$f_0(980)$

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

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. • • •					
965 ±10		ABLIKIM	05	BES2	$J/\psi \to \phi\pi^+\pi^-$, ϕK^+K^-
1031 ± 8		[1] ANISOVICH	03	RVUE	
1037 ±31		TIKHOMIROV	03	SPEC	$40.0\ \pi^- C \to K^0_S K^0_S K^0_L X$
973 ± 1	2438	[2] ALOISIO	02D	KLOE	$e^+e^- \to \pi^0\pi^0\gamma$
977 ± 3 ±2	848	[3] AITALA	01A	E791	$D^+_s \to \pi^-\pi^+\pi^+$
969.8± 4.5	419	[4] ACHASOV	00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$
985 $^{+16}_{-12}$	419	[5,6] ACHASOV	00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$
976 ± 5 ±6		[7] AKHMETSHIN	99B	CMD2	$e^+e^- \to \pi^+\pi^-\gamma$
977 ± 3 ±6	268	[7] AKHMETSHIN	99C	CMD2	$e^+e^- \to \pi^0\pi^0\gamma$
975 ± 4 ±6		[8] AKHMETSHIN	99C	CMD2	$e^+e^- \to \pi^0\pi^0\gamma$
975 ± 4 ±6		[9] AKHMETSHIN	99C	CMD2	$e^+e^- \to \pi^+\pi^-\gamma$, $\pi^0\pi^0\gamma$
985 ±10		BARBERIS	99	OMEG	$450\ pp \to p_s p_f K^+K^-$
982 ± 3		BARBERIS	99B	OMEG	$450\ pp \to p_s p_f \pi^+\pi^-$
982 ± 3		BARBERIS	99C	OMEG	$450\ pp \to p_s p_f \pi^0\pi^0$
987 ± 6 ±6		[10] 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		[11] KAMINSKI	99	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\sigma\sigma$
∼ 980		[11] 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		[11] OLLER	99C	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\eta\eta$
957 ± 6		[12] ACKERSTAFF	98Q	OPAL	$Z \to f_0 X$
960 ±10		ALDE	98	GAM4	
1015 ±15		[11] ANISOVICH	98B	RVUE	Compilation
1008		[13] LOCHER	98	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
955 ±10		[12] ALDE	97	GAM2	$450\ pp \to pp\pi^0\pi^0$
994 ± 9		[14] BERTIN	97C	OBLX	$0.0\ \overline{p}p \to \pi^+\pi^-\pi^0$
993.2± 6.5±6.9		[15] 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	[16] ALDE	95B	GAM2	$38\ \pi^- p \to \pi^0\pi^0 n$
960 ±10	10k	[17] ALDE	95B	GAM2	$38\ \pi^- p \to \pi^0\pi^0 n$

994 ± 5	AMSLER	95B	CBAR	0.0 $\overline{p}p \rightarrow 3\pi^0$
∼ 996	[18] AMSLER	95D	CBAR	0.0 $\overline{p}p \rightarrow \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$
987 ± 6	[19] ANISOVICH	95	RVUE	
1015	JANSSEN	95	RVUE	$\pi\pi \rightarrow \pi\pi$, $K\overline{K}$
983	[20] BUGG	94	RVUE	$\overline{p}p \rightarrow \eta 2\pi^0$
973 ± 2	[21] KAMINSKI	94	RVUE	$\pi\pi \rightarrow \pi\pi$, $K\overline{K}$
988	[22] ZOU	94B	RVUE	
988 ±10	[23] MORGAN	93	RVUE	$\pi\pi(K\overline{K}) \rightarrow \pi\pi(K\overline{K})$, $J/\psi \rightarrow \phi\pi\pi(K\overline{K})$, $D_s \rightarrow \pi(\pi\pi)$
971.1 ± 4.0	[12] AGUILAR-...	91	EHS	400 pp
979 ± 4	[24] ARMSTRONG	91	OMEG	300 $pp \rightarrow pp\pi\pi$, $ppK\overline{K}$
956 ±12	BREAKSTONE	90	SFM	$pp \rightarrow pp\pi^+\pi^-$
959.4 ± 6.5	[12] AUGUSTIN	89	DM2	$J/\psi \rightarrow \omega\pi^+\pi^-$
978 ± 9	[12] ABACHI	86B	HRS	$e^+e^- \rightarrow \pi^+\pi^- X$
$985.0^{+\ 9.0}_{-39.0}$	ETKIN	82B	MPS	23 $\pi^-p \rightarrow n2K^0_S$
974 ± 4	[24] GIDAL	81	MRK2	$J/\psi \rightarrow \pi^+\pi^- X$
975	[25] ACHASOV	80	RVUE	
986 ±10	[24] AGUILAR-...	78	HBC	0.7 $\overline{p}p \rightarrow K^0_S K^0_S$
969 ± 5	[24] LEEPER	77	ASPK	2–2.4 $\pi^-p \rightarrow \pi^+\pi^-n$, K^+K^-n
987 ± 7	[24] BINNIE	73	CNTR	$\pi^-p \rightarrow n$MM
1012 ± 6	[26] GRAYER	73	ASPK	17 $\pi^-p \rightarrow \pi^+\pi^-n$
1007 ±20	[26] HYAMS	73	ASPK	17 $\pi^-p \rightarrow \pi^+\pi^-n$
997 ± 6	[26] PROTOPOP...	73	HBC	7 $\pi^+p \rightarrow \pi^+p\pi^+\pi^-$

