$f_0(980)$

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

See also the minireview on scalar mesons under $f_0(600)$. (See the index for the page number.)

$f_0(980)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
980 ±10 OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1030 ^{+30}_{-10}$		[1] ANISOVICH 09	RVUE	$0.0\ \overline{p}p,\ \pi N$
$977 ^{+11}_{-9} \pm 1$	44	[2] ECKLUND 09	CLEO	$4.17\ e^+e^- \rightarrow D_s^- D_s^{*+}$ + c.c.
$982.2 \pm 1.0 ^{+8.1}_{-8.0}$		[3] UEHARA 08A	BELL	$10.6\ e^+e^- \rightarrow e^+e^-\pi^0\pi^0$
$976.8 \pm 0.3 ^{+10.1}_{-0.6}$	64k	[4] AMBROSINO 07	KLOE	$1.02\ e^+e^- \rightarrow \pi^0\pi^0\gamma$
$984.7 \pm 0.4 ^{+2.4}_{-3.7}$	64k	[5] AMBROSINO 07	KLOE	$1.02\ e^+e^- \rightarrow \pi^0\pi^0\gamma$
973 ± 3	262 ± 30	[6] AUBERT 07AK	BABR	$10.6\ e^+e^- \rightarrow \phi\pi^+\pi^-\gamma$
970 ± 7	54 ± 9	[6] AUBERT 07AK	BABR	$10.6\ e^+e^- \rightarrow \phi\pi^0\pi^0\gamma$
953 ± 20	2.6k	[7] BONVICINI 07	CLEO	$D^+ \rightarrow \pi^-\pi^+\pi^+$
$985.6 ^{+1.2}_{-1.5} ^{+1.1}_{-1.6}$		[8] MORI 07	BELL	$10.6\ e^+e^- \rightarrow e^+e^-\pi^+\pi^-$
$983.0 \pm 0.6 ^{+4.0}_{-3.0}$		[9] AMBROSINO 06B	KLOE	$1.02\ e^+e^- \rightarrow \pi^+\pi^-\gamma$
$977.3 \pm 0.9 ^{+3.7}_{-4.3}$		[10] AMBROSINO 06B	KLOE	$1.02\ e^+e^- \rightarrow \pi^+\pi^-\gamma$
950 ± 9	4286	[11] GARMASH 06	BELL	$B^+ \rightarrow K^+\pi^+\pi^-$
965 ± 10		[12] ABLIKIM 05	BES2	$J/\psi \rightarrow \phi\pi^+\pi^-,\ \phi K^+K^-$
1031 ± 8		[13] ANISOVICH 03	RVUE	
1037 ± 31		TIKHOMIROV 03	SPEC	$40.0\ \pi^- C \rightarrow K_S^0 K_S^0 K_L^0 X$
973 ± 1	2438	[14] ALOISIO 02D	KLOE	$e^+e^- \rightarrow \pi^0\pi^0\gamma$
$977 \pm 3 \pm 2$	848	[15] AITALA 01A	E791	$D_s^+ \rightarrow \pi^-\pi^+\pi^+$
969.8 ± 4.5	419	[16] ACHASOV 00H	SND	$e^+e^- \rightarrow \pi^0\pi^0\gamma$
$985 ^{+16}_{-12}$	419	[17,18] ACHASOV 00H	SND	$e^+e^- \rightarrow \pi^0\pi^0\gamma$
$976 \pm 5 \pm 6$		[19] AKHMETSHIN 99B	CMD2	$e^+e^- \rightarrow \pi^+\pi^-\gamma$
$977 \pm 3 \pm 6$	268	[19] AKHMETSHIN 99C	CMD2	$e^+e^- \rightarrow \pi^0\pi^0\gamma$
$975 \pm 4 \pm 6$		[20] AKHMETSHIN 99C	CMD2	$e^+e^- \rightarrow \pi^0\pi^0\gamma$
$975 \pm 4 \pm 6$		[21] AKHMETSHIN 99C	CMD2	$e^+e^- \rightarrow \pi^+\pi^-\gamma,\ \pi^0\pi^0\gamma$
985 ± 10		BARBERIS 99	OMEG	$450\ pp \rightarrow p_s p_f K^+K^-$
982 ± 3		BARBERIS 99B	OMEG	$450\ pp \rightarrow p_s p_f \pi^+\pi^-$

