NODE=M149

$a_0(1450)$

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

See the review on "Spectroscopy of Light Meson Resonances." NODE=M149

$a_0(1450)$ T-MATRIX POLE $\sqrt{s}$

NODE=M149PP

Note that $\Gamma = -2\ \mathrm{Im}(\sqrt{s})$. NODE=M149PP

NODE=M149PP

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
(1290–1500) − i (30–140) OUR ESTIMATE				→ UNCHECKED ←
$(1302.1 \pm 1.1 \pm 3.9) - i$ $(56.2 \pm 0.7 \pm 1.7)$	[1] ALBRECHT	20	RVUE	0.9 $\overline{p}p \to \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0 K^+K^-$
$(1515 \pm 30) - i\ (115 \pm 18)$	ANISOVICH	09	RVUE	0.0 $\overline{p}p$, πN
$(1432 \pm 13 \pm 25) - i(98 \pm 5 \pm 5)$	[2] BUGG	08A	RVUE	$\overline{p}p$
$(1441^{+40}_{-15}) - i\ (55 \pm 7)$	[3] BAKER	03	SPEC	$\overline{p}p \to \omega\pi^+\pi^-\pi^0$
$(1303 \pm 16) - i\ (46 \pm 8)$	[4] BARGIOTTI	03	OBLX	$\overline{p}p$
$(1296 \pm 10) - i\ (41 \pm 11)$	AMSLER	02	CBAR	0.9 $\overline{p}p \to \pi^0\pi^0\eta$
$(1565 \pm 30) - i\ (146 \pm 20)$	ANISOVICH	98B	RVUE	Compilation
$(1470 \pm 25) - i(132 \pm 15)$	[5] AMSLER	95D	CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$

[1] T-matrix pole, 2 poles, 2 channels ($\pi\eta$, $K\overline{K}$). NODE=M149PP;LINKAGE=A
[2] Using data from AMSLER 94D, ABELE 98, and BAKER 03. Supersedes BUGG 94. NODE=M149PP;LINKAGE=G
[3] From the pole position of a fitted Breit-Wigner amplitude. NODE=M149PP;LINKAGE=C
[4] Coupled channel analysis of $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, and $K^\pm K^0_S\pi^\mp$. NODE=M149PP;LINKAGE=D
[5] Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D. NODE=M149PP;LINKAGE=F

$a_0(1450)$ MASS

NODE=M149M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1439 ±34 OUR AVERAGE		Error includes scale factor of 1.8.			
1480 ±30		ABELE	98	CBAR	0.0 $\overline{p}p \to K^0_L K^\pm\pi^\mp$
1410 ±25		ETKIN	82C	MPS	23 $\pi^- p \to n2K^0_S$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1458 ±14 ±15	190k	[1] AAIJ	16N	LHCB	$D^0 \to K^0_S K^\pm\pi^\mp$
$1316.8^{+\ 0.7\ +24.7}_{-\ 1.0\ -\ 4.6}$		[2] UEHARA	09A	BELL	$\gamma\gamma \to \pi^0\eta$
1477 ±10	80k	[3] UMAN	06	E835	5.2 $\overline{p}p \to \eta\eta\pi^0$
1290 ±10		[4] BERTIN	98B	OBLX	0.0 $\overline{p}p \to K^\pm K_s\pi^\mp$
1450 ±40		AMSLER	94D	CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\eta$
~ 1300		MARTIN	78	SPEC	10 $K^\pm p \to K^0_S\pi p$
1255 ± 5		[5] CASON	76		

[1] Using a model with Gaussian constraints to the PDG averaged values. NODE=M149M;LINKAGE=A
[2] May be a different state. NODE=M149M;LINKAGE=UE
[3] Statistical error only. NODE=M149M;LINKAGE=ST
[4] Not confirmed by BUGG 08A. NODE=M149M;LINKAGE=BE
[5] Isospin 0 not excluded. NODE=M149M;LINKAGE=CC

$a_0(1450)$ WIDTH

NODE=M149W

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
258 ±14 OUR AVERAGE					
265 ±15		ABELE	98	CBAR	0.0 $\overline{p}p \to K^0_L K^\pm\pi^\mp$
230 ±30		ETKIN	82C	MPS	23 $\pi^- p \to n2K^0_S$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
282 ±12 ±13	190k	[1] AAIJ	16N	LHCB	$D^0 \to K^0_S K^\pm\pi^\mp$
$65.0^{+\ 2.1\ +99.1}_{-\ 5.4\ -32.6}$		[2] UEHARA	09A	BELL	$\gamma\gamma \to \pi^0\eta$
267 ±11	80k	[3] UMAN	06	E835	5.2 $\overline{p}p \to \eta\eta\pi^0$
80 ± 5		[4] BERTIN	98B	OBLX	0.0 $\overline{p}p \to K^\pm K_s\pi^\mp$
270 ±40		AMSLER	94D	CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\eta$
~ 250		MARTIN	78	SPEC	10 $K^\pm p \to K^0_S\pi p$
79 ±10		[5] CASON	76		

[1] Using a model with Gaussian constraints to the PDG averaged values.
[2] May be a different state.
[3] Statistical error only.
[4] Not confirmed by BUGG 08A.
[5] Isospin 0 not excluded.

