$f_0(1500)$

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

See also the mini-reviews on scalar mesons under $f_0(600)$ and on non-$q\overline{q}$ candidates. (See the index for the page number.)

$f_0(1500)$ MASS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1507± 5 OUR AVERAGE		Error includes scale factor of 1.2.			
1515±12		[1] BARBERIS	00A		450 $pp \to p_f \eta\eta p_s$
1511± 9		[1,2] BARBERIS	00C		450 $pp \to p_f 4\pi p_s$
1510± 8		[1] BARBERIS	00E		450 $pp \to p_f \eta\eta p_s$
1522±25		BERTIN	98	OBLX	0.05–0.405 $\overline{n}p \to \pi^+\pi^+\pi^-$
1449±20		[1] BERTIN	97C	OBLX	0.0 $\overline{p}p \to \pi^+\pi^-\pi^0$
1515±20		ABELE	96B	CBAR	0.0 $\overline{p}p \to \pi^0 K^0_L K^0_L$
1500±15		[3] AMSLER	95B	CBAR	0.0 $\overline{p}p \to 3\pi^0$
1505±15		[4] 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. • • •					
$1489^{+\ 8}_{-\ 4}$		[13] ANISOVICH	03	RVUE	
1490±30		[5] ABELE	01	CBAR	0.0 $\overline{p}d \to \pi^- 4\pi^0 p$
1497±10		[5] BARBERIS	99	OMEG	450 $pp \to p_s p_f K^+ K^-$
1502±10		[5] BARBERIS	99B	OMEG	450 $pp \to p_s p_f \pi^+\pi^-$
1502±12±10		[6] BARBERIS	99D	OMEG	450 $pp \to K^+K^-, \pi^+\pi^-$
1530±45		[5] BELLAZZINI	99	GAM4	450 $pp \to pp\pi^0\pi^0$
1505±18		[5] FRENCH	99		300 $pp \to p_f(K^+K^-)p_s$
1447±27		[7] KAMINSKI	99	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\sigma\sigma$
1580±80		[5] ALDE	98	GAM4	100 $\pi^- p \to \pi^0\pi^0 n$
1499± 8		[1] ANISOVICH	98B	RVUE	Compilation
~ 1520		REYES	98	SPEC	800 $pp \to p_s p_f K^0_S K^0_S$
1510±20		[1] BARBERIS	97B	OMEG	450 $pp \to pp2(\pi^+\pi^-)$
~ 1475		FRABETTI	97D	E687	$D^\pm_s \to \pi^\mp\pi^\pm\pi^\pm$
~ 1505		ABELE	96	CBAR	0.0 $\overline{p}p \to 5\pi^0$
1500± 8		[1] ABELE	96C	RVUE	Compilation
1460±20	120	[5] AMELIN	96B	VES	37 $\pi^- A \to \eta\eta\pi^- A$
1500± 8		BUGG	96	RVUE	
1500±10		[8] 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		[9] ANTINORI	95	OMEG	300,450 $pp \to pp2(\pi^+\pi^-)$
1497±30		[5] ANTINORI	95	OMEG	300,450 $pp \to pp\pi^+\pi^-$
~ 1505		BUGG	95	MRK3	$J/\psi \to \gamma\pi^+\pi^-\pi^+\pi^-$