982 ± 3		BARBERIS	99C	OMEG	450 $pp \to p_s p_f \pi^0 \pi^0$
987 ± 6 ± 6		[22] BARBERIS	99D	OMEG	450 $pp \to K^+ K^-$, $\pi^+ \pi^-$
989 ±15		BELLAZZINI	99	GAM4	450 $pp \to pp \pi^0 \pi^0$
991 ± 3		[23] KAMINSKI	99	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\sigma\sigma$
∼ 980		[23] OLLER	99	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
∼ 993.5		OLLER	99B	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
∼ 987		[23] OLLER	99C	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\eta\eta$
957 ± 6		[24] ACKERSTAFF	98Q	OPAL	$Z \to f_0$ X
960 ±10		ALDE	98	GAM4	
1015 ±15		[23] ANISOVICH	98B	RVUE	Compilation
1008		[25] LOCHER	98	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
955 ±10		[24] ALDE	97	GAM2	450 $pp \to pp \pi^0 \pi^0$
994 ± 9		[26] BERTIN	97C	OBLX	0.0 $\overline{p}p \to \pi^+ \pi^- \pi^0$
993.2± 6.5± 6.9		[27] ISHIDA	96	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
1006		TORNQVIST	96	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $K\pi$, $\eta\pi$
997 ± 5	3k	[28] ALDE	95B	GAM2	38 $\pi^- p \to \pi^0 \pi^0 n$
960 ±10	10k	[29] ALDE	95B	GAM2	38 $\pi^- p \to \pi^0 \pi^0 n$
994 ± 5		AMSLER	95B	CBAR	0.0 $\overline{p}p \to 3\pi^0$
∼ 996		[30] AMSLER	95D	CBAR	0.0 $\overline{p}p \to \pi^0 \pi^0 \pi^0$, $\pi^0 \eta\eta$, $\pi^0 \pi^0 \eta$
987 ± 6		[31] ANISOVICH	95	RVUE	
1015		JANSSEN	95	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
983		[32] BUGG	94	RVUE	$\overline{p}p \to \eta 2\pi^0$
973 ± 2		[33] KAMINSKI	94	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
988		[34] ZOU	94B	RVUE	
988 ±10		[35] MORGAN	93	RVUE	$\pi\pi(K\overline{K}) \to \pi\pi(K\overline{K})$, $J/\psi \to \phi\pi\pi(K\overline{K})$, $D_s \to \pi(\pi\pi)$
971.1± 4.0		[24] AGUILAR-...	91	EHS	400 pp
979 ± 4		[36] ARMSTRONG	91	OMEG	300 $pp \to pp\pi\pi$, $ppK\overline{K}$
956 ±12		BREAKSTONE	90	SFM	$pp \to pp\pi^+\pi^-$
959.4± 6.5		[24] AUGUSTIN	89	DM2	$J/\psi \to \omega\pi^+\pi^-$
978 ± 9		[24] ABACHI	86B	HRS	$e^+ e^- \to \pi^+\pi^-$ X
$985.0^{+9.0}_{-39.0}$		ETKIN	82B	MPS	23 $\pi^- p \to n 2K^0_S$
974 ± 4		[36] GIDAL	81	MRK2	$J/\psi \to \pi^+\pi^-$ X
975		[37] ACHASOV	80	RVUE	
986 ±10		[36] AGUILAR-...	78	HBC	0.7 $\overline{p}p \to K^0_S K^0_S$
969 ± 5		[36] LEEPER	77	ASPK	2–2.4 $\pi^- p \to \pi^+\pi^- n$, $K^+ K^- n$
987 ± 7		[36] BINNIE	73	CNTR	$\pi^- p \to n$MM
1012 ± 6		[38] GRAYER	73	ASPK	17 $\pi^- p \to \pi^+\pi^- n$
1007 ±20		[38] HYAMS	73	ASPK	17 $\pi^- p \to \pi^+\pi^- n$
997 ± 6		[38] PROTOPOP...	73	HBC	7 $\pi^+ p \to \pi^+ p \pi^+ \pi^-$

[1] On sheet II in a 2-pole solution. The other pole is found on sheet III at (850−100i) MeV

[2] Using a relativistic Breit-Wigner function and taking into account the finite D_s mass.