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

[2] 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.

[3] Coupled-channel Breit-Wigner, couplings g_π=0.09±0.01±0.01, g_K=0.02±0.04±0.03.

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

[5] Supersedes ACHASOV 98I.

[6] In the "narrow resonance" approximation.

[7] Assuming $\Gamma(f_0)$= 40 MeV.

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

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

[10] Supersedes BARBERIS 99 and BARBERIS 99B

[11] T-matrix pole.

[12] From invariant mass fit.

[13] On sheet II in a 2 pole solution. The other pole is found on sheet III at (1039−93i) MeV.

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

[15] Reanalysis of data from HYAMS 73, GRAYER 74, SRINIVASAN 75, and ROSSELET 77 using the interfering amplitude method.
[16] At high $|t|$.
[17] At low $|t|$.
[18] On sheet II in a 4-pole solution, the other poles are found on sheet III at (953−55*i*) MeV and on sheet IV at (938−35*i*) MeV.
[19] Combined fit of ALDE 95B, ANISOVICH 94, AMSLER 94D.
[20] On sheet II in a 2 pole solution. The other pole is found on sheet III at (996−103*i*) MeV.
[21] From sheet II pole position.
[22] On sheet II in a 2 pole solution. The other pole is found on sheet III at (797−185*i*) MeV and can be interpreted as a shadow pole.
[23] On sheet II in a 2 pole solution. The other pole is found on sheet III at (978−28*i*) MeV.
[24] From coupled channel analysis.
[25] Coupled channel analysis with finite width corrections.
[26] 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. • • •					
64 ± 16		[27] ANISOVICH	03	RVUE	
121 ± 23		TIKHOMIROV	03	SPEC	40.0 $\pi^- C \to K^0_S K^0_S K^0_L X$
∼ 70		[28] BRAMON	02	RVUE	1.02 $e^+e^- \to \pi^0\pi^0\gamma$
44 ± 2 ± 2	848	[29] AITALA	01A	E791	$D^+_s \to \pi^-\pi^+\pi^+$
201 ± 28	419	[30] ACHASOV	00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$
122 ± 13	419	[31,32] ACHASOV	00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$
56 ± 20		[33] 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 ± 12 ± 8		[34] 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		[35] KAMINSKI	99	RVUE	$\pi\pi \to \pi\pi, K\overline{K}, \sigma\sigma$
∼ 28		[35] OLLER	99	RVUE	$\pi\pi \to \pi\pi, K\overline{K}$
∼ 25		OLLER	99B	RVUE	$\pi\pi \to \pi\pi, K\overline{K}$
∼ 14		[35] OLLER	99C	RVUE	$\pi\pi \to \pi\pi, K\overline{K}, \eta\eta$
70 ± 20		ALDE	98	GAM4	
86 ± 16		[35] ANISOVICH	98B	RVUE	Compilation
54		[36] LOCHER	98	RVUE	$\pi\pi \to \pi\pi, K\overline{K}$
69 ± 15		[37] ALDE	97	GAM2	450 $pp \to pp\pi^0\pi^0$
38 ± 20		[38] BERTIN	97C	OBLX	0.0 $\overline{p}p \to \pi^+\pi^-\pi^0$
∼ 100		[39] 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	[40] ALDE	95B	GAM2	38 $\pi^- p \to \pi^0\pi^0 n$
95 ± 20		10k	[41] 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			[42] AMSLER	95D	CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$
80 ± 12			[43] ANISOVICH	95	RVUE	
30			JANSSEN	95	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
74			[44] BUGG	94	RVUE	$\overline{p}p \to \eta 2\pi^0$
29 ± 2			[45] KAMINSKI	94	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
46			[46] ZOU	94B	RVUE	
48 ± 12			[47] 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			[37] AGUILAR-...	91	EHS	400 pp
72 ± 8			[48] ARMSTRONG	91	OMEG	300 $pp \to pp\pi\pi$, $ppK\overline{K}$
110 ± 30			BREAKSTONE	90	SFM	$pp \to pp\pi^+\pi^-$
29 ± 13			[37] ABACHI	86B	HRS	$e^+e^- \to \pi^+\pi^- X$
120 ± 281	± 20		ETKIN	82B	MPS	23 $\pi^- p \to n 2K^0_S$
28 ± 10			[48] GIDAL	81	MRK2	$J/\psi \to \pi^+\pi^- X$
70 to 300			[49] ACHASOV	80	RVUE	
100 ± 80			[50] AGUILAR-...	78	HBC	0.7 $\overline{p}p \to K^0_S K^0_S$
30 ± 8			[48] LEEPER	77	ASPK	2–2.4 $\pi^- p \to \pi^+\pi^- n$, $K^+K^- n$
48 ± 14			[48] BINNIE	73	CNTR	$\pi^- p \to n$MM
32 ± 10			[51] GRAYER	73	ASPK	17 $\pi^- p \to \pi^+\pi^- n$
30 ± 10			[51] HYAMS	73	ASPK	17 $\pi^- p \to \pi^+\pi^- n$
54 ± 16			[51] PROTOPOP...	73	HBC	7 $\pi^+ p \to \pi^+ p\pi^+\pi^-$

