pi^0 \eta$ from AMSLER 94D.

$\Gamma(\omega\pi\pi)/\Gamma(\pi\eta)$ Γ_4/Γ_1

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
10.7±2.3	35280	¹ BAKER	03	SPEC $\bar{p}p \rightarrow \omega \pi^+ \pi^- \pi^0$

¹ Using results on $\bar{p}p \rightarrow a_0(1450)^0 \pi^0$, $a_0(1450) \rightarrow \eta \pi^0$ from ABELE 96C and assuming the $\omega\rho$ mechanism for the $\omega\pi\pi$ state.

$\Gamma(a_0(980)\pi\pi)/\Gamma_{\text{total}}$ Γ_5/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
seen	BUGG	08A	RVUE $\bar{p}p$

$\Gamma(a_0(980)\pi\pi)/\Gamma(\pi\eta)$ Γ_5/Γ_1

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
--------------	--------------------	-------------	------------	----------------

• • • We do not use the following data for averages, fits, limits, etc. • • •

≤ 4.3	ANISOVICH	01	RVUE	0 $\bar{p}p \rightarrow \eta 2\pi^+ 2\pi^-$
------------	-----------	----	------	---

$\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ Γ_6/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
seen	¹ UEHARA	09A	BELL $\gamma\gamma \rightarrow \pi^0 \eta$

¹ May be a different state.

$a_0(1450)$ REFERENCES

AAIJ	16N	PR D93 052018	R. Aaij <i>et al.</i>	(LHCb Collab.)
ANISOVICH	09	IJMP A24 2481	V.V. Anisovich, A.V. Sarantsev	
UEHARA	09A	PR D80 032001	S. Uehara <i>et al.</i>	(BELLE Collab.)
BUGG	08A	PR D78 074023	D.V. Bugg	(LOQM)
UMAN	06	PR D73 052009	I. Uman <i>et al.</i>	(FNAL E835)
BAKER	03	PL B563 140	C.A. Baker <i>et al.</i>	
BARGIOTTI	03	EPJ C26 371	M. Bargiotti <i>et al.</i>	(OBELIX Collab.)
AMSLER	02	EPJ C23 29	C. Amsler <i>et al.</i>	
ANISOVICH	01	NP A690 567	A.V. Anisovich <i>et al.</i>	
ABELE	98	PR D57 3860	A. Abele <i>et al.</i>	(Crystal Barrel Collab.)
ANISOVICH	98B	SPU 41 419	V.V. Anisovich <i>et al.</i>	

Translated from UFN 168 481.

BERTIN	98B	PL B434 180	A. Bertin <i>et al.</i>	(OBELIX Collab.)
ABELE	97C	PL B404 179	A. Abele <i>et al.</i>	(Crystal Barrel Collab.)
ABELE	96C	NP A609 562	A. Abele <i>et al.</i>	(Crystal Barrel Collab.)
AMSLER	95B	PL B342 433	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
AMSLER	95C	PL B353 571	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
AMSLER	95D	PL B355 425	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
AMSLER	94D	PL B333 277	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.) IGJPC
BUGG	94	PR D50 4412	D.V. Bugg <i>et al.</i>	(LOQM)
ETKIN	82C	PR D25 2446	A. Etkin <i>et al.</i>	(BNL, CUNY, TUFTS, VAND)
MARTIN	78	NP B134 392	A.D. Martin <i>et al.</i>	(DURH, GEVA)
CASON	76	PRL 36 1485	N.M. Cason <i>et al.</i>	(NDAM, ANL)
