NODE=M003

$f_0(980)$

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

See the related review(s):

Scalar Mesons below 1 GeV

$f_0(980)$ T-MATRIX POLE $\sqrt{s}$

NODE=M003PP

Note that $\Gamma = -2\ \text{Im}(\sqrt{s})$.

NODE=M003PP

NODE=M003PP

→ UNCHECKED ←

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
(980–1010) − i (20–35) OUR ESTIMATE	(see Fig. 64.4 in the review)			
$(1002 \pm 9) - i(23 \pm 8)$	[1] HOFERICHT...	24	RVUE	Compilation
$(993 \pm 2^{+2}_{-1}) - i(21 \pm 3^{+2}_{-4})$	[2] DANILKIN	21	RVUE	Compilation
$(1014 \pm 8) - i(35 \pm 5)$	SARANTSEV	21	RVUE	$J/\psi(1S) \to \gamma\ (\pi\pi,\ K\overline{K},\ \eta\eta,\ \omega\phi)$
$(992.8 \pm 1.3) - i(30.7 \pm 2.3)$	[3] ALBRECHT	20	RVUE	$0.9\ \overline{p}p \to \pi^0\pi^0\eta,\ \pi^0\eta\eta,\ \pi^0 K^+ K^-$
$(1003^{+5}_{-27}) - i(21^{+10}_{-8})$	[4] GARCIA-MAR..	11	RVUE	Compilation
$(996 \pm 7) - i(25^{+10}_{-6})$	[5] GARCIA-MAR..	11	RVUE	Compilation
$(996^{+4}_{-14}) - i(24^{+11}_{-3})$	[6] MOUSSALLAM	11	RVUE	Compilation
$(981 \pm 43) - i(18 \pm 11)$	[7] MENNESSIER	10	RVUE	Compilation
$(1030^{+30}_{-10}) - i(35^{+10}_{-16})$	[8] ANISOVICH	09	RVUE	$0.0\ \overline{p}p,\ \pi N$
$(973^{+39}_{-127}) - i(11^{+189}_{-11})$	[9] PELAEZ	04A	RVUE	$\pi\pi \to \pi\pi$

OCCUR=2

[1] Using the GKPY equations as GARCIA-MARTIN 11, but with different treatment of kaon thresholds and input for $\pi\pi/K\overline{K}$ T-matrix from HOFERICHTER 16. NODE=M003PP;LINKAGE=J

[2] Data driven analysis using partial-wave dispersion relations. NODE=M003PP;LINKAGE=I

[3] 5 poles, 5 channels, including scattering data from HYAMS 75 ($\pi\pi$), LONGACRE 86 ($K\overline{K}$), BINON 83 ($\eta\eta$), and BINON 84C ($\eta\eta'$). Based on 18.5k events. Second solution 977.8 ± 1.7 MeV. NODE=M003PP;LINKAGE=D

[4] Reanalysis of the K_{e4} data of BATLEY 10C and the $\pi N \to \pi\pi N$ data of HYAMS 73, GRAYER 74, and PROTOPOPESCU 73 using Roy equations. NODE=M003PP;LINKAGE=B

[5] Reanalysis of the K_{e4} data of BATLEY 10C and the $\pi N \to \pi\pi N$ data of HYAMS 73, GRAYER 74, and PROTOPOPESCU 73 using GKPY equations. NODE=M003PP;LINKAGE=C

[6] Uses Roy equations. NODE=M003PP;LINKAGE=F

[7] Average of the analyses of three data sets in the K-matrix model. Uses the data of BATLEY 08A, HYAMS 73 , and GRAYER 74 , partially of COHEN 80 or ETKIN 82B. NODE=M003PP;LINKAGE=G

[8] On sheet II in a 2-pole solution. The other pole is found on sheet III at $(850 - i\ 100)$ MeV. NODE=M003PP;LINKAGE=H

[9] Reanalysis of data from PROTOPOPESCU 73, ESTABROOKS 74, GRAYER 74, and COHEN 80 in the unitarized ChPT model. NODE=M003PP;LINKAGE=A

$f_0(980)$ MASS

NODE=M003M1

NODE=M003M1

→ UNCHECKED ←

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
990 ±20 OUR ESTIMATE					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$992.0^{+8.5}_{-7.5} \pm 8.6$		[1] AAIJ	19H	LHCB	$pp \to D^\pm X$
989.4 ± 1.3	424	ABLIKIM	15P	BES3	$J/\psi \to K^+K^- 3\pi$
989.9 ± 0.4	706	ABLIKIM	12E	BES3	$J/\psi \to \gamma 3\pi$
$977\ ^{+11}_{-9} \pm 1$	44	[2] ECKLUND	09	CLEO	$4.17\ e^+e^- \to D_s^- D_s^{*+}$ + c.c.
$982.2 \pm 1.0^{+8.1}_{-8.0}$		[3] UEHARA	08A	BELL	$10.6\ e^+e^- \to e^+e^-\pi^0\pi^0$
$976.8 \pm 0.3^{+10.1}_{-0.6}$	64k	[4] AMBROSINO	07	KLOE	$1.02\ e^+e^- \to \pi^0\pi^0\gamma$
$984.7 \pm 0.4^{+2.4}_{-3.7}$	64k	[5] AMBROSINO	07	KLOE	$1.02\ e^+e^- \to \pi^0\pi^0\gamma$
973 ± 3	262 ± 30	[6] AUBERT	07AK	BABR	$10.6\ e^+e^- \to \phi\pi^+\pi^-\gamma$
970 ± 7	54 ± 9	[6] AUBERT	07AK	BABR	$10.6\ e^+e^- \to \phi\pi^0\pi^0\gamma$
953 ± 20	2.6k	[7] BONVICINI	07	CLEO	$D^+ \to \pi^-\pi^+\pi^+$
$985.6^{+1.2}_{-1.5}{}^{+1.1}_{-1.6}$		[8] MORI	07	BELL	$10.6\ e^+e^- \to e^+e^-\pi^+\pi^-$
$983.0 \pm 0.6^{+4.0}_{-3.0}$		[9] AMBROSINO	06B	KLOE	$1.02\ e^+e^- \to \pi^+\pi^-\gamma$