1446± 5		[5] ABATZIS	94	OMEG	450 $pp \to pp2(\pi^+\pi^-)$
1545±25		[5] AMSLER	94E	CBAR	0.0 $\overline{p}p \to \pi^0\eta\eta'$
1520±25		[1,10] ANISOVICH	94	CBAR	0.0 $\overline{p}p \to 3\pi^0, \pi^0\eta\eta$
1505±20		[1,11] BUGG	94	RVUE	$\overline{p}p \to 3\pi^0, \eta\eta\pi^0, \eta\pi^0\pi^0$
1560±25		[5] AMSLER	92	CBAR	0.0 $\overline{p}p \to \pi^0\eta\eta$
1550±45±30		[5] BELADIDZE	92C	VES	36 π^- Be $\to \pi^-\eta'\eta$ Be
1449± 4		[5] ARMSTRONG	89E	OMEG	300 $pp \to pp2(\pi^+\pi^-)$
1610±20		[5] ALDE	88	GAM4	300 $\pi^- N \to \pi^- N2\eta$
~ 1525		ASTON	88D	LASS	11 $K^- p \to K^0_S K^0_S \Lambda$
1570±20	600	[5] ALDE	87	GAM4	100 $\pi^- p \to 4\pi^0 n$
1575±45		[12] ALDE	86D	GAM4	100 $\pi^- p \to 2\eta n$
1568±33		[5] BINON	84C	GAM2	38 $\pi^- p \to \eta\eta' n$
1592±25		[5] BINON	83	GAM2	38 $\pi^- p \to 2\eta n$
1525± 5		[5] GRAY	83	DBC	0.0 $\overline{p}N \to 3\pi$

[1] T-matrix pole.
[2] Average between $\pi^+\pi^- 2\pi^0$ and $2(\pi^+\pi^-)$.
[3] T-matrix pole, supersedes ANISOVICH 94.
[4] T-matrix pole, supersedes ANISOVICH 94 and AMSLER 92.
[5] Breit-Wigner mass.
[6] Supersedes BARBERIS 99 and BARBERIS 99B.
[7] T-matrix pole on sheet $--+$.
[8] T-matrix pole. Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D.
[9] Supersedes ABATZIS 94, ARMSTRONG 89E. Breit-Wigner mass.
[10] From a simultaneous analysis of the annihilations $\overline{p}p \to 3\pi^0, \pi^0\eta\eta$.
[11] Reanalysis of ANISOVICH 94 data.
[12] From central value and spread of two solutions. Breit-Wigner mass.
[13] 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.

$f_0(1500)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
109± 7 OUR AVERAGE					
110± 24		[14] BARBERIS	00A		450 $pp \to p_f\eta\eta p_s$
102± 18		[14,15] BARBERIS	00C		450 $pp \to p_f 4\pi p_s$
110± 16		[14] BARBERIS	00E		450 $pp \to p_f\eta\eta p_s$
108± 33		BERTIN	98	OBLX	0.05–0.405 $\overline{n}p \to \pi^+\pi^+\pi^-$
114± 30		[14] BERTIN	97C	OBLX	0.0 $\overline{p}p \to \pi^+\pi^-\pi^0$
105± 15		ABELE	96B	CBAR	0.0 $\overline{p}p \to \pi^0 K^0_L K^0_L$
120± 25		[16] AMSLER	95B	CBAR	0.0 $\overline{p}p \to 3\pi^0$
120± 30		[17] 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. • • •

