$f_0(1500)$

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

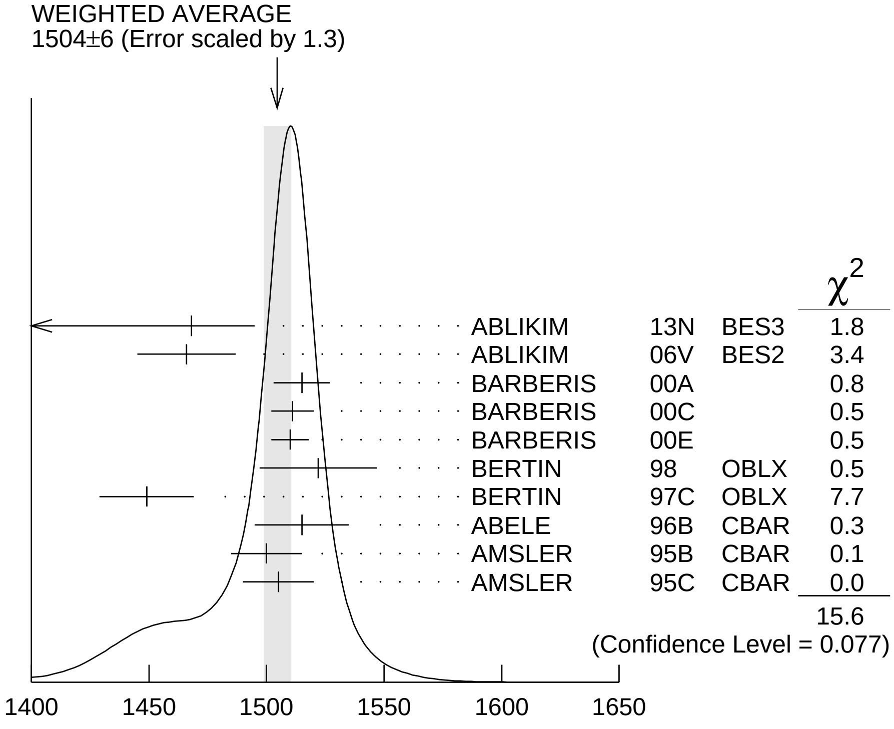
See also the mini-reviews on scalar mesons under $f_0(500)$ (see the index for the page number) and on non-$q\overline{q}$ candidates in PDG 06, Journal of Physics **G33** 1 (2006).

