

$a_0(1450)$

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

See minireview on scalar mesons under $f_0(600)$.

$a_0(1450)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1474 ± 19	OUR AVERAGE			
1480 ± 30		ABELE	98	CBAR 0.0 $\bar{p}p \rightarrow K^0 K^\pm \pi^\mp$
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. ● ● ●				
1515 ± 30		² ANISOVICH	09	RVUE 0.0 $\bar{p}p$, πN
1316.8 ⁺ _{-1.0} 0.7 ⁺ _{-4.6}		³ UEHARA	09A	BELL $\gamma\gamma \rightarrow \pi^0 \eta$
1432 ± 13 ± 25		⁴ BUGG	08A	RVUE $\bar{p}p$
1477 ± 10	80k	⁵ UMAN	06	E835 5.2 $\bar{p}p \rightarrow \eta \eta \pi^0$
1441 ⁺ ₋₁₅ +40	35280	² BAKER	03	SPEC $\bar{p}p \rightarrow \omega \pi^+ \pi^- \pi^0$
1303 ± 16		⁶ BARGIOTTI	03	OBLX $\bar{p}p$
1296 ± 10		⁷ AMSLER	02	CBAR 0.9 $\bar{p}p \rightarrow \pi^0 \pi^0 \eta$
1565 ± 30		⁷ ANISOVICH	98B	RVUE Compilation
1290 ± 10		⁸ 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		⁹ CASON	76	

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

² From the pole position.

³ May be a different state.

⁴ Using data from AMSLER 94D, ABELE 98, and BAKER 03. Supersedes BUGG 94.

⁵ Statistical error only.

⁶ Coupled channel analysis of $\pi^+ \pi^- \pi^0$, $K^+ K^- \pi^0$, and $K^\pm K_S^0 \pi^\mp$.

⁷ T-matrix pole.

⁸ Not confirmed by BUGG 08A.

⁹ 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 $\bar{p}p \rightarrow K^0 K^\pm \pi^\mp$
265 ± 30		¹⁰ 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. • • •

230 ± 36		11 ANISOVICH	09	RVUE	0.0 $\bar{p}p, \pi N$
65.0 ⁺ ₋ 2.1 ⁺ _{5.4} +99.1 _{-32.6}		12 UEHARA	09A	BELL	$\gamma\gamma \rightarrow \pi^0\eta$
196 ± 10 ± 10		13 BUGG	08A	RVUE	$\bar{p}p$
267 ± 11	80k	14 UMAN	06	E835	5.2 $\bar{p}p \rightarrow \eta\eta\pi^0$
110 ± 14	35280	11 BAKER	03	SPEC	$\bar{p}p \rightarrow \omega\pi^+\pi^-\pi^0$
92 ± 16		15 BARGIOTTI	03	OBLX	$\bar{p}p$
81 ± 21		16 AMSLER	02	CBAR	0.9 $\bar{p}p \rightarrow \pi^0\pi^0\eta$
292 ± 40		16 ANISOVICH	98B	RVUE	Compilation
80 ± 5		17 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 $\pi^- p \rightarrow n2K_S^0$
~ 250		MARTIN	78	SPEC	10 $K^\pm p \rightarrow K_S^0 \pi p$
79 ± 10		18 CASON	76		

¹⁰ Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D.

¹¹ From the pole position.

¹² May be a different state.

¹³ Using data from AMSLER 94D, ABELE 98, and BAKER 03. Supersedes BUGG 94.

¹⁴ Statistical error only.

¹⁵ Coupled channel analysis of $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, and $K^\pm K_S^0 \pi^\mp$.

¹⁶ T-matrix pole.

¹⁷ Not confirmed by BUGG 08A.

¹⁸ Isospin 0 not excluded.

$a_0(1450)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $\pi\eta$	seen
Γ_2 $\pi\eta'(958)$	seen
Γ_3 $K\bar{K}$	seen
Γ_4 $\omega\pi\pi$	seen
Γ_5 $a_0(980)\pi\pi$	seen
Γ_6 $\gamma\gamma$	seen

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

$\Gamma(\pi\eta) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$	VALUE (eV)	DOCUMENT ID	TECN	COMMENT	$\Gamma_1\Gamma_6/\Gamma$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

432 ± 6 ⁺ ₋ 1073 ₂₅₆	19 UEHARA	09A	BELL	$\gamma\gamma \rightarrow \pi^0\eta$
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¹⁹ 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	²⁰ 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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²⁰ 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	²¹ ABELE	98	CBAR 0.0 $\bar{p}p \rightarrow K_L^0 K^\pm \pi^\mp$

²¹ Using $\pi^0 \eta$ from AMSLER 94D.

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

10.7±2.3	35280	²² BAKER	03	SPEC $\bar{p}p \rightarrow \omega\pi^+\pi^-\pi^0$
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²² 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
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• • • We do not use the following data for averages, fits, limits, etc. • • •

≤ 4.3	ANISOVICH	01	RVUE	0 $\bar{p}p \rightarrow \eta 2\pi^+ 2\pi^-$
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$\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ Γ_6/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
seen	²³ UEHARA	09A	BELL $\gamma\gamma \rightarrow \pi^0 \eta$

²³ May be a different state.

$a_0(1450)$ REFERENCES

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)