OCCUR=2

OCCUR=2

$977.3 \pm 0.9 ^{+3.7}_{-4.3}$		[10]	AMBROSINO	06B	KLOE	$1.02\ e^+ e^- \to \pi^+ \pi^- \gamma$	OCCUR=2
950 ± 9	4286	[11]	GARMASH	06	BELL	$B^+ \to K^+ \pi^+ \pi^-$	
965 ± 10		[12]	ABLIKIM	05	BES2	$J/\psi \to \phi \pi^+ \pi^-$, $\phi K^+ K^-$	
1031 ± 8		[13]	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	[14]	ALOISIO	02D	KLOE	$e^+ e^- \to \pi^0 \pi^0 \gamma$	
$977 \pm 3 \pm 2$	848	[15]	AITALA	01A	E791	$D^+_s \to \pi^- \pi^+ \pi^+$	
969.8 ± 4.5	419	[16]	ACHASOV	00H	SND	$e^+ e^- \to \pi^0 \pi^0 \gamma$	
$985 ^{+16}_{-12}$	419	[17,18]	ACHASOV	00H	SND	$e^+ e^- \to \pi^0 \pi^0 \gamma$	OCCUR=2
$976 \pm 5 \pm 6$		[19]	AKHMETSHIN	99B	CMD2	$e^+ e^- \to \pi^+ \pi^- \gamma$	
$977 \pm 3 \pm 6$	268	[19]	AKHMETSHIN	99C	CMD2	$e^+ e^- \to \pi^0 \pi^0 \gamma$	
$975 \pm 4 \pm 6$		[20]	AKHMETSHIN	99C	CMD2	$e^+ e^- \to \pi^0 \pi^0 \gamma$	OCCUR=2
$975 \pm 4 \pm 6$		[21]	AKHMETSHIN	99C	CMD2	$e^+ e^- \to \pi^+ \pi^- \gamma$, $\pi^0 \pi^0 \gamma$	OCCUR=3
985 ± 10			BARBERIS	99	OMEG	$450\ p p \to p_s p_f K^+ K^-$	
982 ± 3			BARBERIS	99B	OMEG	$450\ p p \to p_s p_f \pi^+ \pi^-$	
982 ± 3			BARBERIS	99C	OMEG	$450\ p p \to p_s p_f \pi^0 \pi^0$	
$987 \pm 6 \pm 6$		[22]	BARBERIS	99D	OMEG	$450\ p p \to K^+ K^-$, $\pi^+ \pi^-$	
989 ± 15			BELLAZZINI	99	GAM4	$450\ p p \to p p \pi^0 \pi^0$	
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	$450\ p p \to p p \pi^0 \pi^0$	
994 ± 9		[26]	BERTIN	97C	OBLX	$0.0\ \overline{p} p \to \pi^+ \pi^- \pi^0$	
$993.2 \pm 6.5 \pm 6.9$		[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	$38\ \pi^- p \to \pi^0 \pi^0 n$	OCCUR=2
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	$400\ p p$	
979 ± 4		[36]	ARMSTRONG	91	OMEG	$300\ p p \to p p \pi \pi$, $p p K \overline{K}$	
956 ± 12			BREAKSTONE	90	SFM	$p p \to p p \pi^+ \pi^-$	
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] From the $D^{\pm} \to K^{\pm} K^{+} K^{-}$ Dalitz plot fit with the Triple-M amplitude in the multi-meson model of AOUDE 18. NODE=M003M1;LINKAGE=F
[2] Using a relativistic Breit-Wigner function and taking into account the finite D_s mass. NODE=M003M1;LINKAGE=EC
[3] Breit-Wigner mass. Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g_{f_0 K K}/g_{f_0 \pi\pi} = 0$. NODE=M003M1;LINKAGE=UE
[4] In the kaon-loop fit. NODE=M003M1;LINKAGE=AK
[5] In the no-structure fit. NODE=M003M1;LINKAGE=AS
[6] Systematic errors not estimated. NODE=M003M1;LINKAGE=NS
[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. NODE=M003M1;LINKAGE=BO
[8] Breit-Wigner mass. Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g_{f_0 K K}/g_{f_0 \pi\pi} = 4.21 \pm 0.25 \pm 0.21$ from ABLIKIM 05. NODE=M003M1;LINKAGE=MO
[9] In the kaon-loop fit following formalism of ACHASOV 89. NODE=M003M1;LINKAGE=AB
[10] In the no-structure fit assuming a direct coupling of ϕ to $f_0 \gamma$. NODE=M003M1;LINKAGE=AM
[11] FLATTE 76 parameterization. Supersedes GARMASH 05. NODE=M003M1;LINKAGE=GR
[12] FLATTE 76 parameterization, $g_{f_0 K\overline{K}}/g_{f_0 \pi\pi} = 4.21 \pm 0.25 \pm 0.21$. NODE=M003M1;LINKAGE=AL
[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. NODE=M003M;LINKAGE=KM
[14] From the negative interference with the $f_0(500)$ meson of AITALA 01B using the ACHASOV 89 parameterization for the $f_0(980)$, a Breit-Wigner for the $f_0(500)$, and ACHASOV 01F for the $\rho\pi$ contribution. NODE=M003M1;LINKAGE=KD
[15] Coupled-channel Breit-Wigner, couplings g_π=0.09±0.01±0.01, g_K=0.02±0.04±0.03. NODE=M003M;LINKAGE=TL
[16] Supersedes ACHASOV 98I. Using the model of ACHASOV 89. NODE=M003M;LINKAGE=V9
[17] Supersedes ACHASOV 98I. NODE=M003M;LINKAGE=V8
[18] In the "narrow resonance" approximation. NODE=M003M1;LINKAGE=AI
[19] Assuming $\Gamma(f_0)$= 40 MeV. NODE=M003M;LINKAGE=SM
[20] From a narrow pole fit taking into account $f_0(980)$ and $f_0(1200)$ intermediate mechanisms. NODE=M003M;LINKAGE=ST
[21] From the combined fit of the photon spectra in the reactions $e^+e^- \to \pi^+\pi^-\gamma$, $\pi^0\pi^0\gamma$. NODE=M003M;LINKAGE=SL
[22] Supersedes BARBERIS 99 and BARBERIS 99B NODE=M003M1;LINKAGE=BD
[23] T-matrix pole. NODE=M003M1;LINKAGE=AN
[24] From invariant mass fit. NODE=M003M1;LINKAGE=A
[25] On sheet II in a 2 pole solution. The other pole is found on sheet III at (1039−93i) MeV. NODE=M003M1;LINKAGE=LC
[26] On sheet II in a 2 pole solution. The other pole is found on sheet III at (963-29i) MeV. NODE=M003M1;LINKAGE=X
[27] Reanalysis of data from HYAMS 73, GRAYER 74, SRINIVASAN 75, and ROSSELET 77 using the interfering amplitude method. NODE=M003M1;LINKAGE=AA
[28] At high $|t|$. NODE=M003M1;LINKAGE=LA
[29] At low $|t|$. NODE=M003M1;LINKAGE=LB
[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. NODE=M003M1;LINKAGE=KL
[31] Combined fit of ALDE 95B, ANISOVICH 94, AMSLER 94D. NODE=M003M1;LINKAGE=CF
[32] On sheet II in a 2 pole solution. The other pole is found on sheet III at (996−103i) MeV. NODE=M003M1;LINKAGE=C2
[33] From sheet II pole position. NODE=M003M1;LINKAGE=KM
[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. NODE=M003M1;LINKAGE=L
[35] On sheet II in a 2 pole solution. The other pole is found on sheet III at (978−28i) MeV. NODE=M003M1;LINKAGE=K
[36] From coupled channel analysis. NODE=M003M1;LINKAGE=B
[37] Coupled channel analysis with finite width corrections. NODE=M003M;LINKAGE=B
[38] Included in AGUILAR-BENITEZ 78 fit. NODE=M003M;LINKAGE=R