3 Breit-Wigner mass. Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g^2_{f_0 K K}/g^2_{f_0 \pi\pi} = 0$.

4 In the kaon-loop fit.

5 In the no-structure fit.

6 Systematic errors not estimated.

7 FLATTE 76 parameterization. $g_{f_0 \pi\pi} = 329 \pm 96$ MeV/c^2 assuming $g_{f_0 K\overline{K}}/g_{f_0 \pi\pi}$=2.

8 Breit-Wigner mass. Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g^2_{f_0 K K}/g^2_{f_0 \pi\pi} = 4.21 \pm 0.25 \pm 0.21$ from ABLIKIM 05.

9 In the kaon-loop fit following formalism of ACHASOV 89.

10 In the no-structure fit assuming a direct coupling of ϕ to $f_0 \gamma$.

11 FLATTE 76 parameterization. Supersedes GARMASH 05.

12 FLATTE 76 parameterization, $g^2_{f_0 K\overline{K}}/g^2_{f_0 \pi\pi} = 4.21 \pm 0.25 \pm 0.21$.

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.

14 From the negative interference with the $f_0(600)$ meson of AITALA 01B using the ACHASOV 89 parameterization for the $f_0(980)$, a Breit-Wigner for the $f_0(600)$, and ACHASOV 01F for the $\rho\pi$ contribution.

15 Coupled-channel Breit-Wigner, couplings $g_\pi = 0.09 \pm 0.01 \pm 0.01$, $g_K = 0.02 \pm 0.04 \pm 0.03$.

16 Supersedes ACHASOV 98I. Using the model of ACHASOV 89.

17 Supersedes ACHASOV 98I.

18 In the "narrow resonance" approximation.

19 Assuming $\Gamma(f_0)$= 40 MeV.

20 From a narrow pole fit taking into account $f_0(980)$ and $f_0(1200)$ intermediate mechanisms.

21 From the combined fit of the photon spectra in the reactions $e^+ e^- \to \pi^+ \pi^- \gamma$, $\pi^0 \pi^0 \gamma$.

22 Supersedes BARBERIS 99 and BARBERIS 99B

23 T-matrix pole.

24 From invariant mass fit.

25 On sheet II in a 2 pole solution. The other pole is found on sheet III at ($1039-93i$) MeV.

26 On sheet II in a 2 pole solution. The other pole is found on sheet III at (963-29i) MeV.

27 Reanalysis of data from HYAMS 73, GRAYER 74, SRINIVASAN 75, and ROSSELET 77 using the interfering amplitude method.

28 At high $|t|$.

29 At low $|t|$.

30 On sheet II in a 4-pole solution, the other poles are found on sheet III at ($953-55i$) MeV and on sheet IV at ($938-35i$) MeV.

31 Combined fit of ALDE 95B, ANISOVICH 94, AMSLER 94D.

32 On sheet II in a 2 pole solution. The other pole is found on sheet III at ($996-103i$) MeV.

33 From sheet II pole position.

34 On sheet II in a 2 pole solution. The other pole is found on sheet III at ($797-185i$) MeV and can be interpreted as a shadow pole.

