$f_0(600)$ or σ

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

A REVIEW GOES HERE – Check our WWW List of Reviews

$f_0(600)$ T-MATRIX POLE $\sqrt{s}$

Note that $\Gamma \approx 2\ \mathrm{Im}(\sqrt{s_{\text{pole}}})$.

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
(400–1200)−i(300–500) OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$532 - i272$	BLACK	01	RVUE	$\pi^0\pi^0 \to \pi^0\pi^0$
$(470 \pm 30){-}i(295 \pm 20)$	[1] COLANGELO	01	RVUE	$\pi\pi \to \pi\pi$
$(535^{+48}_{-36}){-}i(155^{+76}_{-53})$	[2] ISHIDA	01		$\Upsilon(3S) \to \Upsilon\pi\pi$
$610 \pm 14 - i620 \pm 26$	[3] SUROVTSEV	01	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
$(558^{+34}_{-27}){-}i(196^{+32}_{-41})$	ISHIDA	00B		$p\overline{p} \to \pi^0\pi^0\pi^0$
$445 - i235$	HANNAH	99	RVUE	π scalar form factor
$(523 \pm 12){-}i(259 \pm 7)$	KAMINSKI	99	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\sigma\sigma$
$442 - i\,227$	OLLER	99	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
$469 - i203$	OLLER	99B	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
$445 - i221$	OLLER	99C	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\eta\eta$
$(1530^{+\ 90}_{-250}){-}i(560 \pm 40)$	ANISOVICH	98B	RVUE	Compilation
$420 - i\,212$	LOCHER	98	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
$(602 \pm 26){-}i(196 \pm 27)$	[4] ISHIDA	97		$\pi\pi \to \pi\pi$
$(537 \pm 20){-}i(250 \pm 17)$	[5] KAMINSKI	97B	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, 4π
$470 - i250$	[6,7] TORNQVIST	96	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $K\pi$, $\eta\pi$
$\sim (1100 - i300)$	AMSLER	95B	CBAR	$\overline{p}p \to 3\pi^0$
$400 - i500$	[7,8] AMSLER	95D	CBAR	$\overline{p}p \to 3\pi^0$
$1100 - i137$	[7,9] AMSLER	95D	CBAR	$\overline{p}p \to 3\pi^0$
$387 - i305$	[7,10] JANSSEN	95	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
$525 - i269$	[11] ACHASOV	94	RVUE	$\pi\pi \to \pi\pi$
$(506 \pm 10){-}i(247 \pm 3)$	KAMINSKI	94	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
$370 - i356$	[12] ZOU	94B	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
$408 - i342$	[7,12] ZOU	93	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
$870 - i370$	[7,13] AU	87	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
$470 - i208$	[14] BEVEREN	86	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\eta\eta$, ...
$(750 \pm 50){-}i(450 \pm 50)$	[15] ESTABROOKS	79	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
$(660 \pm 100){-}i(320 \pm 70)$	PROTOPOP...	73	HBC	$\pi\pi \to \pi\pi$, $K\overline{K}$
$650 - i370$	[16] BASDEVANT	72	RVUE	$\pi\pi \to \pi\pi$

[1] From a phase-shift analysis of HYAMS 73 and PROTOPOPESCU 73 data.

[2] A similar analysis (KOMADA 01) finds $(580^{+79}_{-30}){-}i(190^{+107}_{-\ 49})$ MeV.

[3] Coupled channel reanalysis of BATON 70, BENSINGER 71, BAILLON 72, HYAMS 73, HYAMS 75, ROSSELET 77, COHEN 80, and ETKIN 82B using the uniformizing variable.

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

[5] Average and spread of 4 variants ("up" and "down") of KAMINSKI 97B 3-channel model.

[6] Uses data from BEIER 72B, OCHS 73, HYAMS 73, GRAYER 74, ROSSELET 77, CASON 83, ASTON 88, and ARMSTRONG 91B. Coupled channel analysis with flavor symmetry and all light two-pseudoscalars systems.
[7] Demonstrates explicitly that $f_0(600)$ and $f_0(1370)$ are two different poles.
[8] Coupled channel analysis of $\overline{p}p \rightarrow 3\pi^0$, $\pi^0\eta\eta$ and $\pi^0\pi^0\eta$ on sheet II.
[9] Coupled channel analysis of $\overline{p}p \rightarrow 3\pi^0$, $\pi^0\eta\eta$ and $\pi^0\pi^0\eta$ on sheet III.
[10] Analysis of data from FALVARD 88.
[11] Analysis of data from OCHS 73, ESTABROOKS 75, ROSSELET 77, and MUKHIN 80.
[12] Analysis of data from OCHS 73, GRAYER 74, and ROSSELET 77.
[13] Analysis of data from OCHS 73, GRAYER 74, BECKER 79, and CASON 83.
[14] Uses data from PROTOPOPESCU 73, HYAMS 73, HYAMS 75, GRAYER 74, ESTABROOKS 74, ESTABROOKS 75, FROGGATT 77, CORDEN 79, BISWAS 81.
[15] Analysis of data from APEL 73, GRAYER 74, CASON 76, PAWLICKI 77. Includes spread and errors of 4 solutions.
[16] Analysis of data from BATON 70, BENSINGER 71, COLTON 71, BAILLON 72, PROTOPOPESCU 73, and WALKER 67.