f_0(980) WIDTH

NODE=M003W1

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

NODE=M003W1

NODE=M003W1
→ UNCHECKED ←

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
10 to 100 OUR ESTIMATE					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
15.3± 4.7	424	ABLIKIM	15P	BES3	$J/\psi \to K^+K^- 3\pi$
9.5± 1.1	706	ABLIKIM	12E	BES3	$J/\psi \to \gamma 3\pi$
$91\ ^{+30}_{-22} \pm 3$	44	[1] ECKLUND	09	CLEO	4.17 $e^+e^- \to D^-_s D^{*+}_s$ + c.c.
$66.9 \pm 2.2^{+17.6}_{-12.5}$		[2] UEHARA	08A	BELL	10.6 $e^+e^- \to e^+e^-\pi^0\pi^0$
65 ± 13	262 ± 30	[3] AUBERT	07AK	BABR	10.6 $e^+e^- \to \phi\pi^+\pi^-\gamma$

81 ± 21	54 ± 9	[3] AUBERT	07AK	BABR	10.6 $e^+e^- \to \phi\pi^0\pi^0\gamma$	OCCUR=2
$51.3^{+20.8+13.2}_{-17.7-\ 3.8}$		[4] MORI	07	BELL	10.6 $e^+e^- \to e^+e^-\pi^+\pi^-$	
$61 \pm 9\ ^{+14}_{-\ 8}$	2584	[5] GARMASH	05	BELL	$B^+ \to K^+\pi^+\pi^-$	
64 ± 16		[6] ANISOVICH	03	RVUE		
121 ± 23		TIKHOMIROV	03	SPEC	40.0 $\pi^- C \to K^0_S K^0_S K^0_L X$	
~ 70		[7] BRAMON	02	RVUE	1.02 $e^+e^- \to \pi^0\pi^0\gamma$	
44 ± 2 ± 2	848	[8] AITALA	01A	E791	$D_s^+ \to \pi^-\pi^+\pi^+$	
201 ± 28	419	[9] ACHASOV	00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$	
122 ± 13	419	[10,11] ACHASOV	00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$	OCCUR=2
56 ± 20		[12] 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		[13] 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		[14] KAMINSKI	99	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\sigma\sigma$	
~ 28		[14] OLLER	99	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$	
~ 25		OLLER	99B	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$	
~ 14		[14] OLLER	99C	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\eta\eta$	
70 ± 20		ALDE	98	GAM4		
86 ± 16		[14] ANISOVICH	98B	RVUE	Compilation	
54		[15] LOCHER	98	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$	
69 ± 15		[16] ALDE	97	GAM2	450 $pp \to pp\pi^0\pi^0$	
38 ± 20		[17] BERTIN	97C	OBLX	0.0 $\overline{p}p \to \pi^+\pi^-\pi^0$	
~ 100		[18] 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	[19] ALDE	95B	GAM2	38 $\pi^- p \to \pi^0\pi^0 n$	
95 ± 20	10k	[20] ALDE	95B	GAM2	38 $\pi^- p \to \pi^0\pi^0 n$	OCCUR=2
26 ± 10		AMSLER	95B	CBAR	0.0 $\overline{p}p \to 3\pi^0$	
~ 112		[21] 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		[22] ANISOVICH	95	RVUE		
30		JANSSEN	95	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$	
74		[23] BUGG	94	RVUE	$\overline{p}p \to \eta 2\pi^0$	
29 ± 2		[24] KAMINSKI	94	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$	
46		[25] ZOU	94B	RVUE		
48 ± 12		[26] 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		[16] AGUILAR-...	91	EHS	400 pp	
72 ± 8		[27] ARMSTRONG	91	OMEG	300 $pp \to pp\pi\pi$, $ppK\overline{K}$	
110 ± 30		BREAKSTONE	90	SFM	$pp \to pp\pi^+\pi^-$	
29 ± 13		[16] 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		[27] GIDAL	81	MRK2	$J/\psi \to \pi^+\pi^- X$	
70 to 300		[28] ACHASOV	80	RVUE		
100 ± 80		[29] AGUILAR-...	78	HBC	0.7 $\overline{p}p \to K^0_S K^0_S$	
30 ± 8		[27] LEEPER	77	ASPK	2–2.4 $\pi^- p \to \pi^+\pi^- n$, $K^+K^- n$	
48 ± 14		[27] BINNIE	73	CNTR	$\pi^- p \to n MM$	
32 ± 10		[30] GRAYER	73	ASPK	17 $\pi^- p \to \pi^+\pi^- n$	
30 ± 10		[30] HYAMS	73	ASPK	17 $\pi^- p \to \pi^+\pi^- n$	
54 ± 16		[30] PROTOPOP...	73	HBC	7 $\pi^+ p \to \pi^+ p\pi^+\pi^-$	

[1] Using a relativistic Breit-Wigner function and taking into account the finite D_s mass. NODE=M003W1;LINKAGE=EC

[2] Breit-Wigner $\pi\pi$ width. Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g_{f_0 K K}/g_{f_0 \pi\pi} = 0$. NODE=M003W1;LINKAGE=UE

[3] Systematic errors not estimated. NODE=M003W1;LINKAGE=NS

[4] Breit-Wigner $\pi\pi$ width. Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g_{f_0 K K}/g_{f_0 \pi\pi} = 4.21 \pm 0.25 \pm 0.21$ from ABLIKIM 05. NODE=M003W1;LINKAGE=MO

[5] Breit-Wigner, solution 1, PWA ambiguous. NODE=M003W1;LINKAGE=GA

[6] 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. NODE=M003W;LINKAGE=KM

[7] Using the data of AKHMETSHIN 99C, ACHASOV 00H, and ALOISIO 02D. NODE=M003W;LINKAGE=BR

[8] Breit-Wigner width. NODE=M003W;LINKAGE=TL

[9] Supersedes ACHASOV 98I. Using the model of ACHASOV 89. NODE=M003W;LINKAGE=V9

[10] Supersedes ACHASOV 98I. NODE=M003W;LINKAGE=V8

[11] In the "narrow resonance" approximation. NODE=M003W1;LINKAGE=AI

[12] From the combined fit of the photon spectra in the reactions $e^+ e^- \to \pi^+ \pi^- \gamma$, $\pi^0 \pi^0 \gamma$. NODE=M003W;LINKAGE=SL

[13] Supersedes BARBERIS 99 and BARBERIS 99B NODE=M003W1;LINKAGE=BD

[14] T-matrix pole. NODE=M003W1;LINKAGE=AN

[15] On sheet II in a 2 pole solution. The other pole is found on sheet III at (1039−93i) MeV. NODE=M003W1;LINKAGE=LO