35 On sheet II in a 2 pole solution. The other pole is found on sheet III at ($978-28i$) MeV.

36 From coupled channel analysis.

37 Coupled channel analysis with finite width corrections.

38 Included in AGUILAR-BENITEZ 78 fit.

$f_0(980)$ WIDTH

Width determination very model dependent. Peak width in $\pi\pi$ is about 50 MeV, but decay width can be much larger.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
40 to 100 OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$70 {}^{+20}_{-32}$		[39] ANISOVICH 09	RVUE	$0.0\ \overline{p}p,\ \pi N$
$91 {}^{+30}_{-22} \pm 3$	44	[40] ECKLUND 09	CLEO	$4.17\ e^+e^- \to D_s^- D_s^{*+}$ + c.c.
$66.9 \pm 2.2 {}^{+17.6}_{-12.5}$		[41] UEHARA 08A	BELL	$10.6\ e^+e^- \to e^+e^-\pi^0\pi^0$
65 ± 13	262 ± 30	[42] AUBERT 07AK	BABR	$10.6\ e^+e^- \to \phi\pi^+\pi^-\gamma$
81 ± 21	54 ± 9	[42] AUBERT 07AK	BABR	$10.6\ e^+e^- \to \phi\pi^0\pi^0\gamma$
$51.3 {}^{+20.8}_{-17.7} {}^{+13.2}_{-3.8}$		[43] MORI 07	BELL	$10.6\ e^+e^- \to e^+e^-\pi^+\pi^-$
$61 \pm 9 {}^{+14}_{-8}$	2584	[44] GARMASH 05	BELL	$B^+ \to K^+\pi^+\pi^-$
64 ± 16		[45] ANISOVICH 03	RVUE	
121 ± 23		TIKHOMIROV 03	SPEC	$40.0\ \pi^- C \to K_S^0 K_S^0 K_L^0 X$
~ 70		[46] BRAMON 02	RVUE	$1.02\ e^+e^- \to \pi^0\pi^0\gamma$
$44 \pm 2 \pm 2$	848	[47] AITALA 01A	E791	$D_s^+ \to \pi^-\pi^+\pi^+$
201 ± 28	419	[48] ACHASOV 00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$
122 ± 13	419	[49,50] ACHASOV 00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$
56 ± 20		[51] AKHMETSHIN 99C	CMD2	$e^+e^- \to \pi^0\pi^0\gamma$
65 ± 20		BARBERIS 99	OMEG	$450\ pp \to p_s p_f K^+K^-$
80 ± 10		BARBERIS 99B	OMEG	$450\ pp \to p_s p_f \pi^+\pi^-$
80 ± 10		BARBERIS 99C	OMEG	$450\ pp \to p_s p_f \pi^0\pi^0$
$48 \pm 12 \pm 8$		[52] BARBERIS 99D	OMEG	$450\ pp \to K^+K^-,\ \pi^+\pi^-$
65 ± 25		BELLAZZINI 99	GAM4	$450\ pp \to pp\pi^0\pi^0$
71 ± 14		[53] KAMINSKI 99	RVUE	$\pi\pi \to \pi\pi,\ K\overline{K},\ \sigma\sigma$
~ 28		[53] OLLER 99	RVUE	$\pi\pi \to \pi\pi,\ K\overline{K}$
~ 25		OLLER 99B	RVUE	$\pi\pi \to \pi\pi,\ K\overline{K}$
~ 14		[53] OLLER 99C	RVUE	$\pi\pi \to \pi\pi,\ K\overline{K},\ \eta\eta$
70 ± 20		ALDE 98	GAM4	
86 ± 16		[53] ANISOVICH 98B	RVUE	Compilation
54		[54] LOCHER 98	RVUE	$\pi\pi \to \pi\pi,\ K\overline{K}$
69 ± 15		[55] ALDE 97	GAM2	$450\ pp \to pp\pi^0\pi^0$
38 ± 20		[56] BERTIN 97C	OBLX	$0.0\ \overline{p}p \to \pi^+\pi^-\pi^0$
~ 100		[57] ISHIDA 96	RVUE	$\pi\pi \to \pi\pi,\ K\overline{K}$
34		TORNQVIST 96	RVUE	$\pi\pi \to \pi\pi,\ K\overline{K},\ K\pi,\ \eta\pi$