$f_0(600)$ BREIT-WIGNER MASS OR K-MATRIX POLE PARAMETERS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
(400–1200) OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
513 ± 32	[17] MURAMATSU	02	CLEO	$D^0 \rightarrow K^0_S\pi^+\pi^-$
$478^{+24}_{-23}\pm17$	AITALA	01B	E791	$D^+ \rightarrow \pi^-\pi^+\pi^+$
$563\pm{}^{+58}_{-20}$	[18] ISHIDA	01		$\Upsilon(3S) \rightarrow \Upsilon\pi\pi$
555	[19] ASNER	00	CLE2	$\tau^- \rightarrow \pi^-\pi^0\pi^0\nu_\tau$
540 ± 36	ISHIDA	00B		$p\overline{p} \rightarrow \pi^0\pi^0\pi^0$
$750\pm\ 4$	ALEKSEEV	99	SPEC	$1.78\ \pi^- p_{polar} \rightarrow \pi^-\pi^+ n$
$744\pm\ 5$	ALEKSEEV	98	SPEC	$1.78\ \pi^- p_{polar} \rightarrow \pi^-\pi^+ n$
$759\pm\ 5$	[20] TROYAN	98		$5.2\ np \rightarrow np\pi^+\pi^-$
780 ± 30	ALDE	97	GAM2	$450\ pp \rightarrow pp\pi^0\pi^0$
585 ± 20	[21] ISHIDA	97		$\pi\pi \rightarrow \pi\pi$
761 ± 12	[22] SVEC	96	RVUE	6–17 $\pi N_{polar} \rightarrow \pi^+\pi^- N$
$\sim$ 860	[23,24] TORNQVIST	96	RVUE	$\pi\pi \rightarrow \pi\pi$, $K\overline{K}$, $K\pi$, $\eta\pi$
1165 ± 50	[25,26] ANISOVICH	95	RVUE	$\pi^- p \rightarrow \pi^0\pi^0 n$, $\overline{p}p \rightarrow \pi^0\pi^0\pi^0$, $\pi^0\pi^0\eta$, $\pi^0\eta\eta$
$\sim$ 1000	[27] ACHASOV	94	RVUE	$\pi\pi \rightarrow \pi\pi$
414 ± 20	[22] AUGUSTIN	89	DM2	

[17] Statistical uncertainty only.
[18] A similar analysis (KOMADA 01) finds 526^{+48}_{-37} MeV.
[19] From the best fit of the Dalitz plot.
[20] 6σ effect, no PWA.
[21] Reanalysis of data from HYAMS 73, GRAYER 74, SRINIVASAN 75, and ROSSELET 77 using the interfering amplitude method.
[22] Breit-Wigner fit to S-wave intensity measured in $\pi N \rightarrow \pi^-\pi^+ N$ on polarized targets. The fit does not include $f_0(980)$.
[23] Uses data from ASTON 88, OCHS 73, HYAMS 73, ARMSTRONG 91B, GRAYER 74, CASON 83, ROSSELET 77, and BEIER 72B. Coupled channel analysis with flavor symmetry and all light two-pseudoscalars systems.

[24] Also observed by ASNER 00 in $\tau^- \rightarrow \pi^- \pi^0 \pi^0 \nu_\tau$ decays.
[25] Uses $\pi^0 \pi^0$ data from ANISOVICH 94, AMSLER 94D, and ALDE 95B, $\pi^+ \pi^-$ data from OCHS 73, GRAYER 74 and ROSSELET 77, and $\eta\eta$ data fromANISOVICH 94.
[26] The pole is on Sheet III. Demonstrates explicitly that $f_0(600)$ and $f_0(1370)$ are two different poles.
[27] Analysis of data from OCHS 73, ESTABROOKS 75, ROSSELET 77, and MUKHIN 80.

