

a₀(1450)

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

See the review on "Scalar Mesons below 2 GeV."

a₀(1450) MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1474 ± 19	OUR AVERAGE			
1480 ± 30		ABELE 98	CBAR	0.0 $\bar{p}p \rightarrow K_L^0 K^\pm \pi^\mp$
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. ● ● ●				
1302.1 ± 1.1 ± 3.9		² ALBRECHT 20	RVUE	0.9 $\bar{p}p \rightarrow \pi^0 \pi^0 \eta, \pi^0 \eta \eta, \pi^0 K^+ K^-$
1458 ± 14 ± 15	190k	³ AAIJ 16N	LHCB	$D^0 \rightarrow K_S^0 K^\pm \pi^\mp$
1515 ± 30		⁴ ANISOVICH 09	RVUE	0.0 $\bar{p}p, \pi N$
1316.8 ⁺ _{-1.0} 0.7 ⁺ _{-4.6}		⁵ UEHARA 09A	BELL	$\gamma\gamma \rightarrow \pi^0 \eta$
1432 ± 13 ± 25		⁶ BUGG 08A	RVUE	$\bar{p}p$
1477 ± 10	80k	⁷ UMAN 06	E835	5.2 $\bar{p}p \rightarrow \eta \eta \pi^0$
1441 ⁺ ₋₁₅	35k	⁴ BAKER 03	SPEC	$\bar{p}p \rightarrow \omega \pi^+ \pi^- \pi^0$
1303 ± 16		⁸ BARGIOTTI 03	OBLX	$\bar{p}p$
1296 ± 10		⁹ AMSLER 02	CBAR	0.9 $\bar{p}p \rightarrow \pi^0 \pi^0 \eta$
1565 ± 30		⁹ ANISOVICH 98B	RVUE	Compilation
1290 ± 10		¹⁰ 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 $\pi^- p \rightarrow n 2 K_S^0$
~ 1300		MARTIN 78	SPEC	10 $K^\pm p \rightarrow K_S^0 \pi p$
1255 ± 5		¹¹ CASON 76		

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

² T-matrix pole, 2 poles, 2 channels ($\pi \eta, K \bar{K}$).

³ Using a model with Gaussian constraints to the PDG averaged values.

⁴ From the pole position.

⁵ May be a different state.

⁶ Using data from AMSLER 94D, ABELE 98, and BAKER 03. Supersedes BUGG 94.

⁷ Statistical error only.

⁸ Coupled channel analysis of $\pi^+ \pi^- \pi^0, K^+ K^- \pi^0,$ and $K^\pm K_S^0 \pi^\mp$.

⁹ T-matrix pole.

¹⁰ Not confirmed by BUGG 08A.

¹¹ Isospin 0 not excluded.

a₀(1450) WIDTH

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

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112.4 ± 1.4 ± 3.4		² ALBRECHT	20	RVUE	0.9 $\bar{p}p \rightarrow \pi^0 \pi^0 \eta$,
					$\pi^0 \eta \eta, \pi^0 K^+ K^-$
282 ± 12 ± 13	190k	³ AAIJ	16N	LHCB	$D^0 \rightarrow K_S^0 K^\pm \pi^\mp$
230 ± 36		⁴ ANISOVICH	09	RVUE	0.0 $\bar{p}p, \pi N$
65.0 ⁺ ₋ 2.1 ⁺ ₋ 99.1 ⁺ ₋ 5.4 ⁺ ₋ 32.6		⁵ UEHARA	09A	BELL	$\gamma\gamma \rightarrow \pi^0 \eta$
196 ± 10 ± 10		⁶ BUGG	08A	RVUE	$\bar{p}p$
267 ± 11	80k	⁷ UMAN	06	E835	5.2 $\bar{p}p \rightarrow \eta \eta \pi^0$
110 ± 14	35k	⁴ BAKER	03	SPEC	$\bar{p}p \rightarrow \omega \pi^+ \pi^- \pi^0$
92 ± 16		⁸ BARGIOTTI	03	OBLX	$\bar{p}p$
81 ± 21		⁹ AMSLER	02	CBAR	0.9 $\bar{p}p \rightarrow \pi^0 \pi^0 \eta$
292 ± 40		⁹ ANISOVICH	98B	RVUE	Compilation
80 ± 5		¹⁰ 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 $\pi^- p \rightarrow n 2 K_S^0$
~ 250		MARTIN	78	SPEC	10 $K^\pm p \rightarrow K_S^0 \pi p$
79 ± 10		¹¹ CASON	76		

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

² T-matrix pole, 2 poles, 2 channels ($\pi \eta, K \bar{K}$).

³ Using a model with Gaussian constraints to the PDG averaged values .

⁴ From the pole position.

⁵ May be a different state.

⁶ Using data from AMSLER 94D, ABELE 98, and BAKER 03. Supersedes BUGG 94.

⁷ Statistical error only.

⁸ Coupled channel analysis of $\pi^+ \pi^- \pi^0, K^+ K^- \pi^0$, and $K^\pm K_S^0 \pi^\mp$.

⁹ T-matrix pole.

¹⁰ Not confirmed by BUGG 08A.

¹¹ 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 ± 6 ⁺ ₋ 1073 ⁺ ₋ 256	¹ UEHARA	09A	BELL	$\gamma\gamma \rightarrow \pi^0 \eta$
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¹ May be a different state.

$a_0(1450)$ BRANCHING RATIOS

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

VALUE	DOCUMENT ID	TECN	COMMENT
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 $\bar{p}p \rightarrow \pi^0 \pi^0 \eta'$
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¹ Using $\pi^0 \eta$ from AMSLER 94D.

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

VALUE	DOCUMENT ID	TECN	COMMENT
0.88 ± 0.23	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. • • •

1.887 ± 0.041 ± 0.97	² ALBRECHT	20	RVUE 0.9 $\bar{p}p \rightarrow \pi^0 \pi^0 \eta,$ $\pi^0 \eta \eta, \pi^0 K^+ K^-$
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¹ Using $\pi^0 \eta$ from AMSLER 94D.

² Residues from T-matrix pole, 2 poles, 2 channels ($\pi\eta, K\bar{K}$).

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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

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

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

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
≤ 4.3	ANISOVICH	01	RVUE 0	$\bar{p}p \rightarrow \eta 2\pi^+ 2\pi^-$

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

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

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

¹ May be a different state.

$a_0(1450)$ REFERENCES

ALBRECHT	20	EPJ C80 453	M. Albrecht <i>et al.</i>	(Crystal Barrel Collab.)
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)