$f_0(1500)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1504± 6 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.			
$1468^{+14}_{-15}{}^{+23}_{-74}$	5.5k	[1] ABLIKIM	13N	BES3	$e^+e^- \rightarrow J/\psi \rightarrow \gamma\eta\eta$
1466± 6± 20		ABLIKIM	06V	BES2	$e^+e^- \rightarrow J/\psi \rightarrow \gamma\pi^+\pi^-$
1515±12		[2] BARBERIS	00A		450 $pp \rightarrow p_f \eta\eta p_s$
1511± 9		[2,3] BARBERIS	00C		450 $pp \rightarrow p_f 4\pi p_s$
1510± 8		[2] BARBERIS	00E		450 $pp \rightarrow p_f \eta\eta p_s$
1522±25		BERTIN	98	OBLX	0.05–0.405 $\overline{n}p \rightarrow \pi^+\pi^+\pi^-$
1449±20		[2] BERTIN	97C	OBLX	0.0 $\overline{p}p \rightarrow \pi^+\pi^-\pi^0$
1515±20		ABELE	96B	CBAR	0.0 $\overline{p}p \rightarrow \pi^0 K^0_L K^0_L$
1500±15		[4] AMSLER	95B	CBAR	0.0 $\overline{p}p \rightarrow 3\pi^0$
1505±15		[5] AMSLER	95C	CBAR	0.0 $\overline{p}p \rightarrow \eta\eta\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1486±10		[2] ANISOVICH	09	RVUE	0.0 $\overline{p}p$, πN
1470±60	568	[6] KLEMPT	08	E791	$D^+_s \rightarrow \pi^-\pi^+\pi^+$
$1470^{+6}_{-7}{}^{+72}_{-255}$		[7] UEHARA	08A	BELL	10.6 $e^+e^- \rightarrow e^+e^-\pi^0\pi^0$
1495± 4		AMSLER	06	CBAR	0.9 $\overline{p}p \rightarrow K^+K^-\pi^0$
1539±20	9.9k	AUBERT	06O	BABR	$B^+ \rightarrow K^+K^+K^-$
1473± 5	80k	[8,9] UMAN	06	E835	5.2 $\overline{p}p \rightarrow \eta\eta\pi^0$
1478± 6		VLADIMIRSK...	06	SPEC	40 $\pi^-p \rightarrow K^0_S K^0_S n$
1493± 7		[8] BINON	05	GAMS	33 $\pi^-p \rightarrow \eta\eta n$
1524±14	1400	[10] GARMASH	05	BELL	$B^+ \rightarrow K^+K^+K^-$
1489^{+8}_{-4}		[11] ANISOVICH	03	RVUE	
1490±30		[8] ABELE	01	CBAR	0.0 $\overline{p}d \rightarrow \pi^- 4\pi^0 p$
1497±10		[8] BARBERIS	99	OMEG	450 $pp \rightarrow p_s p_f K^+K^-$
1502±10		[8] BARBERIS	99B	OMEG	450 $pp \rightarrow p_s p_f \pi^+\pi^-$
1502±12± 10		[12] BARBERIS	99D	OMEG	450 $pp \rightarrow K^+K^-$, $\pi^+\pi^-$
1530±45		[8] BELLAZZINI	99	GAM4	450 $pp \rightarrow pp\pi^0\pi^0$
1505±18		[8] FRENCH	99		300 $pp \rightarrow p_f(K^+K^-)p_s$
1447±27		[13] KAMINSKI	99	RVUE	$\pi\pi \rightarrow \pi\pi$, $K\overline{K}$, $\sigma\sigma$
1580±80		[8] ALDE	98	GAM4	100 $\pi^-p \rightarrow \pi^0\pi^0 n$
1499± 8		[2] ANISOVICH	98B	RVUE	Compilation
∼ 1520		REYES	98	SPEC	800 $pp \rightarrow p_s p_f K^0_S K^0_S$
1510±20		[2] BARBERIS	97B	OMEG	450 $pp \rightarrow pp2(\pi^+\pi^-)$
∼ 1475		FRABETTI	97D	E687	$D^\pm_s \rightarrow \pi^\mp\pi^\pm\pi^\pm$
∼ 1505		ABELE	96	CBAR	0.0 $\overline{p}p \rightarrow 5\pi^0$

1500± 8		[2]	ABELE	96C	RVUE	Compilation
1460±20	120	[8]	AMELIN	96B	VES	37 $\pi^- A \to \eta\eta\pi^- A$
1500± 8			BUGG	96	RVUE	
1500±10		[14]	AMSLER	95D	CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$
1445± 5		[15]	ANTINORI	95	OMEG	300,450 $pp \to pp2(\pi^+\pi^-)$
1497±30		[8]	ANTINORI	95	OMEG	300,450 $pp \to pp\pi^+\pi^-$
∼ 1505			BUGG	95	MRK3	$J/\psi \to \gamma\pi^+\pi^-\pi^+\pi^-$
1446± 5		[8]	ABATZIS	94	OMEG	450 $pp \to pp2(\pi^+\pi^-)$
1545±25		[8]	AMSLER	94E	CBAR	0.0 $\overline{p}p \to \pi^0\eta\eta'$
1520±25		[2,16]	ANISOVICH	94	CBAR	0.0 $\overline{p}p \to 3\pi^0, \pi^0\eta\eta$
1505±20		[2,17]	BUGG	94	RVUE	$\overline{p}p \to 3\pi^0$, $\eta\eta\pi^0$, $\eta\pi^0\pi^0$
1560±25		[8]	AMSLER	92	CBAR	0.0 $\overline{p}p \to \pi^0\eta\eta$
1550±45± 30		[8]	BELADIDZE	92C	VES	36 π^- Be $\to \pi^-\eta'\eta$Be
1449± 4		[8]	ARMSTRONG	89E	OMEG	300 $pp \to pp2(\pi^+\pi^-)$
1610±20		[8]	ALDE	88	GAM4	300 $\pi^- N \to \pi^- N 2\eta$
∼ 1525			ASTON	88D	LASS	11 $K^- p \to K^0_S K^0_S \Lambda$
1570±20	600	[8]	ALDE	87	GAM4	100 $\pi^- p \to 4\pi^0 n$
1575±45		[18]	ALDE	86D	GAM4	100 $\pi^- p \to 2\eta n$
1568±33		[8]	BINON	84C	GAM2	38 $\pi^- p \to \eta\eta' n$
1592±25		[8]	BINON	83	GAM2	38 $\pi^- p \to 2\eta n$
1525± 5		[8]	GRAY	83	DBC	0.0 $\overline{p}N \to 3\pi$