48 ± 10	3k	[58] ALDE	95B	GAM2	$38\ \pi^- p \to \pi^0 \pi^0 n$
95 ± 20	10k	[59] ALDE	95B	GAM2	$38\ \pi^- p \to \pi^0 \pi^0 n$
26 ± 10		AMSLER	95B	CBAR	$0.0\ \overline{p} p \to 3\pi^0$
~ 112		[60] AMSLER	95D	CBAR	$0.0\ \overline{p} p \to \pi^0 \pi^0 \pi^0$, $\pi^0 \eta \eta$, $\pi^0 \pi^0 \eta$
80 ± 12		[61] ANISOVICH	95	RVUE	
30		JANSSEN	95	RVUE	$\pi \pi \to \pi \pi$, $K \overline{K}$
74		[62] BUGG	94	RVUE	$\overline{p} p \to \eta 2\pi^0$
29 ± 2		[63] KAMINSKI	94	RVUE	$\pi \pi \to \pi \pi$, $K \overline{K}$
46		[64] ZOU	94B	RVUE	
48 ± 12		[65] MORGAN	93	RVUE	$\pi \pi (K \overline{K}) \to \pi \pi (K \overline{K})$, $J/\psi \to \phi \pi \pi (K \overline{K})$, $D_s \to \pi (\pi \pi)$
37.4 ± 10.6		[55] AGUILAR-...	91	EHS	$400\ p p$
72 ± 8		[66] ARMSTRONG	91	OMEG	$300\ p p \to p p \pi \pi$, $p p K \overline{K}$
110 ± 30		BREAKSTONE	90	SFM	$p p \to p p \pi^+ \pi^-$
29 ± 13		[55] ABACHI	86B	HRS	$e^+ e^- \to \pi^+ \pi^- X$
$120 \pm 281 \pm 20$		ETKIN	82B	MPS	$23\ \pi^- p \to n 2K^0_S$
28 ± 10		[66] GIDAL	81	MRK2	$J/\psi \to \pi^+ \pi^- X$
70 to 300		[67] ACHASOV	80	RVUE	
100 ± 80		[68] AGUILAR-...	78	HBC	$0.7\ \overline{p} p \to K^0_S K^0_S$
30 ± 8		[66] LEEPER	77	ASPK	$2–2.4\ \pi^- p \to \pi^+ \pi^- n$, $K^+ K^- n$
48 ± 14		[66] BINNIE	73	CNTR	$\pi^- p \to n$ MM
32 ± 10		[69] GRAYER	73	ASPK	$17\ \pi^- p \to \pi^+ \pi^- n$
30 ± 10		[69] HYAMS	73	ASPK	$17\ \pi^- p \to \pi^+ \pi^- n$
54 ± 16		[69] PROTOPOP...	73	HBC	$7\ \pi^+ p \to \pi^+ p \pi^+ \pi^-$

[39] On sheet II in a 2-pole solution. The other pole is found on sheet III at $(850-100i)$ MeV

[40] Using a relativistic Breit-Wigner function and taking into account the finite D_s mass.

[41] Breit-Wigner $\pi\pi$ width. Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g^2_{f_0 K K}/g^2_{f_0 \pi\pi} = 0$.

[42] Systematic errors not estimated.

[43] Breit-Wigner $\pi\pi$ width. Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g^2_{f_0 K K}/g^2_{f_0 \pi\pi} = 4.21 \pm 0.25 \pm 0.21$ from ABLIKIM 05.

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

[45] 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.

[46] Using the data of AKHMETSHIN 99C, ACHASOV 00H, and ALOISIO 02D.

[47] Breit-Wigner width.

[48] Supersedes ACHASOV 98I. Using the model of ACHASOV 89.

[49] Supersedes ACHASOV 98I.

[50] In the "narrow resonance" approximation.

[51] From the combined fit of the photon spectra in the reactions $e^+ e^- \to \pi^+ \pi^- \gamma$, $\pi^0 \pi^0 \gamma$.

[52] Supersedes BARBERIS 99 and BARBERIS 99B

[53] T-matrix pole.
[54] On sheet II in a 2 pole solution. The other pole is found on sheet III at (1039−93i) MeV.
[55] From invariant mass fit.
[56] On sheet II in a 2 pole solution. The other pole is found on sheet III at (963-29i) MeV.
[57] Reanalysis of data from HYAMS 73, GRAYER 74, SRINIVASAN 75, and ROSSELET 77 using the interfering amplitude method.
[58] At high $|t|$.
[59] At low $|t|$.
[60] On sheet II in a 4-pole solution, the other poles are found on sheet III at (953−55i) MeV and on sheet IV at (938−35i) MeV.
[61] Combined fit of ALDE 95B, ANISOVICH 94,
[62] On sheet II in a 2 pole solution. The other pole is found on sheet III at (996−103i) MeV.
[63] From sheet II pole position.
[64] On sheet II in a 2 pole solution. The other pole is found on sheet III at (797−185i) MeV and can be interpreted as a shadow pole.
[65] On sheet II in a 2 pole solution. The other pole is found on sheet III at (978−28i) MeV.
[66] From coupled channel analysis.
[67] Coupled channel analysis with finite width corrections.
[68] From coupled channel fit to the HYAMS 73 and PROTOPOPESCU 73 data. With a simultaneous fit to the $\pi\pi$ phase-shifts, inelasticity and to the $K^0_S K^0_S$ invariant mass.
[69] Included in AGUILAR-BENITEZ 78 fit.