[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.

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

[29] Breit-Wigner width.

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

[31] Supersedes ACHASOV 98I.

[32] In the "narrow resonance" approximation.

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

[34] Supersedes BARBERIS 99 and BARBERIS 99B

[35] T-matrix pole.

[36] On sheet II in a 2 pole solution. The other pole is found on sheet III at (1039−93*i*) MeV.

[37] From invariant mass fit.

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

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

[40] At high $|t|$.

[41] At low $|t|$.
[42] 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.
[43] Combined fit of ALDE 95B, ANISOVICH 94,
[44] On sheet II in a 2 pole solution. The other pole is found on sheet III at (996−103i) MeV.
[45] From sheet II pole position.
[46] 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.
[47] On sheet II in a 2 pole solution. The other pole is found on sheet III at (978−28i) MeV.
[48] From coupled channel analysis.
[49] Coupled channel analysis with finite width corrections.
[50] 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.
[51] Included in AGUILAR-BENITEZ 78 fit.

$f_0(980)$ DECAY MODES

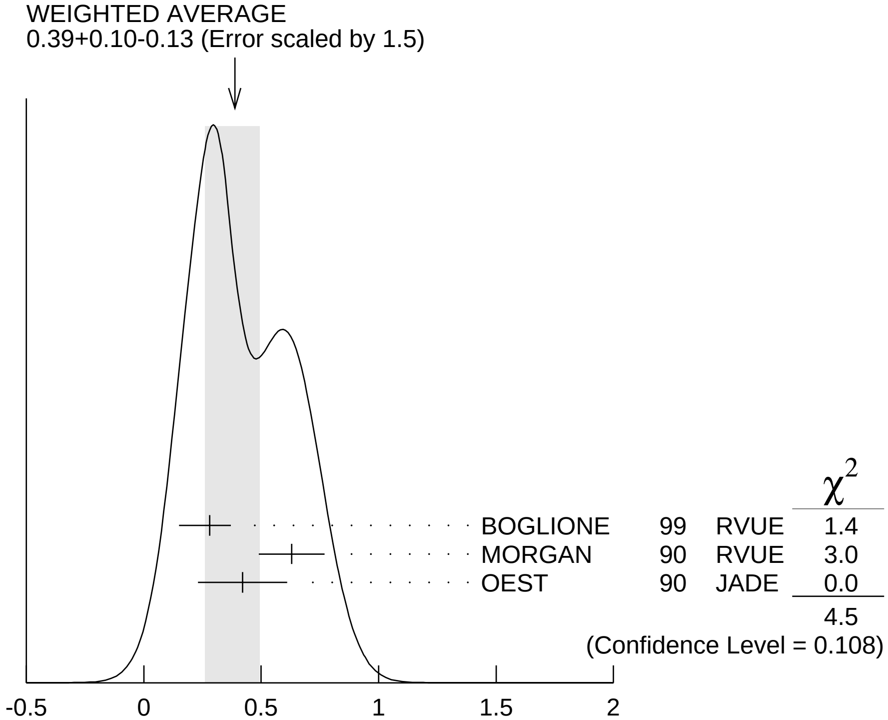
	Mode	Fraction (Γ_i/Γ)
Γ_1	$\pi\pi$	dominant
Γ_2	$K\overline{K}$	seen
Γ_3	$\gamma\gamma$	seen
Γ_4	e^+e^-	