[1] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances.
[2] T-matrix pole.
[3] Average between $\pi^+\pi^- 2\pi^0$ and $2(\pi^+\pi^-)$.
[4] T-matrix pole, supersedes ANISOVICH 94.
[5] T-matrix pole, supersedes ANISOVICH 94 and AMSLER 92.
[6] Reanalysis of AITALA 01A data. This state could also be $f_0(1370)$.
[7] Breit-Wigner mass. May also be the $f_0(1370)$.
[8] Breit-Wigner mass.
[9] Statistical error only.
[10] Breit-Wigner, solution 1, PWA ambiguous.
[11] K-matrix pole from combined analysis of $\pi^- p \to \pi^0\pi^0 n$, $\pi^- p \to K\overline{K} n$, $\pi^+\pi^- \to \pi^+\pi^-$, $\overline{p}p \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$, $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, $K^0_S K^0_S \pi^0$, $K^+ K^0_S \pi^-$ at rest, $\overline{p}n \to \pi^-\pi^-\pi^+$, $K^0_S K^-\pi^0$, $K^0_S K^0_S \pi^-$ at rest.
[12] Supersedes BARBERIS 99 and BARBERIS 99B.
[13] T-matrix pole on sheet $--+$.
[14] T-matrix pole. Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D.
[15] Supersedes ABATZIS 94, ARMSTRONG 89E. Breit-Wigner mass.
[16] From a simultaneous analysis of the annihilations $\overline{p}p \to 3\pi^0, \pi^0\eta\eta$.
[17] Reanalysis of ANISOVICH 94 data.
[18] From central value and spread of two solutions. Breit-Wigner mass.