[16] From invariant mass fit. NODE=M003W1;LINKAGE=A

[17] On sheet II in a 2 pole solution. The other pole is found on sheet III at (963-29i) MeV. NODE=M003W1;LINKAGE=X

[18] Reanalysis of data from HYAMS 73, GRAYER 74, SRINIVASAN 75, and ROSSELET 77 using the interfering amplitude method. NODE=M003W1;LINKAGE=AA

[19] At high $|t|$. NODE=M003W1;LINKAGE=LA

[20] At low $|t|$. NODE=M003W1;LINKAGE=LB

[21] 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. NODE=M003W1;LINKAGE=KL

[22] Combined fit of ALDE 95B, ANISOVICH 94, NODE=M003W1;LINKAGE=CF

[23] On sheet II in a 2 pole solution. The other pole is found on sheet III at (996−103i) MeV. NODE=M003W1;LINKAGE=C2

[24] From sheet II pole position. NODE=M003W1;LINKAGE=KM

[25] 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. NODE=M003W1;LINKAGE=L

[26] On sheet II in a 2 pole solution. The other pole is found on sheet III at (978−28i) MeV. NODE=M003W1;LINKAGE=K

[27] From coupled channel analysis. NODE=M003W1;LINKAGE=B

[28] Coupled channel analysis with finite width corrections. NODE=M003W;LINKAGE=B

[29] 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. NODE=M003W;LINKAGE=C

[30] Included in AGUILAR-BENITEZ 78 fit. NODE=M003W;LINKAGE=R

$f_0(980)$ DECAY MODES

NODE=M003215;NODE=M003

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$\pi\pi$	seen	DESIG=2;OUR EVAL;→ UNCHECKED ←
Γ_2	$K\overline{K}$	seen	DESIG=1;OUR EVAL;→ UNCHECKED ←
Γ_3	$\gamma\gamma$	seen	DESIG=5;OUR EVAL;→ UNCHECKED ←
Γ_4	$e^+ e^-$		DESIG=4

$f_0(980)$ PARTIAL WIDTHS

NODE=M003220

$\Gamma(\gamma\gamma)$ Γ_3

NODE=M003W4

NODE=M003W4

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
0.29 $^{+0.11}_{-0.06}$ OUR AVERAGE				
$0.286 \pm 0.017 ^{+0.211}_{-0.070}$	[1] UEHARA	08A	BELL	10.6 $e^+ e^- \to e^+ e^- \pi^0 \pi^0$
$0.205 ^{+0.095}_{-0.083} {}^{+0.147}_{-0.117}$	[2] MORI	07	BELL	10.6 $e^+ e^- \to e^+ e^- \pi^+ \pi^-$
$0.42 \pm 0.06 \pm 0.18$	[3] OEST	90	JADE	$e^+ e^- \to e^+ e^- \pi^0 \pi^0$

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

0.32 ± 0.05	[4] DAI	14A	RVUE	Compilation	
0.16 ± 0.01	[5] MENNESSIER	11	RVUE		
0.29 ± 0.21 $^{+0.02}_{-0.07}$	[6] MOUSSALLAM	11	RVUE	Compilation	
0.42	[7,8] PENNINGTON	08	RVUE	Compilation	
0.10	[8,9] PENNINGTON	08	RVUE	Compilation	OCCUR=2
0.28 $^{+0.09}_{-0.13}$	[10] BOGLIONE	99	RVUE	$\gamma\gamma \to \pi^+\pi^-$, $\pi^0\pi^0$	
0.29 ± 0.07 ± 0.12	[11,12] BOYER	90	MRK2	$e^+e^- \to e^+e^-\pi^+\pi^-$	
0.31 ± 0.14 ± 0.09	[11,12] MARSISKE	90	CBAL	$e^+e^- \to e^+e^-\pi^0\pi^0$	
0.63 ± 0.14	[13] MORGAN	90	RVUE	$\gamma\gamma \to \pi^+\pi^-$, $\pi^0\pi^0$	

[1] Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g_{f_0 K K}/g_{f_0 \pi\pi} = 0$. NODE=M003W4;LINKAGE=UE

[2] Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g_{f_0 K K}/g_{f_0 \pi\pi} = 4.21 \pm 0.25 \pm 0.21$ from ABLIKIM 05. NODE=M003W4;LINKAGE=MO

[3] OEST 90 quote systematic errors $^{+0.08}_{-0.18}$. We use ± 0.18. Observed 60 events. NODE=M003W4;LINKAGE=H

[4] Using dispersive analysis with phases from GARCIA-MARTIN 11A and BUETTIKER 04 as input. NODE=M003W4;LINKAGE=D

[5] Uses an analytic K-matrix model. Compilation. NODE=M003W4;LINKAGE=ME

[6] Using dispersion integral with phase input from Roy equations and data from MARSISKE 90, BOYER 90, BEHREND 92, UEHARA 08A, and MORI 07. NODE=M003W4;LINKAGE=MU

[7] Solution A (preferred solution based on χ^2-analysis). NODE=M003W4;LINKAGE=P1

[8] Dispersion theory based amplitude analysis of BOYER 90, MARSISKE 90, BEHREND 92, and MORI 07. NODE=M003W4;LINKAGE=P3