102 ± 10		[27] ANISOVICH	03	RVUE		
140 ± 40		[18] ABELE	01	CBAR	0.0 $\overline{p}d \to \pi^- 4\pi^0 p$	
104 ± 25		[18] BARBERIS	99	OMEG	450 $pp \to p_s p_f K^+ K^-$	
131 ± 15		[18] BARBERIS	99B	OMEG	450 $pp \to p_s p_f \pi^+ \pi^-$	
$98 \pm 18 \pm 16$		[19] BARBERIS	99D	OMEG	450 $pp \to K^+ K^-, \pi^+ \pi^-$	
160 ± 50		[18] BELLAZZINI	99	GAM4	450 $pp \to pp\pi^0\pi^0$	
100 ± 33		[18] FRENCH	99		300 $pp \to p_f(K^+K^-)p_s$	
108 ± 46		[20] KAMINSKI	99	RVUE	$\pi\pi \to \pi\pi, K\overline{K}, \sigma\sigma$	
280 ± 100		[21] ALDE	98	GAM4	100 $\pi^- p \to \pi^0\pi^0 n$	
130 ± 20		[14] ANISOVICH	98B	RVUE	Compilation	
120 ± 35		[14] 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	[18] AMELIN	96B	VES	37 $\pi^- A \to \eta\eta\pi^- A$	
132 ± 15		BUGG	96	RVUE		
154 ± 30		[22] 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		[23] ANTINORI	95	OMEG	300,450 $pp \to pp2(\pi^+\pi^-)$	
199 ± 30		[18] ANTINORI	95	OMEG	300,450 $pp \to pp\pi^+\pi^-$	
56 ± 12		[18] ABATZIS	94	OMEG	450 $pp \to pp2(\pi^+\pi^-)$	
100 ± 40		[18] AMSLER	94E	CBAR	0.0 $\overline{p}p \to \pi^0\eta\eta'$	
148^{+20}_{-25}		[14,24] ANISOVICH	94	CBAR	0.0 $\overline{p}p \to 3\pi^0, \pi^0\eta\eta$	
150 ± 20		[14,25] BUGG	94	RVUE	$\overline{p}p \to 3\pi^0, \eta\eta\pi^0, \eta\pi^0\pi^0$	
245 ± 50		[18] AMSLER	92	CBAR	0.0 $\overline{p}p \to \pi^0\eta\eta$	
$153 \pm 67 \pm 50$		[18] BELADIDZE	92C	VES	36 π^- Be $\to \pi^-\eta'\eta$ Be	
78 ± 18		[18] ARMSTRONG	89E	OMEG	300 $pp \to pp2(\pi^+\pi^-)$	
170 ± 40		[18] ALDE	88	GAM4	300 $\pi^- N \to \pi^- N 2\eta$	
150 ± 20	600	[18] ALDE	87	GAM4	100 $\pi^- p \to 4\pi^0 n$	
265 ± 65		[26] ALDE	86D	GAM4	100 $\pi^- p \to 2\eta n$	
260 ± 60		[18] BINON	84C	GAM2	38 $\pi^- p \to \eta\eta' n$	
210 ± 40		[18] BINON	83	GAM2	38 $\pi^- p \to 2\eta n$	
101 ± 13		[18] GRAY	83	DBC	0.0 $\overline{p}N \to 3\pi$	

[14] T-matrix pole.
[15] Average between $\pi^+\pi^- 2\pi^0$ and $2(\pi^+\pi^-)$.
[16] T-matrix pole, supersedes ANISOVICH 94.
[17] T-matrix pole, supersedes ANISOVICH 94 and AMSLER 92.
[18] Breit-Wigner width.
[19] Supersedes BARBERIS 99 and BARBERIS 99B.
[20] T-matrix pole on sheet $--+$.

[21] Breit-Wigner width.
[22] T-matrix pole. Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D.
[23] Supersedes ABATZIS 94, ARMSTRONG 89E. Breit-Wigner mass.
[24] From a simultaneous analysis of the annihilations $\overline{p}p \to 3\pi^0, \pi^0\eta\eta$.
[25] Reanalysis of ANISOVICH 94 data.
[26] From central value and spread of two solutions. Breit-Wigner mass.
[27] 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.

$f_0(1500)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Scale factor
Γ_1	$\eta\eta'(958)$	(1.9±0.8) %	1.7
Γ_2	$\eta\eta$	(5.1±0.9) %	1.4
Γ_3	4π	(49.5±3.3) %	1.2
Γ_4	$4\pi^0$	seen	
Γ_5	$2\pi^+ 2\pi^-$	seen	
Γ_6	$2(\pi\pi)_{S\text{-wave}}$		
Γ_7	$\rho\rho$		
Γ_8	$\pi(1300)\pi$		
Γ_9	$a_1(1260)\pi$		
Γ_{10}	$\pi\pi$	(34.9±2.3) %	1.2
Γ_{11}	$\pi^+\pi^-$	seen	
Γ_{12}	$2\pi^0$	seen	
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 $\langle \delta x_i \delta x_j \rangle / (\delta x_i \cdot \delta x_j)$, 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_2	29			
x_3	−31	−52		
x_{10}	−5	11	−83	
x_{13}	6	33	−67	39
	x_1	x_2	x_3	x_{10}