$f_0(1500)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
109± 7 OUR AVERAGE					
$136^{+41}_{-26}{}^{+28}_{-100}$	5.5k	[19] ABLIKIM	13N	BES3	$e^+e^- \rightarrow J/\psi \rightarrow \gamma\eta\eta$
$108^{+14}_{-11}\pm 25$		ABLIKIM	06V	BES2	$e^+e^- \rightarrow J/\psi \rightarrow \gamma\pi^+\pi^-$
110± 24		[20] BARBERIS	00A		450 $pp \rightarrow p_f\eta\eta p_s$
102± 18		[20,21] BARBERIS	00C		450 $pp \rightarrow p_f 4\pi p_s$
110± 16		[20] BARBERIS	00E		450 $pp \rightarrow p_f\eta\eta p_s$
108± 33		BERTIN	98	OBLX	0.05–0.405 $\overline{n}p \rightarrow \pi^+\pi^+\pi^-$
114± 30		[20] BERTIN	97C	OBLX	0.0 $\overline{p}p \rightarrow \pi^+\pi^-\pi^0$
105± 15		ABELE	96B	CBAR	0.0 $\overline{p}p \rightarrow \pi^0 K^0_L K^0_L$
120± 25		[22] AMSLER	95B	CBAR	0.0 $\overline{p}p \rightarrow 3\pi^0$
120± 30		[23] AMSLER	95C	CBAR	0.0 $\overline{p}p \rightarrow \eta\eta\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
114± 10		[20] ANISOVICH	09	RVUE	0.0 $\overline{p}p$, πN
$90^{+2}_{-1}{}^{+50}_{-22}$		[24] UEHARA	08A	BELL	10.6 $e^+e^- \rightarrow e^+e^-\pi^0\pi^0$
121± 8		AMSLER	06	CBAR	0.9 $\overline{p}p \rightarrow K^+K^-\pi^0$
257± 33	9.9k	AUBERT	06O	BABR	$B^+ \rightarrow K^+K^+K^-$
108± 9	80k	[25,26] UMAN	06	E835	5.2 $\overline{p}p \rightarrow \eta\eta\pi^0$
119± 10		VLADIMIRSK...	06	SPEC	40 $\pi^-p \rightarrow K^0_S K^0_S n$
90± 15		[25] BINON	05	GAMS	33 $\pi^-p \rightarrow \eta\eta n$
136± 23	1400	[27] GARMASH	05	BELL	$B^+ \rightarrow K^+K^+K^-$

102 ± 10		[28] ANISOVICH 03	RVUE	
140 ± 40		[25] ABELE 01	CBAR	$0.0\ \overline{p}d \to \pi^- 4\pi^0 p$
104 ± 25		[25] BARBERIS 99	OMEG	$450\ pp \to p_s p_f K^+ K^-$
131 ± 15		[25] BARBERIS 99B	OMEG	$450\ pp \to p_s p_f \pi^+ \pi^-$
$98 \pm 18 \pm 16$		[29] BARBERIS 99D	OMEG	$450\ pp \to K^+ K^-, \pi^+ \pi^-$
160 ± 50		[25] BELLAZZINI 99	GAM4	$450\ pp \to pp\pi^0\pi^0$
100 ± 33		[25] FRENCH 99		$300\ pp \to p_f (K^+ K^-) p_s$
108 ± 46		[30] KAMINSKI 99	RVUE	$\pi\pi \to \pi\pi, K\overline{K}, \sigma\sigma$
280 ± 100		[25] ALDE 98	GAM4	$100\ \pi^- p \to \pi^0\pi^0 n$
130 ± 20		[20] ANISOVICH 98B	RVUE	Compilation
120 ± 35		[20] BARBERIS 97B	OMEG	$450\ pp \to pp2(\pi^+\pi^-)$
~ 100		FRABETTI 97D	E687	$D_s^\pm \to \pi^\mp\pi^\pm\pi^\pm$
~ 169		ABELE 96	CBAR	$0.0\ \overline{p}p \to 5\pi^0$
100 ± 30	120	[25] AMELIN 96B	VES	$37\ \pi^- A \to \eta\eta\pi^- A$
132 ± 15		BUGG 96	RVUE	
154 ± 30		[31] AMSLER 95D	CBAR	$0.0\ \overline{p}p \to \pi^0\pi^0\pi^0, \pi^0\eta\eta, \pi^0\pi^0\eta$
65 ± 10		[32] ANTINORI 95	OMEG	$300,450\ pp \to pp2(\pi^+\pi^-)$
199 ± 30		[25] ANTINORI 95	OMEG	$300,450\ pp \to pp\pi^+\pi^-$
56 ± 12		[25] ABATZIS 94	OMEG	$450\ pp \to pp2(\pi^+\pi^-)$
100 ± 40		[25] AMSLER 94E	CBAR	$0.0\ \overline{p}p \to \pi^0\eta\eta'$
148^{+20}_{-25}		[20,33] ANISOVICH 94	CBAR	$0.0\ \overline{p}p \to 3\pi^0, \pi^0\eta\eta$
150 ± 20		[20,34] BUGG 94	RVUE	$\overline{p}p \to 3\pi^0, \eta\eta\pi^0, \eta\pi^0\pi^0$
245 ± 50		[25] AMSLER 92	CBAR	$0.0\ \overline{p}p \to \pi^0\eta\eta$
$153 \pm 67 \pm 50$		[25] BELADIDZE 92C	VES	$36\ \pi^-\mathrm{Be} \to \pi^-\eta'\eta\mathrm{Be}$
78 ± 18		[25] ARMSTRONG 89E	OMEG	$300\ pp \to pp2(\pi^+\pi^-)$
170 ± 40		[25] ALDE 88	GAM4	$300\ \pi^- N \to \pi^- N 2\eta$
150 ± 20	600	[25] ALDE 87	GAM4	$100\ \pi^- p \to 4\pi^0 n$
265 ± 65		[35] ALDE 86D	GAM4	$100\ \pi^- p \to 2\eta n$
260 ± 60		[25] BINON 84C	GAM2	$38\ \pi^- p \to \eta\eta' n$
210 ± 40		[25] BINON 83	GAM2	$38\ \pi^- p \to 2\eta n$
101 ± 13		[25] GRAY 83	DBC	$0.0\ \overline{p}N \to 3\pi$