NODE=M149W;LINKAGE=A
NODE=M149W;LINKAGE=UE
NODE=M149W;LINKAGE=ST
NODE=M149W;LINKAGE=BE
NODE=M149W;LINKAGE=CC

$a_0(1450)$ DECAY MODES

NODE=M149215;NODE=M149

Branching fractions are given relative to the one **DEFINED AS 1**.

NODE=M149

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$\pi\eta$	0.093 ± 0.020	DESIG=1
Γ_2	$\pi\eta'(958)$	0.033 ± 0.017	DESIG=2
Γ_3	$K\overline{K}$	0.082 ± 0.028	DESIG=3
Γ_4	$\omega\pi\pi$	**DEFINED AS 1**	DESIG=4
Γ_5	$a_0(980)\pi\pi$	seen	DESIG=5
Γ_6	$\gamma\gamma$	seen	DESIG=6

$a_0(1450)$ Γ(i)$\Gamma(\gamma\gamma)/\Gamma$(total)

NODE=M149225

$\Gamma(\pi\eta) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_1\Gamma_6/\Gamma$

NODE=M149G01
NODE=M149G01

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$432\pm6^{+1073}_{-256}$	[1] UEHARA	09A	BELL	$\gamma\gamma \to \pi^0\eta$

[1] May be a different state.

NODE=M149G01;LINKAGE=UE

$a_0(1450)$ BRANCHING RATIOS

NODE=M149220

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

NODE=M149R1
NODE=M149R1

VALUE	DOCUMENT ID		TECN	COMMENT
0.35±0.16	[1] ABELE	98	CBAR	0.0 $\overline{p}p \to K^0_L K^\pm\pi^\mp$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.43 ± 0.19	ABELE	97C	CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\eta'$

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

NODE=M149R1;LINKAGE=A

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

NODE=M149R2
NODE=M149R2

VALUE	DOCUMENT ID		TECN	COMMENT
0.88 ±0.23	[1] ABELE	98	CBAR	0.0 $\overline{p}p \to K^0_L K^\pm\pi^\mp$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.887\pm0.041\pm0.97$	[2] ALBRECHT	20	RVUE	0.9 $\overline{p}p \to \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0K^+K^-$

[1] Using $\pi^0\eta$ from AMSLER 94D.
[2] Residues from T-matrix pole, 2 poles, 2 channels ($\pi\eta$, $K\overline{K}$).

NODE=M149R2;LINKAGE=A
NODE=M149R2;LINKAGE=B

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

NODE=M149R3
NODE=M149R3

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
10.7±2.3	35280	[1] BAKER	03	SPEC	$\overline{p}p \to \omega\pi^+\pi^-\pi^0$

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

NODE=M149R;LINKAGE=PP

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

NODE=M149R01
NODE=M149R01

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

NODE=M149R02
NODE=M149R02

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

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

NODE=M149R03
NODE=M149R03

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

[1] May be a different state.

NODE=M149R03;LINKAGE=UE

$a_0(1450)$ REFERENCES

NODE=M149

ALBRECHT	20	EPJ C80 453	M. Albrecht *et al.*	(Crystal Barrel Collab.)	REFID=60439
AAIJ	16N	PR D93 052018	R. Aaij *et al.*	(LHCb Collab.)	REFID=57273
ANISOVICH	09	IJMP A24 2481	V.V. Anisovich, A.V. Sarantsev	(PNPI)	REFID=52719
UEHARA	09A	PR D80 032001	S. Uehara *et al.*	(BELLE Collab.)	REFID=53002
BUGG	08A	PR D78 074023	D.V. Bugg	(LOQM)	REFID=52578
UMAN	06	PR D73 052009	I. Uman *et al.*	(FNAL E835)	REFID=51063
BAKER	03	PL B563 140	C.A. Baker *et al.*		REFID=49414
BARGIOTTI	03	EPJ C26 371	M. Bargiotti *et al.*	(OBELIX Collab.)	REFID=49217
AMSLER	02	EPJ C23 29	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=48580
ANISOVICH	01	NP A690 567	A.V. Anisovich *et al.*		REFID=48308
ABELE	98	PR D57 3860	A. Abele *et al.*	(Crystal Barrel Collab.)	REFID=45863
ANISOVICH	98B	SPU 41 419	V.V. Anisovich *et al.*		REFID=46331
		Translated from UFN 168 481.			
BERTIN	98B	PL B434 180	A. Bertin *et al.*	(OBELIX Collab.)	REFID=46351
ABELE	97C	PL B404 179	A. Abele *et al.*	(Crystal Barrel Collab.)	REFID=45531
ABELE	96C	NP A609 562	A. Abele *et al.*	(Crystal Barrel Collab.)	REFID=45076
AMSLER	95B	PL B342 433	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44377
AMSLER	95C	PL B353 571	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44440
AMSLER	95D	PL B355 425	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44441
AMSLER	94D	PL B333 277	C. Amsler *et al.*	(Crystal Barrel Collab.) IGJPC	REFID=44093
BUGG	94	PR D50 4412	D.V. Bugg *et al.*	(LOQM)	REFID=44078
ETKIN	82C	PR D25 2446	A. Etkin *et al.*	(BNL, CUNY, TUFTS, VAND)	REFID=20391
MARTIN	78	NP B134 392	A.D. Martin *et al.*	(DURH, GEVA)	REFID=22446
CASON	76	PRL 36 1485	N.M. Cason *et al.*	(NDAM, ANL)	REFID=21064