[9] Solution B (worse than solution A; still acceptable when systematic uncertainties are included). NODE=M003W4;LINKAGE=P2

[10] Supersedes MORGAN 90. NODE=M003W4;LINKAGE=BL

[11] From analysis allowing arbitrary background unconstrained by unitarity. NODE=M003W4;LINKAGE=B

[12] Data included in MORGAN 90, BOGLIONE 99 analyses. NODE=M003W4;LINKAGE=C

[13] From amplitude analysis of BOYER 90 and MARSISKE 90, data corresponds to resonance parameters m = 989 MeV, Γ = 61 MeV. NODE=M003W4;LINKAGE=A

$\Gamma(e^+e^-)$ Γ_4

NODE=M003W3
NODE=M003W3

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

NODE=M003225

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

NODE=M003R1
NODE=M003R1

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

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.52 ± 0.12	9.9k	[1] AUBERT	06O	BABR	$B^\pm \to K^\pm\pi^\pm\pi^\mp$
$0.75^{+0.11}_{-0.13}$		[2] ABLIKIM	05Q	BES2	$\chi_{c0} \to 2\pi^+2\pi^-$, $\pi^+\pi^-K^+K^-$
0.84 ± 0.02		[3] ANISOVICH	02D	SPEC	Combined fit
~ 0.68		OLLER	99B	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
0.67 ± 0.09		[4] LOVERRE	80	HBC	$4\ \pi^- p \to n 2K^0_S$
$0.81^{+0.09}_{-0.04}$		[4] CASON	78	STRC	$7\ \pi^- p \to n 2K^0_S$
0.78 ± 0.03		[4] WETZEL	76	OSPK	$8.9\ \pi^- p \to n 2K^0_S$

[1] Recalculated by us using $\Gamma(K^+K^-)$ / $\Gamma(\pi^+\pi^-) = 0.69 \pm 0.32$ from AUBERT 06O and isospin relations. NODE=M003R1;LINKAGE=AU

[2] Using data from ABLIKIM 04G. NODE=M003R1;LINKAGE=AB

[3] From a combined K-matrix analysis of Crystal Barrel ($p\overline{p} \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$), 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. NODE=M003R;LINKAGE=CH

[4] Measure $\pi\pi$ elasticity assuming two resonances coupled to the $\pi\pi$ and $K\overline{K}$ channels only. NODE=M003R1;LINKAGE=B