[19] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances.

[20] T-matrix pole.

[21] Average between $\pi^+\pi^-2\pi^0$ and $2(\pi^+\pi^-)$.

[22] T-matrix pole, supersedes ANISOVICH 94.

[23] T-matrix pole, supersedes ANISOVICH 94 and AMSLER 92.

[24] Breit-Wigner width. May also be the $f_0(1370)$.

[25] Breit-Wigner width.

[26] Statistical error only.

[27] Breit-Wigner, solution 1, PWA ambiguous.

[28] K-matrix pole from combined analysis of $\pi^- p \to \pi^0\pi^0 n$, $\pi^- p \to K\overline{K}n$, $\pi^+\pi^- \to \pi^+\pi^-$, $\overline{p}p \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$, $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, $K^0_S K^0_S \pi^0$, $K^+ K^0_S \pi^-$ at rest, $\overline{p}n \to \pi^-\pi^-\pi^+$, $K^0_S K^-\pi^0$, $K^0_S K^0_S \pi^-$ at rest.

[29] Supersedes BARBERIS 99 and BARBERIS 99B.

[30] T-matrix pole on sheet $--+$.

[31] T-matrix pole. Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D.

[32] Supersedes ABATZIS 94, ARMSTRONG 89E. Breit-Wigner mass.
[33] From a simultaneous analysis of the annihilations $\overline{p}p \to 3\pi^0, \pi^0\eta\eta$.
[34] Reanalysis of ANISOVICH 94 data.
[35] From central value and spread of two solutions. Breit-Wigner mass.

$f_0(1500)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Scale factor
Γ_1	$\pi\pi$	(34.9±2.3) %	1.2
Γ_2	$\pi^+\pi^-$	seen	
Γ_3	$2\pi^0$	seen	
Γ_4	4π	(49.5±3.3) %	1.2
Γ_5	$4\pi^0$	seen	
Γ_6	$2\pi^+2\pi^-$	seen	
Γ_7	$2(\pi\pi)_{S\text{-wave}}$	seen	
Γ_8	$\rho\rho$	seen	
Γ_9	$\pi(1300)\pi$	seen	
Γ_{10}	$a_1(1260)\pi$	seen	
Γ_{11}	$\eta\eta$	(5.1±0.9) %	1.4
Γ_{12}	$\eta\eta'(958)$	(1.9±0.8) %	1.7
Γ_{13}	$K\overline{K}$	(8.6±1.0) %	1.1
Γ_{14}	$\gamma\gamma$	not seen	