$f_0(1500)$ Γ(i)Γ($\gamma\gamma$)/Γ(total)

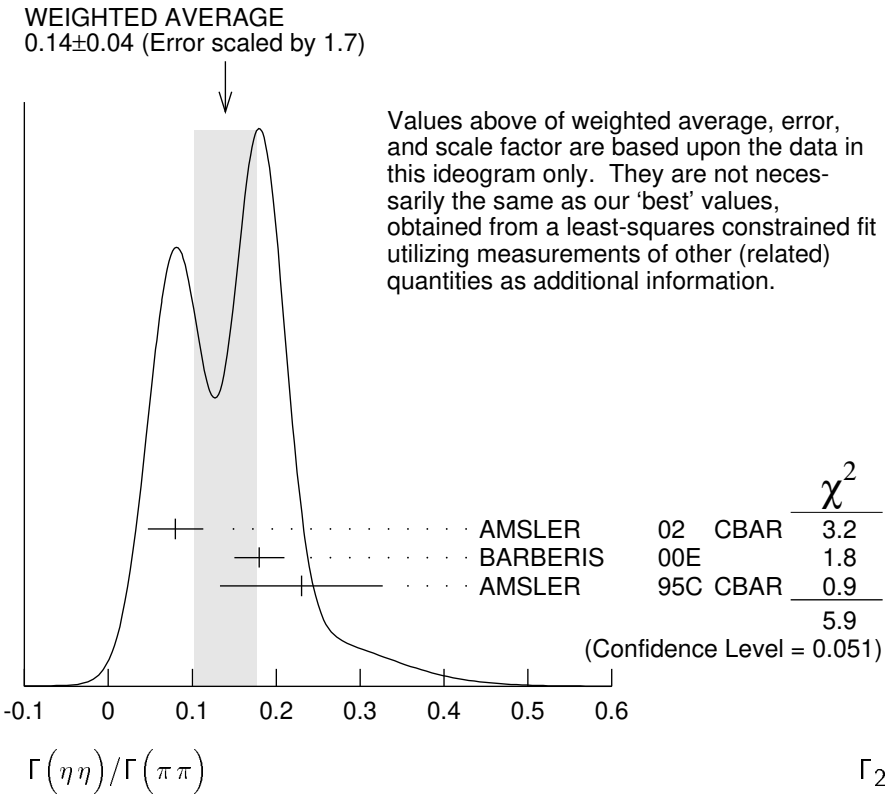
$\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{10}\Gamma_{14}/\Gamma$

VALUE (keV)	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen		ACCIARRI	01H L3	$\gamma\gamma \to K^0_S K^0_S$, E^{ee}_{cm}= 91, 183–209 GeV
<0.46	95	BARATE	00E ALEP	$\gamma\gamma \to \pi^+\pi^-$

$f_0(1500)$ BRANCHING RATIOS

$\Gamma(\eta\eta)/\Gamma(\pi\pi)$ Γ_2/Γ_{10}

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	[28] 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	[29] ANISOVICH	02D SPEC	Combined fit
0.078±0.013	[30] ABELE	96C RVUE	Compilation
0.157±0.060	[31] AMSLER	95D CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$



$\Gamma(K\overline{K})/\Gamma(\eta\eta)$ Γ_{13}/Γ_2

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 $pp \to p_f \eta\eta p_s$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.5 ±0.6		[29] ANISOVICH	02D	SPEC	Combined fit
<0.4	90	[32] PROKOSHKIN	91	GAM4	300 $\pi^- p \to \pi^- p\eta\eta$
<0.6		[33] BINON	83	GAM2	38 $\pi^- p \to 2\eta n$