$f_0(980)$ REFERENCES

NODE=M003

HOFERICHT...	24	PL B853 138698	M. Hoferichter *et al.*	(BERN, MADU, BONN+)	REFID=63010
DANILKIN	21	PR D103 114023	I. Danilkin, O. Deineka, M. Vanderhaeghen	(MAINZ)	REFID=62088
SARANTSEV	21	PL B816 136227	A.V. Sarantsev *et al.*	(BONN, PNPI)	REFID=61091
ALBRECHT	20	EPJ C80 453	M. Albrecht *et al.*	(Crystal Barrel Collab.)	REFID=60439
AAIJ	19H	JHEP 1904 063	R. Aaij *et al.*	(LHCb Collab.)	REFID=59670
AOUDE	18	PR D98 056021	R.T. Aoude *et al.*		REFID=59987
HOFERICHT...	16	PRPL 625 1	M. Hoferichter *et al.*	(WASH, BONN)	REFID=63224
ABLIKIM	15P	PR D92 012007	M. Ablikim *et al.*	(BESIII Collab.)	REFID=56781
DAI	14A	PR D90 036004	L.-Y. Dai, M.R. Pennington	(CEBAF)	REFID=55923
ABLIKIM	12E	PRL 108 182001	M. Ablikim *et al.*	(BESIII Collab.)	REFID=54270
GARCIA-MAR...	11	PRL 107 072001	R. Garcia-Martin *et al.*	(MADR, CRAC)	REFID=16761
GARCIA-MAR...	11A	PR D83 074004	R. Garcia-Martin *et al.*	(MADR, CRAC)	REFID=54121
MENNESSIER	11	PL B696 40	G. Mennessier, S. Narison, X.-G. Wang		REFID=53637
MOUSSALLAM	11	EPJ C71 1814	B. Moussallam		REFID=53975
BATLEY	10C	EPJ C70 635	J.R. Batley *et al.*	(CERN NA48/2 Collab.)	REFID=53567
MENNESSIER	10	PL B688 59	G. Mennessier, S. Narison, X.-G. Wang		REFID=53657
ANISOVICH	09	IJMP A24 2481	V.V. Anisovich, A.V. Sarantsev	(PNPI)	REFID=52719
ECKLUND	09	PR D80 052009	K.M. Ecklund *et al.*	(CLEO Collab.)	REFID=53041
BATLEY	08A	EPJ C54 411	J.R. Batley *et al.*	(CERN NA48/2 Collab.)	REFID=52487
PENNINGTON	08	EPJ C56 1	M.R. Pennington *et al.*		REFID=52303
UEHARA	08A	PR D78 052004	S. Uehara *et al.*	(BELLE Collab.)	REFID=52309
AMBROSINO	07	EPJ C49 473	F. Ambrosino *et al.*	(KLOE Collab.)	REFID=51616
AUBERT	07AK	PR D76 012008	B. Aubert *et al.*	(BABAR Collab.)	REFID=51908
BONVICINI	07	PR D76 012001	G. Bonvicini *et al.*	(CLEO Collab.)	REFID=51721
MORI	07	PR D75 051101	T. Mori *et al.*	(BELLE Collab.)	REFID=51652
AMBROSINO	06B	PL B634 148	F. Ambrosino *et al.*	(KLOE Collab.)	REFID=51043
AUBERT	06O	PR D74 032003	B. Aubert *et al.*	(BABAR Collab.)	REFID=51141
GARMASH	06	PRL 96 251803	A. Garmash *et al.*	(BELLE Collab.)	REFID=51162
ABLIKIM	05	PL B607 243	M. Ablikim *et al.*	(BES Collab.)	REFID=50450
ABLIKIM	05Q	PR D72 092002	M. Ablikim *et al.*	(BES Collab.)	REFID=50958
ACHASOV	05	PR D72 013006	N.N. Achasov, G.N. Shestakov		REFID=50762
GARMASH	05	PR D71 092003	A. Garmash *et al.*	(BELLE Collab.)	REFID=50641
ABLIKIM	04G	PR D70 092002	M. Ablikim *et al.*	(BES Collab.)	REFID=50187
BUETTIKER	04	EPJ C33 409	P. Buettiker, S. Descotes-Genon, B. Moussallam		REFID=56428;ERROR=1
PELAEZ	04A	MPL A19 2879	J.R. Pelaez	(MADU)	REFID=50347
ANISOVICH	03	EPJ A16 229	V.V. Anisovich *et al.*		REFID=49401
TIKHOMIROV	03	PAN 66 828	G.D. Tikhomirov *et al.*		REFID=49423
		Translated from YAF 66 860.			
ALOISIO	02D	PL B537 21	A. Aloisio *et al.*	(KLOE Collab.)	REFID=48824
ANISOVICH	02D	PAN 65 1545	V.V. Anisovich *et al.*		REFID=48831
		Translated from YAF 65 1583.			
BRAMON	02	EPJ C26 253	A. Bramon *et al.*		REFID=49178
ACHASOV	01F	PR D63 094007	N.N. Achasov, V.V. Gubin	(Novosibirsk SND Collab.)	REFID=48312
AITALA	01A	PRL 86 765	E.M. Aitala *et al.*	(FNAL E791 Collab.)	REFID=48004
AITALA	01B	PRL 86 770	E.M. Aitala *et al.*	(FNAL E791 Collab.)	REFID=48005
ACHASOV	00H	PL B485 349	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=47930