CONSTRAINED FIT INFORMATION

An overall fit to 6 branching ratios uses 10 measurements and one constraint to determine 5 parameters. The overall fit has a $\chi^2 =$ 11.4 for 6 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle\delta x_i\delta x_j\right\rangle/(\delta x_i\cdot\delta x_j)$, in percent, from the fit to the branching fractions, $x_i \equiv \Gamma_i/\Gamma_{\text{total}}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_4	−83			
x_{11}	11	−52		
x_{12}	−5	−31	29	
x_{13}	39	−67	33	6
	x_1	x_4	x_{11}	x_{12}

$f_0(1500)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ **$\Gamma_1\Gamma_{14}/\Gamma$**

VALUE (eV)	*CL%*	*DOCUMENT ID*	*TECN*	*COMMENT*

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

$33^{+12}_{-6}{}^{+1809}_{-21}$		[36] UEHARA	08A	BELL	10.6 $e^+e^- \rightarrow e^+e^-\pi^0\pi^0$
not seen		ACCIARRI	01H	L3	$\gamma\gamma \rightarrow K^0_S K^0_S$, E^{ee}_{cm}= 91, 183–209 GeV
<460	95	BARATE	00E	ALEP	$\gamma\gamma \rightarrow \pi^+\pi^-$

[36] May also be the $f_0(1370)$. Multiplied by us by 3 to obtain the $\pi\pi$ value.

$f_0(1500)$ BRANCHING RATIOS

$\Gamma(\pi\pi)/\Gamma_{total}$ — Γ_1/Γ

VALUE	DOCUMENT ID		TECN
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.454±0.104	BUGG	96	RVUE

$\Gamma(\pi^+\pi^-)/\Gamma_{total}$ — Γ_2/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	BERTIN	98	OBLX	0.05–0.405 $\overline{n}p \rightarrow \pi^+\pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
possibly seen	FRABETTI	97D	E687	$D^{\pm}_s \rightarrow \pi^{\mp}\pi^{\pm}\pi^{\pm}$

$\Gamma(4\pi)/\Gamma(\pi\pi)$ — Γ_4/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
1.42±0.18 OUR FIT Error includes scale factor of 1.2.				
1.42±0.18 OUR AVERAGE Error includes scale factor of 1.2.				
1.37±0.16	BARBERIS	00D		450 $pp \rightarrow p_f 4\pi p_s$
2.1 ±0.6	[37] AMSLER	98	RVUE	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.1 ±0.2	[38] ANISOVICH	02D	SPEC	Combined fit
3.4 ±0.8	[37] ABELE	96	CBAR	0.0 $\overline{p}p \rightarrow 5\pi^0$

$\Gamma(2(\pi\pi)_{S\text{-wave}})/\Gamma(\pi\pi)$ — Γ_7/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.42±0.26	[39] ABELE	01	CBAR	0.0 $\overline{p}d \rightarrow \pi^- 4\pi^0 p$

$\Gamma(2(\pi\pi)_{S\text{-wave}})/\Gamma(4\pi)$ — Γ_7/Γ_4

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.26±0.07	ABELE	01B	CBAR	0.0 $\overline{p}d \rightarrow 5\pi p$

$\Gamma(\rho\rho)/\Gamma(4\pi)$ — Γ_8/Γ_4

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.13±0.08	ABELE	01B	CBAR	0.0 $\overline{p}d \rightarrow 5\pi p$

$\Gamma(\rho\rho)/\Gamma(2(\pi\pi)_{S\text{-wave}})$ — Γ_8/Γ_7

VALUE	DOCUMENT ID		COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
3.3 ± 0.5	BARBERIS	00C	450 $pp \to p_f \pi^+\pi^- 2\pi^0 p_s$
2.6 ± 0.4	BARBERIS	00C	450 $pp \to p_f 2(\pi^+\pi^-) p_s$

$\Gamma(\pi(1300)\pi)/\Gamma(4\pi)$ — Γ_9/Γ_4

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.50 ± 0.25	ABELE	01B	CBAR	0.0 $\overline{p}d \to 5\pi p$

