

**$a_0(1450)$** 

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

See the review on "Spectroscopy of Light Meson Resonances."

 **$a_0(1450)$  MASS**

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1474 ±19</b>	<b>OUR AVERAGE</b>			
1480 ±30		ABELE 98	CBAR	0.0 $\bar{p}p \rightarrow K^0 K^\pm \pi^\mp$
1470 ±25		<sup>1</sup> 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		<sup>2</sup> 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	<sup>3</sup> AAIJ 16N	LHCB	$D^0 \rightarrow K_S^0 K^\pm \pi^\mp$
1515 ±30		<sup>4</sup> ANISOVICH 09	RVUE	0.0 $\bar{p}p, \pi N$
1316.8 <sup>+</sup> <sub>-1.0</sub> 0.7 <sup>+</sup> <sub>-4.6</sub>		<sup>5</sup> UEHARA 09A	BELL	$\gamma\gamma \rightarrow \pi^0 \eta$
1432 ±13 ±25		<sup>6</sup> BUGG 08A	RVUE	$\bar{p}p$
1477 ±10	80k	<sup>7</sup> UMAN 06	E835	5.2 $\bar{p}p \rightarrow \eta \eta \pi^0$
1441 <sup>+</sup> <sub>-15</sub>	35k	<sup>4</sup> BAKER 03	SPEC	$\bar{p}p \rightarrow \omega \pi^+ \pi^- \pi^0$
1303 ±16		<sup>8</sup> BARGIOTTI 03	OBLX	$\bar{p}p$
1296 ±10		<sup>9</sup> AMSLER 02	CBAR	0.9 $\bar{p}p \rightarrow \pi^0 \pi^0 \eta$
1565 ±30		<sup>9</sup> ANISOVICH 98B	RVUE	Compilation
1290 ±10		<sup>10</sup> 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		<sup>11</sup> CASON 76		

<sup>1</sup> Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D.<sup>2</sup> T-matrix pole, 2 poles, 2 channels ( $\pi \eta, K \bar{K}$ ).<sup>3</sup> Using a model with Gaussian constraints to the PDG averaged values .<sup>4</sup> From the pole position.<sup>5</sup> May be a different state.<sup>6</sup> Using data from AMSLER 94D, ABELE 98, and BAKER 03. Supersedes BUGG 94.<sup>7</sup> Statistical error only.<sup>8</sup> Coupled channel analysis of  $\pi^+ \pi^- \pi^0, K^+ K^- \pi^0,$  and  $K^\pm K_S^0 \pi^\mp$ .<sup>9</sup> T-matrix pole.<sup>10</sup> Not confirmed by BUGG 08A.<sup>11</sup> Isospin 0 not excluded. **$a_0(1450)$  WIDTH**

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>265 ±13</b>	<b>OUR AVERAGE</b>			
265 ±15		ABELE 98	CBAR	0.0 $\bar{p}p \rightarrow K^0 K^\pm \pi^\mp$
265 ±30		<sup>1</sup> 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. • • •

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

- <sup>1</sup> Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D.  
<sup>2</sup> T-matrix pole, 2 poles, 2 channels ( $\pi \eta, K \bar{K}$ ).  
<sup>3</sup> Using a model with Gaussian constraints to the PDG averaged values.  
<sup>4</sup> From the pole position.  
<sup>5</sup> May be a different state.  
<sup>6</sup> Using data from AMSLER 94D, ABELE 98, and BAKER 03. Supersedes BUGG 94.  
<sup>7</sup> Statistical error only.  
<sup>8</sup> Coupled channel analysis of  $\pi^+ \pi^- \pi^0, K^+ K^- \pi^0$ , and  $K^\pm K_S^0 \pi^\mp$ .  
<sup>9</sup> T-matrix pole.  
<sup>10</sup> Not confirmed by BUGG 08A.  
<sup>11</sup> Isospin 0 not excluded.

### **$a_0(1450)$ DECAY MODES**

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

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1 \quad \pi \eta$	0.093 ± 0.020
$\Gamma_2 \quad \pi \eta'(958)$	0.033 ± 0.017
$\Gamma_3 \quad K \bar{K}$	0.082 ± 0.028
$\Gamma_4 \quad \omega \pi \pi$	<b>DEFINED AS 1</b>
$\Gamma_5 \quad a_0(980) \pi \pi$	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 <sup>+</sup> <sub>-</sub> 1073 <sup>+</sup> <sub>-</sub> 256	<sup>1</sup> UEHARA	09A	BELL	$\gamma\gamma \rightarrow \pi^0 \eta$
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- <sup>1</sup> May be a different state.

**$a_0(1450)$  BRANCHING RATIOS** **$\Gamma(\pi\eta'(958))/\Gamma(\pi\eta)$**  **$\Gamma_2/\Gamma_1$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.35±0.16</b>	<sup>1</sup> 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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<sup>1</sup> Using  $\pi^0 \eta$  from AMSLER 94D. **$\Gamma(K\bar{K})/\Gamma(\pi\eta)$**  **$\Gamma_3/\Gamma_1$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.88 ±0.23</b>	<sup>1</sup> 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	<sup>2</sup> 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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<sup>1</sup> Using  $\pi^0 \eta$  from AMSLER 94D.<sup>2</sup> Residues from T-matrix pole, 2 poles, 2 channels ( $\pi\eta, K\bar{K}$ ). **$\Gamma(\omega\pi\pi)/\Gamma(\pi\eta)$**  **$\Gamma_4/\Gamma_1$** 

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

<sup>1</sup> 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. **$\Gamma(a_0(980)\pi\pi)/\Gamma_{\text{total}}$**  **$\Gamma_5/\Gamma$** 

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

 **$\Gamma(a_0(980)\pi\pi)/\Gamma(\pi\eta)$**  **$\Gamma_5/\Gamma_1$** 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$\leq 4.3$	ANISOVICH	01	RVUE 0	$\bar{p}p \rightarrow \eta 2\pi^+ 2\pi^-$
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 **$\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$**  **$\Gamma_6/\Gamma$** 

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

<sup>1</sup> 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)

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