f_0(980) DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$\pi\pi$	dominant
Γ_2	$K\overline{K}$	seen
Γ_3	$\gamma\gamma$	seen
Γ_4	e^+e^-	

f_0(980) PARTIAL WIDTHS

$\Gamma(\gamma\gamma)$ Γ_3

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
0.29 $^{+0.07}_{-0.06}$ OUR AVERAGE				
$0.286 \pm 0.017 ^{+0.211}_{-0.070}$	[70] UEHARA	08A	BELL	10.6 $e^+e^- \rightarrow e^+e^-\pi^0\pi^0$
$0.205 ^{+0.095}_{-0.083} {}^{+0.147}_{-0.117}$	[71] MORI	07	BELL	10.6 $e^+e^- \rightarrow e^+e^-\pi^+\pi^-$
$0.28 ^{+0.09}_{-0.13}$	[72] BOGLIONE	99	RVUE	$\gamma\gamma \rightarrow \pi^+\pi^-$, $\pi^0\pi^0$
$0.42 \pm 0.06 \pm 0.18$	[73] OEST	90	JADE	$e^+e^- \rightarrow e^+e^-\pi^0\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.29 \pm 0.07 \pm 0.12$	[74,75] BOYER	90	MRK2	$e^+e^- \rightarrow e^+e^-\pi^+\pi^-$
$0.31 \pm 0.14 \pm 0.09$	[74,75] MARSISKE	90	CBAL	$e^+e^- \rightarrow e^+e^-\pi^0\pi^0$
0.63 ± 0.14	[76] MORGAN	90	RVUE	$\gamma\gamma \rightarrow \pi^+\pi^-$, $\pi^0\pi^0$

[70] Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g^2_{f_0 K K}/g^2_{f_0 \pi\pi} = 0$.
[71] Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g^2_{f_0 K K}/g^2_{f_0 \pi\pi} = 4.21 \pm 0.25 \pm 0.21$ from ABLIKIM 05.
[72] Supersedes MORGAN 90.
[73] OEST 90 quote systematic errors $^{+0.08}_{-0.18}$. We use ± 0.18. Observed 60 events.
[74] From analysis allowing arbitrary background unconstrained by unitarity.
[75] Data included in MORGAN 90, BOGLIONE 99 analyses.
[76] From amplitude analysis of BOYER 90 and MARSISKE 90, data corresponds to resonance parameters m = 989 MeV, Γ = 61 MeV.

$\Gamma(e^+ e^-)$ — Γ_4

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<8.4	90	VOROBYEV	88	ND	$e^+ e^- \rightarrow \pi^0 \pi^0$

f_0(980) BRANCHING RATIOS

$\Gamma(\pi\pi)/[\Gamma(\pi\pi)+\Gamma(K\overline{K})]$ — $\Gamma_1/(\Gamma_1+\Gamma_2)$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.52 ± 0.12	9.9k	[77] AUBERT	06O	BABR	$B^\pm \rightarrow K^\pm \pi^\pm \pi^\mp$
$0.75^{+0.11}_{-0.13}$		[78] ABLIKIM	05Q	BES2	$\chi_{c0} \rightarrow 2\pi^+ 2\pi^-$, $\pi^+ \pi^- K^+ K^-$
0.84 ± 0.02		[79] ANISOVICH	02D	SPEC	Combined fit
~ 0.68		OLLER	99B	RVUE	$\pi\pi \rightarrow \pi\pi$, $K\overline{K}$
0.67 ± 0.09		[80] LOVERRE	80	HBC	$4\ \pi^- p \rightarrow n 2K^0_S$
$0.81^{+0.09}_{-0.04}$		[80] CASON	78	STRC	$7\ \pi^- p \rightarrow n 2K^0_S$
0.78 ± 0.03		[80] WETZEL	76	OSPK	$8.9\ \pi^- p \rightarrow n 2K^0_S$