AKHMETSHIN	99B	PL B462 371	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=47392
AKHMETSHIN	99C	PL B462 380	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=47393
BARBERIS	99	PL B453 305	D. Barberis *et al.*	(Omega Expt.)	REFID=46921
BARBERIS	99B	PL B453 316	D. Barberis *et al.*	(Omega Expt.)	REFID=46922
BARBERIS	99C	PL B453 325	D. Barberis *et al.*	(Omega Expt.)	REFID=46923
BARBERIS	99D	PL B462 462	D. Barberis *et al.*	(Omega Expt.)	REFID=47395
BELLAZZINI	99	PL B467 296	R. Bellazzini *et al.*		REFID=47400
BOGLIONE	99	EPJ C9 11	M. Boglione, M.R. Pennington		REFID=46931
KAMINSKI	99	EPJ C9 141	R. Kaminski, L. Lesniak, B. Loiseau	(CRAC, PARIN)	REFID=46927
OLLER	99	PR D60 099906 (errat.)	J.A. Oller *et al.*		REFID=46899
OLLER	99B	NP A652 407 (errat.)	J.A. Oller, E. Oset		REFID=46924
OLLER	99C	PR D60 074023	J.A. Oller, E. Oset		REFID=47386
ACHASOV	98I	PL B440 442	M.N. Achasov *et al.*		REFID=46600
ACKERSTAFF	98Q	EPJ C4 19	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=46145
ALDE	98	EPJ A3 361	D. Alde *et al.*	(GAM4 Collab.)	REFID=46605
Also		PAN 62 405	D. Alde *et al.*	(GAMS Collab.)	REFID=46914
		Translated from YAF 62 446.			
ANISOVICH	98B	SPU 41 419	V.V. Anisovich *et al.*		REFID=46331
		Translated from UFN 168 481.			
LOCHER	98	EPJ C4 317	M.P. Locher *et al.*	(PSI)	REFID=46372
ALDE	97	PL B397 350	D.M. Alde *et al.*	(GAMS Collab.)	REFID=45392
BERTIN	97C	PL B408 476	A. Bertin *et al.*	(OBELIX Collab.)	REFID=45701
ISHIDA	96	PTP 95 745	S. Ishida *et al.*	(TOKY, MIYA, KEK)	REFID=45770
TORNQVIST	96	PRL 76 1575	N.A. Tornqvist, M. Roos	(HELS)	REFID=44507
ALDE	95B	ZPHY C66 375	D.M. Alde *et al.*	(GAMS Collab.)	REFID=44375
AMSLER	95B	PL B342 433	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44377
AMSLER	95D	PL B355 425	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44441
ANISOVICH	95	PL B355 363	V.V. Anisovich *et al.*	(PNPI, SERP)	REFID=44442
JANSSEN	95	PR D52 2690	G. Janssen *et al.*	(STON, ADLD, JULI)	REFID=44508
AMSLER	94D	PL B333 277	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44093
ANISOVICH	94	PL B323 233	V.V. Anisovich *et al.*	(Crystal Barrel Collab.)	REFID=43659
BUGG	94	PR D50 4412	D.V. Bugg *et al.*	(LOQM)	REFID=44078
KAMINSKI	94	PR D50 3145	R. Kaminski, L. Lesniak, J.P. Maillet	(CRAC+)	REFID=45771
ZOU	94B	PR D50 591	B.S. Zou, D.V. Bugg	(LOQM)	REFID=44072
MORGAN	93	PR D48 1185	D. Morgan, M.R. Pennington	(RAL, DURH)	REFID=43614
BEHREND	92	ZPHY C56 381	H.J. Behrend	(CELLO Collab.)	REFID=43172
AGUILAR-...	91	ZPHY C50 405	M. Aguilar-Benitez *et al.*	(LEBC-EHS Collab.)	REFID=41637
ARMSTRONG	91	ZPHY C51 351	T.A. Armstrong *et al.*	(ATHU, BARI, BIRM+)	REFID=41744
BOYER	90	PR D42 1350	J. Boyer *et al.*	(Mark II Collab.)	REFID=41362
BREAKSTONE	90	ZPHY C48 569	A.M. Breakstone *et al.*	(ISU, BGNA, CERN+)	REFID=41376
MARSISKE	90	PR D41 3324	H. Marsiske *et al.*	(Crystal Ball Collab.)	REFID=41351
MORGAN	90	ZPHY C48 623	D. Morgan, M.R. Pennington	(RAL, DURH)	REFID=41583
OEST	90	ZPHY C47 343	T. Oest *et al.*	(JADE Collab.)	REFID=41358
ACHASOV	89	NP B315 465	N.N. Achasov, V.N. Ivanchenko		REFID=48021
AUGUSTIN	89	NP B320 1	J.E. Augustin, G. Cosme	(DM2 Collab.)	REFID=41004
VOROBYEV	88	SJNP 48 273	P.V. Vorobiev *et al.*	(NOVO)	REFID=41023
		Translated from YAF 48 436.			