$\Gamma(K\overline{K})/\Gamma(\pi\pi)$ Γ_{13}/Γ_{10}

VALUE	DOCUMENT ID		TECN	COMMENT
0.246±0.026 OUR FIT				
0.241±0.028 OUR AVERAGE				
0.25 ±0.03	[34] BARGIOTTI	03	OBLX	$\overline{p}p$
0.19 ±0.07	[35] 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. • • •				
0.16 ±0.05	[29] ANISOVICH	02D	SPEC	Combined fit
0.33 ±0.03 ±0.07	BARBERIS	99D	OMEG	450 $pp \to K^+K^-, \pi^+\pi^-$
0.20 ±0.08	[36] ABELE	96B	CBAR	0.0 $\overline{p}p \to \pi^0 K^0_L K^0_L$

$\Gamma(\eta\eta'(958))/\Gamma(\pi\pi)$ Γ_1/Γ_{10}

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	[29] ANISOVICH	02D	SPEC	Combined fit

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.38±0.16 OUR FIT Error includes scale factor of 1.9.				
0.29±0.10	[37] 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	[29] ANISOVICH	02D	SPEC	Combined fit
0.84±0.23	ABELE	96C	RVUE	Compilation
2.7 ±0.8	BINON	84C	GAM2	38 $\pi^- p \to \eta\eta' n$

$\Gamma(\pi\pi)/\Gamma_{\text{total}}$ Γ_{10}/Γ

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

$\Gamma(\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{11}/Γ

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

$\Gamma(K\overline{K})/\Gamma_{total}$ — 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

$\Gamma(\eta\eta)/\Gamma_{total}$ — Γ_2/Γ

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

$\Gamma(4\pi)/\Gamma(\pi\pi)$ — Γ_3/Γ_{10}

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	[38] AMSLER	98	RVUE	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.1 ± 0.2	[29] ANISOVICH	02D	SPEC	Combined fit
3.4 ± 0.8	[38] ABELE	96	CBAR	0.0 $\overline{p}p \rightarrow 5\pi^0$

$\Gamma(4\pi^0)/\Gamma(\eta\eta)$ — Γ_4/Γ_2

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 $\pi^- p \rightarrow 4\pi^0 n$

$\Gamma(\rho\rho)/\Gamma(2(\pi\pi)_{S\text{-wave}})$ — Γ_7/Γ_6

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

$\Gamma(2(\pi\pi)_{S\text{-wave}})/\Gamma(\pi\pi)$ — Γ_6/Γ_{10}

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_6/Γ_3

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 $\overline{p}n \rightarrow 5\pi$

$\Gamma(\rho\rho)/\Gamma(4\pi)$ — Γ_7/Γ_3

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 $\overline{p}n \rightarrow 5\pi$

$\Gamma(\pi(1300)\pi)/\Gamma(4\pi)$ Γ_8/Γ_3

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

$\Gamma(a_1(1260)\pi)/\Gamma(4\pi)$ Γ_9/Γ_3

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

[28] Using AMSLER 95B ($3\pi^0$).
[29] 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.
[30] 2π width determined to be 60 ± 12 MeV.
[31] Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D.
[32] Combining results of GAM4 with those of WA76 on $K\overline{K}$ central production.
[33] Using ETKIN 82B and COHEN 80.
[34] Coupled channel analysis of $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, and $K^\pm K^0_S\pi^\mp$.
[35] Using $\pi^0\pi^0$ from AMSLER 95B.
[36] Using AMSLER 95B ($3\pi^0$), AMSLER 94C ($2\pi^0\eta$) and SU(3).
[37] Using AMSLER 94E ($\eta\eta'\pi^0$).
[38] Excluding $\rho\rho$ contribution to 4π.
[39] From the combined data of ABELE 96 and ABELE 96C.