[77] Recalculated by us using $\Gamma(K^+ K^-)$ / $\Gamma(\pi^+ \pi^-) = 0.69 \pm 0.32$ from AUBERT 06O and isospin relations.
[78] Using data from ABLIKIM 04G.
[79] 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.
[80] Measure $\pi\pi$ elasticity assuming two resonances coupled to the $\pi\pi$ and $K\overline{K}$ channels only.

f_0(980) REFERENCES

ANISOVICH	09	IJMP A24 2481	V.V. Anisovich, A.V. Sarantsev	
ECKLUND	09	PR D80 052009	K.M. Ecklund et al.	(CLEO Collab.)
UEHARA	08A	PR D78 052004	S. Uehara et al.	(BELLE Collab.)
AMBROSINO	07	EPJ C49 473	F. Ambrosino et al.	(KLOE Collab.)
AUBERT	07AK	PR D76 012008	B. Aubert et al.	(BABAR Collab.)
BONVICINI	07	PR D76 012001	G. Bonvicini et al.	(CLEO Collab.)
MORI	07	PR D75 051101R	T. Mori et al.	(BELLE Collab.)
AMBROSINO	06B	PL B634 148	F. Ambrosino et al.	(KLOE Collab.)
AUBERT	06O	PR D74 032003	B. Aubert et al.	(BABAR Collab.)
GARMASH	06	PRL 96 251803	A. Garmash et al.	(BELLE Collab.)
ABLIKIM	05	PL B607 243	M. Ablikim et al.	(BES Collab.)
ABLIKIM	05Q	PR D72 092002	M. Ablikim et al.	(BES Collab.)
ACHASOV	05	PR D72 013006	N.N. Achasov, G.N. Shestakov	