ABACHI	86B	PRL 57 1990	S. Abachi *et al.*	(PURD, ANL, IND, MICH+)	REFID=20394
LONGACRE	86	PL B177 223	R.S. Longacre *et al.*	(BNL, BRAN, CUNY+)	REFID=20768
BINON	84C	NC 80A 363	F.G. Binon *et al.*	(BELG, LAPP, SERP+)	REFID=21418
BINON	83	NC 78A 313	F.G. Binon *et al.*	(BELG, LAPP, SERP+)	REFID=20750
ETKIN	82B	PR D25 1786	A. Etkin *et al.*	(BNL, CUNY, TUFTS, VAND)	REFID=20390
GIDAL	81	PL 107B 153	G. Gidal *et al.*	(SLAC, LBL)	REFID=20386
ACHASOV	80	SJNP 32 566	N.N. Achasov, S.A. Devyanin, G.N. Shestakov	(NOVM)	REFID=20458
		Translated from YAF 32 1098.			
COHEN	80	PR D22 2595	D. Cohen *et al.*	(ANL) IJP	REFID=20381
LOVERRE	80	ZPHY C6 187	P.F. Loverre *et al.*	(CERN, CDEF, MADR+) IJP	REFID=20382
AGUILAR-...	78	NP B140 73	M. Aguilar-Benitez *et al.*	(MADR, BOMB+)	REFID=20368
CASON	78	PRL 41 271	N.M. Cason *et al.*	(NDAM, ANL)	REFID=20370
LEEPER	77	PR D16 2054	R.J. Leeper *et al.*	(ISU)	REFID=20365
ROSSELET	77	PR D15 574	L. Rosselet *et al.*	(GEVA, SACL)	REFID=11004
FLATTE	76	PL 63B 224	S.M. Flatte	(CERN)	REFID=20446
WETZEL	76	NP B115 208	W. Wetzel *et al.*	(ETH, CERN, LOIC)	REFID=20362
HYAMS	75	NP B100 205	B.D. Hyams *et al.*	(CERN, MPIM)	REFID=20355
SRINIVASAN	75	PR D12 681	V. Srinivasan *et al.*	(NDAM, ANL)	REFID=21062
ESTABROOKS	74	NP B79 301	P.G. Estabrooks, A.D. Martin	(DURH)	REFID=20111
GRAYER	74	NP B75 189	G. Grayer *et al.*	(CERN, MPIM)	REFID=20113
BINNIE	73	PRL 31 1534	D.M. Binnie *et al.*	(LOIC, SHMP)	REFID=20343
GRAYER	73	Tallahassee	G. Grayer *et al.*	(CERN, MPIM)	REFID=20347
HYAMS	73	NP B64 134	B.D. Hyams *et al.*	(CERN, MPIM)	REFID=20107
PROTOPOP...	73	PR D7 1279	S.D. Protopopescu *et al.*	(LBL)	REFID=20108