$f_0(1500)$ REFERENCES

ANISOVICH	03	EPJ A16 229	V.V. Anisovich *et al.*	
BARGIOTTI	03	EPJ C26 371	M. Bargiotti *et al.*	(OBELIX Collab.)
AMSLER	02	EPJ C23 29	C. Amsler *et al.*	
ANISOVICH	02D	PAN 65 1545	V.V. Anisovich *et al.*	
		Translated from YAF 65 1583.		
ABELE	01	EPJ C19 667	A. Abele *et al.*	(Crystal Barrel Collab.)
ABELE	01B	EPJ C21 261	A. Abele *et al.*	(Crystal Barrel Collab.)
ACCIARRI	01H	PL B501 173	M. Acciarri *et al.*	(L3 Collab.)
BARATE	00E	PL B472 189	R. Barate *et al.*	(ALEPH Collab.)
BARBERIS	00A	PL B471 429	D. Barberis *et al.*	(WA 102 Collab.)
BARBERIS	00C	PL B471 440	D. Barberis *et al.*	(WA 102 Collab.)
BARBERIS	00D	PL B474 423	D. Barberis *et al.*	(WA 102 Collab.)
BARBERIS	00E	PL B479 59	D. Barberis *et al.*	(WA 102 Collab.)
BARBERIS	99	PL B453 305	D. Barberis *et al.*	(Omega Expt.)
BARBERIS	99B	PL B453 316	D. Barberis *et al.*	(Omega Expt.)
BARBERIS	99D	PL B462 462	D. Barberis *et al.*	(Omega Expt.)
BELLAZZINI	99	PL B467 296	R. Bellazzini *et al.*	
FRENCH	99	PL B460 213	B. French *et al.*	(WA76 Collab.)
KAMINSKI	99	EPJ C9 141	R. Kaminski, L. Lesniak, B. Loiseau	(CRAC, PARIN)
ABELE	98	PR D57 3860	A. Abele *et al.*	(Crystal Barrel Collab.)
ALDE	98	EPJ A3 361	D. Alde *et al.*	(GAM4 Collab.)
Also	99	PAN 62 405	D. Alde *et al.*	(GAMS Collab.)
		Translated from YAF 62 446.		
AMSLER	98	RMP 70 1293	C. Amsler	
ANISOVICH	98B	UFN 41 419	V.V. Anisovich *et al.*	
BERTIN	98	PR D57 55	A. Bertin *et al.*	(OBELIX Collab.)
REYES	98	PRL 81 4079	M.A. Reyes *et al.*	
BARBERIS	97B	PL B413 217	D. Barberis *et al.*	(WA 102 Collab.)
BERTIN	97C	PL B408 476	A. Bertin *et al.*	(OBELIX Collab.)
FRABETTI	97D	PL B407 79	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
ABELE	96	PL B380 453	A. Abele *et al.*	(Crystal Barrel Collab.)
ABELE	96B	PL B385 425	A. Abele *et al.*	(Crystal Barrel Collab.)
ABELE	96C	NP A609 562	A. Abele *et al.*	(Crystal Barrel Collab.)
AMELIN	96B	PAN 59 976	D.V. Amelin *et al.*	(SERP, TBIL)
		Translated from YAF 59 1021.		

