$a_0(1450)$

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

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 $\overline{p}p \to K^0_L K^\pm \pi^\mp$
1470 ±25		[1] AMSLER	95D	CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1515 ±30		[2] ANISOVICH	09	RVUE	0.0 $\overline{p}p$, πN
$1316.8^{+\ 0.7+24.7}_{-\ 1.0-\ 4.6}$		[3] UEHARA	09A	BELL	$\gamma\gamma \to \pi^0\eta$
1432 ±13 ±25		[4] BUGG	08A	RVUE	$\overline{p}p$
1477 ±10	80k	[5] UMAN	06	E835	5.2 $\overline{p}p \to \eta\eta\pi^0$
$1441\ ^{+40}_{-15}$	35280	[2] BAKER	03	SPEC	$\overline{p}p \to \omega\pi^+\pi^-\pi^0$
1303 ±16		[6] BARGIOTTI	03	OBLX	$\overline{p}p$
1296 ±10		[7] AMSLER	02	CBAR	0.9 $\overline{p}p \to \pi^0\pi^0\eta$
1565 ±30		[7] ANISOVICH	98B	RVUE	Compilation
1290 ±10		[8] BERTIN	98B	OBLX	0.0 $\overline{p}p \to K^\pm K_S \pi^\mp$
1450 ±40		AMSLER	94D	CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\eta$
1410 ±25		ETKIN	82C	MPS	23 $\pi^- p \to n2K^0_S$
~ 1300		MARTIN	78	SPEC	10 $K^\pm p \to K^0_S \pi p$
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 $K^\pm K^0_S \pi^\mp$.
[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 $\overline{p}p \to K^0_L K^\pm \pi^\mp$
265 ±30		[10] AMSLER	95D	CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$

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

230	±36		[11] ANISOVICH	09	RVUE	0.0 $\overline{p}p$, πN
65.0	$^{+\ 2.1+99.1}_{-\ 5.4-32.6}$		[12] UEHARA	09A	BELL	$\gamma\gamma \to \pi^0\eta$
196	±10 ±10		[13] BUGG	08A	RVUE	$\overline{p}p$
267	±11	80k	[14] UMAN	06	E835	5.2 $\overline{p}p \to \eta\eta\pi^0$
110	±14	35280	[11] BAKER	03	SPEC	$\overline{p}p \to \omega\pi^+\pi^-\pi^0$
92	±16		[15] BARGIOTTI	03	OBLX	$\overline{p}p$
81	±21		[16] AMSLER	02	CBAR	0.9 $\overline{p}p \to \pi^0\pi^0\eta$
292	±40		[16] ANISOVICH	98B	RVUE	Compilation
80	± 5		[17] BERTIN	98B	OBLX	0.0 $\overline{p}p \to K^\pm K_S\pi^\mp$
270	±40		AMSLER	94D	CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\eta$
230	±30		ETKIN	82C	MPS	23 $\pi^- p \to n2K^0_S$
∼ 250			MARTIN	78	SPEC	10 $K^\pm p \to K^0_S\pi p$
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 $K^\pm K^0_S\pi^\mp$.
[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	$K\overline{K}$	seen
Γ_4	$\omega\pi\pi$	seen
Γ_5	$a_0(980)\pi\pi$	seen
Γ_6	$\gamma\gamma$	seen

$a_0(1450)$ Γ(i)$\Gamma(\gamma\gamma)/\Gamma$(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. • • •

$432 \pm 6^{+1073}_{-\ 256}$	[19] UEHARA	09A	BELL	$\gamma\gamma \to \pi^0\eta$

[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 $\overline{p}p \rightarrow K^0_L K^\pm \pi^\mp$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.43±0.19	ABELE	97C	CBAR	0.0 $\overline{p}p \rightarrow \pi^0\pi^0\eta'$

[20] Using $\pi^0\eta$ from AMSLER 94D.

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.88±0.23	[21] ABELE	98	CBAR	0.0 $\overline{p}p \rightarrow K^0_L K^\pm \pi^\mp$

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

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

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

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

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

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
≤ 4.3	ANISOVICH	01	RVUE	0	$\overline{p}p \rightarrow \eta 2\pi^+ 2\pi^-$

$\Gamma(\gamma\gamma)/\Gamma_{total}$ 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 *et al.*	(BELLE Collab.)
BUGG	08A	PR D78 074023	D.V. Bugg	(LOQM)
UMAN	06	PR D73 052009	I. Uman *et al.*	(FNAL E835)
BAKER	03	PL B563 140	C.A. Baker *et al.*	
BARGIOTTI	03	EPJ C26 371	M. Bargiotti *et al.*	(OBELIX Collab.)
AMSLER	02	EPJ C23 29	C. Amsler *et al.*	
ANISOVICH	01	NP A690 567	A.V. Anisovich *et al.*	
ABELE	98	PR D57 3860	A. Abele *et al.*	(Crystal Barrel Collab.)
ANISOVICH	98B	SPU 41 419	V.V. Anisovich *et al.*	

Translated from UFN 168 481.

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