$f_0(980)$ PARTIAL WIDTHS

$\Gamma(\gamma\gamma)$ — Γ_3

VALUE (keV)	EVTS	DOCUMENT ID		TECN	COMMENT
$0.39^{+0.10}_{-0.13}$ OUR AVERAGE		Error includes scale factor of 1.5. See the ideogram below.			
$0.28^{+0.09}_{-0.13}$		[52] BOGLIONE	99	RVUE	$\gamma\gamma \to \pi^+\pi^-$, $\pi^0\pi^0$
0.63 ± 0.14		[53] MORGAN	90	RVUE	$\gamma\gamma \to \pi^+\pi^-$, $\pi^0\pi^0$
$0.42\pm0.06\pm0.18$	60	[54] OEST	90	JADE	$e^+e^- \to e^+e^-\pi^0\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.29\pm0.07\pm0.12$		[55,56] BOYER	90	MRK2	$e^+e^- \to e^+e^-\pi^+\pi^-$
$0.31\pm0.14\pm0.09$		[55,56] MARSISKE	90	CBAL	$e^+e^- \to e^+e^-\pi^0\pi^0$

[52] Supersedes MORGAN 90.
[53] From amplitude analysis of BOYER 90 and MARSISKE 90, data corresponds to resonance parameters m = 989 MeV, Γ = 61 MeV.
[54] OEST 90 quote systematic errors $^{+0.08}_{-0.18}$. We use ±0.18.
[55] From analysis allowing arbitrary background unconstrained by unitarity.
[56] Data included in MORGAN 90, BOGLIONE 99 analyses.



$\Gamma(\gamma\gamma)$ Γ_3

$\Gamma(e^+e^-)$ Γ_4

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

$f_0(980)$ BRANCHING RATIOS

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

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.84 ± 0.02	[57] ANISOVICH	02D	SPEC	Combined fit
~ 0.68	OLLER	99B	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
0.67 ± 0.09	[58] LOVERRE	80	HBC	$4\ \pi^- p \to n2K^0_S$
$0.81^{+0.09}_{-0.04}$	[58] CASON	78	STRC	$7\ \pi^- p \to n2K^0_S$
0.78 ± 0.03	[58] WETZEL	76	OSPK	$8.9\ \pi^- p \to n2K^0_S$

[57] From a combined K-matrix analysis of Crystal Barrel (0. $p\overline{p} \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$), GAMS ($\pi p \to \pi^0\pi^0 n$, $\eta\eta n$, $\eta\eta' n$), and BNL ($\pi p \to K\overline{K} n$) data.

[58] Measure $\pi\pi$ elasticity assuming two resonances coupled to the $\pi\pi$ and $K\overline{K}$ channels only.

$f_0(980)$ REFERENCES

ABLIKIM	05	PL B607 243	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 *et al.*	(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	99	PAN 62 405	D. Alde *et al.*	(GAMS Collab.)
		Translated from YAF 62 446.		
ANISOVICH	98B	UFN 41 419	V.V. Anisovich *et al.*	
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)
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SRINIVASAN	75	PR D12 681	V. Srinivasan *et al.*	(NDAM, ANL)

GRAYER	74	NP B75 189	G. Grayer *et al.*	(CERN, MPIM)
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