GARMASH	05	PR D71 092003	A. Garmash *et al.*	(BELLE Collab.)
ABLIKIM	04G	PR D70 092002	M. Ablikim *et al.*	(BES Collab.)
ANISOVICH	03	EPJ A16 229	V.V. Anisovich *et al.*	
TIKHOMIROV	03	PAN 66 828	G.D. Tikhomirov *et al.*	
		Translated from YAF 66 860.		
ALOISIO	02D	PL B537 21	A. Aloisio *et al.*	(KLOE Collab.)
ANISOVICH	02D	PAN 65 1545	V.V. Anisovich *et al.*	
		Translated from YAF 65 1583.		
BRAMON	02	EPJ C26 253	A. Bramon *et al.*	
ACHASOV	01F	PR D63 094007	N.N. Achasov, V.V. Gubin	(Novosibirsk SND Collab.)
AITALA	01A	PRL 86 765	E.M. Aitala *et al.*	(FNAL E791 Collab.)
AITALA	01B	PRL 86 770	E.M. Aitala *et al.*	(FNAL E791 Collab.)
ACHASOV	00H	PL B485 349	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
AKHMETSHIN	99B	PL B462 371	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
AKHMETSHIN	99C	PL B462 380	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
BARBERIS	99	PL B453 305	D. Barberis *et al.*	(Omega Expt.)
BARBERIS	99B	PL B453 316	D. Barberis *et al.*	(Omega Expt.)
BARBERIS	99C	PL B453 325	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.*	
BOGLIONE	99	EPJ C9 11	M. Boglione, M.R. Pennington	
KAMINSKI	99	EPJ C9 141	R. Kaminski, L. Lesniak, B. Loiseau	(CRAC, PARIN)
OLLER	99	PR D60 099906 (erratum)	J.A. Oller *et al.*	
OLLER	99B	NP A652 407 (erratum)	J.A. Oller, E. Oset	
OLLER	99C	PR D60 074023	J.A. Oller, E. Oset	
ACHASOV	98I	PL B440 442	M.N. Achasov *et al.*	
ACKERSTAFF	98Q	EPJ C4 19	K. Ackerstaff *et al.*	(OPAL Collab.)
ALDE	98	EPJ A3 361	D. Alde *et al.*	(GAM4 Collab.)
Also		PAN 62 405	D. Alde *et al.*	(GAMS Collab.)
		Translated from YAF 62 446.		
ANISOVICH	98B	SPU 41 419	V.V. Anisovich *et al.*	
		Translated from UFN 168 481.		
LOCHER	98	EPJ C4 317	M.P. Locher *et al.*	(PSI)
ALDE	97	PL B397 350	D.M. Alde *et al.*	(GAMS Collab.)
BERTIN	97C	PL B408 476	A. Bertin *et al.*	(OBELIX Collab.)
ISHIDA	96	PTP 95 745	S. Ishida *et al.*	(TOKY, MIYA, KEK)
TORNQVIST	96	PRL 76 1575	N.A. Tornqvist, M. Roos	(HELS)
ALDE	95B	ZPHY C66 375	D.M. Alde *et al.*	(GAMS Collab.)
AMSLER	95B	PL B342 433	C. Amsler *et al.*	(Crystal Barrel Collab.)
AMSLER	95D	PL B355 425	C. Amsler *et al.*	(Crystal Barrel Collab.)
ANISOVICH	95	PL B355 363	V.V. Anisovich *et al.*	(PNPI, SERP)
JANSSEN	95	PR D52 2690	G. Janssen *et al.*	(STON, ADLD, JULI)
AMSLER	94D	PL B333 277	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)
KAMINSKI	94	PR D50 3145	R. Kaminski, L. Lesniak, J.P. Maillet	(CRAC+)
ZOU	94B	PR D50 591	B.S. Zou, D.V. Bugg	(LOQM)
MORGAN	93	PR D48 1185	D. Morgan, M.R. Pennington	(RAL, DURH)
AGUILAR-...	91	ZPHY C50 405	M. Aguilar-Benitez *et al.*	(LEBC-EHS Collab.)
ARMSTRONG	91	ZPHY C51 351	T.A. Armstrong *et al.*	(ATHU, BARI, BIRM+)
BOYER	90	PR D42 1350	J. Boyer *et al.*	(Mark II Collab.)
BREAKSTONE	90	ZPHY C48 569	A.M. Breakstone *et al.*	(ISU, BGNA, CERN+)
MARSISKE	90	PR D41 3324	H. Marsiske *et al.*	(Crystal Ball Collab.)
MORGAN	90	ZPHY C48 623	D. Morgan, M.R. Pennington	(RAL, DURH)
OEST	90	ZPHY C47 343	T. Oest *et al.*	(JADE Collab.)
ACHASOV	89	NP B315 465	N.N. Achasov, V.N. Ivanchenko	
AUGUSTIN	89	NP B320 1	J.E. Augustin, G. Cosme	(DM2 Collab.)
VOROBYEV	88	SJNP 48 273	P.V. Vorobiev *et al.*	(NOVO)
		Translated from YAF 48 436.		
ABACHI	86B	PRL 57 1990	S. Abachi *et al.*	(PURD, ANL, IND, MICH+)
ETKIN	82B	PR D25 1786	A. Etkin *et al.*	(BNL, CUNY, TUFTS, VAND)
GIDAL	81	PL 107B 153	G. Gidal *et al.*	(SLAC, LBL)
ACHASOV	80	SJNP 32 566	N.N. Achasov, S.A. Devyanin, G.N. Shestakov	(NOVM)
		Translated from YAF 32 1098.		
LOVERRE	80	ZPHY C6 187	P.F. Loverre *et al.*	(CERN, CDEF, MADR+) IJP
AGUILAR-...	78	NP B140 73	M. Aguilar-Benitez *et al.*	(MADR, BOMB+)
CASON	78	PRL 41 271	N.M. Cason *et al.*	(NDAM, ANL)
LEEPER	77	PR D16 2054	R.J. Leeper *et al.*	(ISU)
ROSSELET	77	PR D15 574	L. Rosselet *et al.*	(GEVA, SACL)
FLATTE	76	PL 63B 224	S.M. Flatte	(CERN)
WETZEL	76	NP B115 208	W. Wetzel *et al.*	(ETH, CERN, LOIC)

SRINIVASAN	75	PR D12 681	V. Srinivasan *et al.*	(NDAM, ANL)
GRAYER	74	NP B75 189	G. Grayer *et al.*	(CERN, MPIM)
BINNIE	73	PRL 31 1534	D.M. Binnie *et al.*	(LOIC, SHMP)
GRAYER	73	Tallahassee	G. Grayer *et al.*	(CERN, MPIM)
HYAMS	73	NP B64 134	B.D. Hyams *et al.*	(CERN, MPIM)
PROTOPOP...	73	PR D7 1279	S.D. Protopopescu *et al.*	(LBL)