BUGG	96	NP B471 59	D.V. Bugg, A.V. Sarantsev, B.S. Zou	(LOQM, PNPI)
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.)
ANTINORI	95	PL B353 589	F. Antinori *et al.*	(ATHU, BARI, BIRM+)
BUGG	95	PL B353 378	D.V. Bugg *et al.*	(LOQM, PNPI, WASH)
ABATZIS	94	PL B324 509	S. Abatzis *et al.*	(ATHU, BARI, BIRM+)
AMSLER	94C	PL B327 425	C. Amsler *et al.*	(Crystal Barrel Collab.)
AMSLER	94D	PL B333 277	C. Amsler *et al.*	(Crystal Barrel Collab.)
AMSLER	94E	PL B340 259	C. Amsler *et al.*	(Crystal Barrel Collab.)
ANISOVICH	94	PL B323 233	V.V. Anisovich *et al.*	(Crystal Barrel Collab.)
BUGG	94	PR D50 4412	D.V. Bugg *et al.*	(LOQM)
AMSLER	92	PL B291 347	C. Amsler *et al.*	(Crystal Barrel Collab.)
BELADIDZE	92C	SJNP 55 1535	G.M. Beladidze, S.I. Bityukov, G.V. Borisov	(SERP+)
		Translated from YAF 55 2748.		
PROKOSHKIN	91	SPD 36 155	Y.D. Prokoshkin	(GAM2, GAM4 Collab.)
		Translated from DANS 316 900.		
ARMSTRONG	89E	PL B228 536	T.A. Armstrong, M. Benayoun	(ATHU, BARI, BIRM+)
ALDE	88	PL B201 160	D.M. Alde *et al.*	(SERP, BELG, LANL, LAPP+)
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+)
BINON	83	NC 78A 313	F.G. Binon *et al.*	(BELG, LAPP, SERP+)
Also	83B	SJNP 38 561	F.G. Binon *et al.*	(BELG, LAPP, SERP+)
		Translated from YAF 38 934.		
GRAY	83	PR D27 307	L. Gray *et al.*	(SYRA)
ETKIN	82B	PR D25 1786	A. Etkin *et al.*	(BNL, CUNY, TUFTS, VAND)
COHEN	80	PR D22 2595	D. Cohen *et al.*	(ANL)

OTHER RELATED PAPERS

ANISOVICH	03B	PAN 66 741	V.V. Anisovich, V.A. Nikonov, A.V. Sarantsev	
		Translated from YAF 66 772.		
DEWITT	03	PR D68 054026	M.A. DeWitt, H.M. Choi, C.R. Ji	
AMSLER	02B	PL B541 22	C. Amsler	
GARMASH	02	PR D65 092005	A. Garmash *et al.*	(BELLE Collab.)
JIN	02	PR D66 057505	H. Jin, X. Zhang	
KLEEFELD	02	PR D66 034007	F. Kleefeld *et al.*	
RUPP	02	PR D65 078501	G. Rupp, E. vanBeveren, M.D. Scadron	
SHAKIN	02	PR D65 078502	C.M. Shakin, H. Wang	
TESHIMA	02	JPG 28 1391	T. Teshima, I. Kitamura, N. Morisita	
VOLKOV	02	PAN 65 1657	M.K. Volkov, V.L. Yudichev	
		Translated from YAF 65 1701.		
LI	01B	EPJ C19 529	D.-M. Li, H. Yu, Q.-X. Shen	
SUROVTSEV	01	PR D63 054024	Y.S. Surovtsev, D. Krupa, M. Nagy	
BAI	00A	PL B472 207	J.Z. Bai *et al.*	(BES Collab.)
ANISOVICH	99H	PL B467 289	A.V. Anisovich, V.V. Anisovich	
AMSLER	98	RMP 70 1293	C. Amsler	
STROHMEIER	98	PL B438 21	M. Strohmeier *et al.*	
ANISOVICH	97	PL B395 123	A.V. Anisovich, A.V. Sarantsev	(PNPI)
KAMINSKI	97B	PL B413 130	R. Kaminski, L. Lesniak, B. Loiseau	(CRAC, IPN)
PROKOSHKIN	97	SPD 42 117	Y.D. Prokoshkin *et al.*	(SERP)
		Translated from DANS 353 323.		
AMSLER	96	PR D53 295	C. Amsler, F.E. Close	(ZURI, RAL)
GASPERO	95	NP A588 861	M. Gaspero	(ROMA)
SLAUGHTER	88	MPL A3 1361	M.D. Slaughter	(LANL)
BRIDGES	86B	PRL 56 215	D.L. Bridges *et al.*	(SYRA, CASE)