$\Gamma(a_1(1260)\pi)/\Gamma(4\pi)$ — Γ_{10}/Γ_4

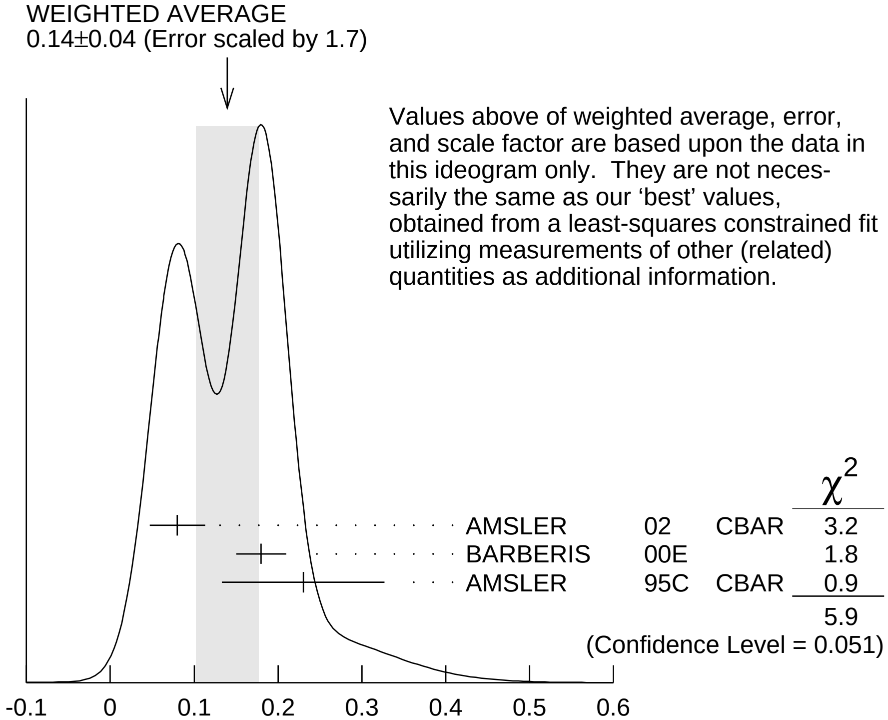
VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.12 ± 0.05	ABELE	01B	CBAR	0.0 $\overline{p}d \to 5\pi p$

$\Gamma(\eta\eta)/\Gamma_{\text{total}}$ — Γ_{11}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
large	ALDE	88	GAM4	300 $\pi^- N \to \eta\eta\pi^- N$
large	BINON	83	GAM2	38 $\pi^- p \to 2\eta n$

$\Gamma(\eta\eta)/\Gamma(\pi\pi)$ — Γ_{11}/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
0.145±0.027 OUR FIT Error includes scale factor of 1.5.				
0.14 ±0.04 OUR AVERAGE Error includes scale factor of 1.7. See the ideogram below.				
0.080 ± 0.033	AMSLER	02	CBAR	0.9 $\overline{p}p \to \pi^0\eta\eta$, $\pi^0\pi^0\pi^0$
0.18 ± 0.03	BARBERIS	00E		450 $pp \to p_f \eta\eta p_s$
0.230 ± 0.097	[40] AMSLER	95C	CBAR	0.0 $\overline{p}p \to \eta\eta\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.11 ± 0.03	[38] ANISOVICH	02D	SPEC	Combined fit
0.078 ± 0.013	[41] ABELE	96C	RVUE	Compilation
0.157 ± 0.060	[42] AMSLER	95D	CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$



$\Gamma(\eta\eta)/\Gamma(\pi\pi)$ Γ_{11}/Γ_1

$\Gamma(4\pi^0)/\Gamma(\eta\eta)$ Γ_5/Γ_{11}

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.8±0.3	ALDE	87	GAM4	100 $\pi^- p \to 4\pi^0 n$

$\Gamma(\eta\eta'(958))/\Gamma(\pi\pi)$ Γ_{12}/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
0.055±0.024 OUR FIT Error includes scale factor of 1.8.				
0.095±0.026	BARBERIS	00A		450 $pp \to p_f \eta\eta p_s$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.005±0.003	[38] ANISOVICH	02D	SPEC	Combined fit

$\Gamma(\eta\eta'(958))/\Gamma(\eta\eta)$ Γ_{12}/Γ_{11}

VALUE	DOCUMENT ID		TECN	COMMENT
0.38±0.16 OUR FIT Error includes scale factor of 1.9.				
0.29±0.10	[43] AMSLER	95C	CBAR	0.0 $\overline{p}p \to \eta\eta\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.05±0.03	[38] ANISOVICH	02D	SPEC	Combined fit
0.84±0.23	ABELE	96C	RVUE	Compilation
2.7 ±0.8	BINON	84C	GAM2	38 $\pi^- p \to \eta\eta' n$

$\Gamma(K\overline{K})/\Gamma_{\text{total}}$ Γ_{13}/Γ

VALUE	DOCUMENT ID		TECN
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.044±0.021	BUGG	96	RVUE

$\Gamma(K\overline{K})/\Gamma(\pi\pi)$ — Γ_{13}/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
0.246±0.026 OUR FIT				
0.241±0.028 OUR AVERAGE				
0.25 ±0.03	[44] BARGIOTTI	03	OBLX	$\overline{p}p$
0.19 ±0.07	[45] 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. • • •				
0.16 ±0.05	[38] ANISOVICH	02D	SPEC	Combined fit
0.33 ±0.03 ±0.07	BARBERIS	99D	OMEG	$450\ pp \rightarrow K^+K^-, \pi^+\pi^-$
0.20 ±0.08	[46] ABELE	96B	CBAR	$0.0\ \overline{p}p \rightarrow \pi^0 K^0_L K^0_L$

$\Gamma(K\overline{K})/\Gamma(\eta\eta)$ — Γ_{13}/Γ_{11}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
1.69±0.33 OUR FIT	Error includes scale factor of 1.4.				
1.85±0.41		BARBERIS	00E		$450\ pp \rightarrow p_f \eta\eta p_s$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.5 ±0.6		[38] ANISOVICH	02D	SPEC	Combined fit
<0.4	90	[47] PROKOSHKIN	91	GAM4	$300\ \pi^- p \rightarrow \pi^- p\eta\eta$
<0.6		[48] BINON	83	GAM2	$38\ \pi^- p \rightarrow 2\eta n$

[37] Excluding $\rho\rho$ contribution to 4π.
[38] From a combined K-matrix analysis of Crystal Barrel (0. $p\overline{p} \rightarrow \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$), GAMS ($\pi p \rightarrow \pi^0\pi^0 n$, $\eta\eta n$, $\eta\eta' n$), and BNL ($\pi p \rightarrow K\overline{K} n$) data.
[39] From the combined data of ABELE 96 and ABELE 96C.
[40] Using AMSLER 95B ($3\pi^0$).
[41] 2π width determined to be 60 ± 12 MeV.
[42] Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D.
[43] Using AMSLER 94E ($\eta\eta'\pi^0$).
[44] Coupled channel analysis of $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, and $K^{\pm}K^0_S\pi^{\mp}$.
[45] Using $\pi^0\pi^0$ from AMSLER 95B.
[46] Using AMSLER 95B ($3\pi^0$), AMSLER 94C ($2\pi^0\eta$) and SU(3).
[47] Combining results of GAM4 with those of WA76 on $K\overline{K}$ central production.
[48] Using ETKIN 82B and COHEN 80.

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ASTON	88D	NP B301 525	D. Aston *et al.*	(SLAC, NAGO, CINC, INUS)
ALDE	87	PL B198 286	D.M. Alde *et al.*	(LANL, BRUX, SERP, LAPP)
ALDE	86D	NP B269 485	D.M. Alde *et al.*	(BELG, LAPP, SERP, CERN+)
BINON	84C	NC 80A 363	F.G. Binon *et al.*	(BELG, LAPP, SERP+)
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