$f_0(600)$ BREIT-WIGNER WIDTH

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
(600–1000) OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
335 ± 67	[28] MURAMATSU	02	CLEO	$D^0 \rightarrow K^0_S \pi^+ \pi^-$
$324^{+42}_{-40} \pm 21$	AITALA	01B	E791	$D^+ \rightarrow \pi^- \pi^+ \pi^+$
$372 \pm {}^{+229}_{-95}$	[29] ISHIDA	01		$\Upsilon(3S) \rightarrow \Upsilon \pi\pi$
540	[30] ASNER	00	CLE2	$\tau^- \rightarrow \pi^- \pi^0 \pi^0 \nu_\tau$
372 ± 80	ISHIDA	00B		$p\overline{p} \rightarrow \pi^0 \pi^0 \pi^0$
119 ± 13	ALEKSEEV	99	SPEC	$1.78\ \pi^- p_{polar} \rightarrow \pi^- \pi^+ n$
77 ± 22	ALEKSEEV	98	SPEC	$1.78\ \pi^- p_{polar} \rightarrow \pi^- \pi^+ n$
35 ± 12	[31] TROYAN	98		$5.2\ np \rightarrow np\pi^+ \pi^-$
780 ± 60	ALDE	97	GAM2	$450\ pp \rightarrow pp\pi^0 \pi^0$
385 ± 70	[32] ISHIDA	97		$\pi\pi \rightarrow \pi\pi$
290 ± 54	[33] SVEC	96	RVUE	6–17 $\pi N_{polar} \rightarrow \pi^+ \pi^- N$
$\sim$ 880	[34,35] TORNQVIST	96	RVUE	$\pi\pi \rightarrow \pi\pi$, $K\overline{K}$, $K\pi$, $\eta\pi$
460 ± 40	[36,37] ANISOVICH	95	RVUE	$\pi^- p \rightarrow \pi^0 \pi^0 n$, $\overline{p}p \rightarrow \pi^0 \pi^0 \pi^0$, $\pi^0 \pi^0 \eta$, $\pi^0 \eta\eta$
$\sim$ 3200	[38] ACHASOV	94	RVUE	$\pi\pi \rightarrow \pi\pi$
494 ± 58	[33] AUGUSTIN	89	DM2	

[28] Statistical uncertainty only.
[29] A similar analysis (KOMADA 01) finds 301^{+145}_{-100} MeV.
[30] From the best fit of the Dalitz plot.
[31] 6σ effect, no PWA.
[32] Reanalysis of data from HYAMS 73, GRAYER 74, SRINIVASAN 75, and ROSSELET 77 using the interfering amplitude method.
[33] Breit-Wigner fit to S-wave intensity measured in $\pi N \rightarrow \pi^- \pi^+ N$ on polarized targets. The fit does not include $f_0(980)$.
[34] Uses data from ASTON 88, OCHS 73, HYAMS 73, ARMSTRONG 91B, GRAYER 74, CASON 83, ROSSELET 77, and BEIER 72B. Coupled channel analysis with flavor symmetry and all light two-pseudoscalars systems.
[35] Also observed by ASNER 00 in $\tau^- \rightarrow \pi^- \pi^0 \pi^0 \nu_\tau$ decays.
[36] Uses $\pi^0 \pi^0$ data from ANISOVICH 94, AMSLER 94D, and ALDE 95B, $\pi^+ \pi^-$ data from OCHS 73, GRAYER 74 and ROSSELET 77, and $\eta\eta$ data fromANISOVICH 94.
[37] The pole is on Sheet III. Demonstrates explicitly that $f_0(600)$ and $f_0(1370)$ are two different poles.
[38] Analysis of data from OCHS 73, ESTABROOKS 75, ROSSELET 77, and MUKHIN 80.

$f_0(600)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$\pi\pi$	dominant
Γ_2	$\gamma\gamma$	seen

$f_0(600)$ PARTIAL WIDTHS

$\Gamma(\gamma\gamma)$ Γ_2

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3.8 ± 1.5	[39,40] BOGLIONE	99	RVUE	$\gamma\gamma\to\pi^+\pi^-$, $\pi^0\pi^0$
5.4 ± 2.3	[39] MORGAN	90	RVUE	$\gamma\gamma\to\pi^+\pi^-$, $\pi^0\pi^0$
$10\ \pm6$	COURAU	86	DM1	$e^+e^-\to\pi^+\pi^-e^+e^-$

[39] This width could equally well be assigned to the $f_0(1370)$. The authors analyse data from BOYER 90 and MARSISKE 90 and report strong correlation with $\gamma\gamma$ width of $f_2(1270)$.

[40] Supersedes MORGAN 90.

$f_0(600)$ REFERENCES

MURAMATSU	02	PRL 89 251802	H. Muramatsu et al.	(CLEO Collab.)
AITALA	01B	PRL 86 770	E.M. Aitala et al.	(FNAL E791 Collab.)
BLACK	01	PR D64 014031	D. Black et al.	
COLANGELO	01	NP B603 125	G. Colangelo, J. Gasser, H. Leytwyler	
ISHIDA	01	PL B518 47	M. Ishida et al.	
KOMADA	01	PL B508 31	T. Komada et al.	
SUROVTSEV	01	PR D63 054024	Y.S. Surovtsev, D. Krupa, M. Nagy	
ASNER	00	PR D61 012002	D.M. Asner et al.	(CLEO Collab.)
ISHIDA	00B	PTP 104 203	M. Ishida et al.	
ALEKSEEV	99	NP B541 3	I.G. Alekseev et al.	
BOGLIONE	99	EPJ C9 11	M. Boglione, M.R. Pennington	
HANNAH	99	PR D60 017502	T. Hannah	
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	
ALEKSEEV	98	PAN 61 174	I.G. Alekseev et al.	
ANISOVICH	98B	UFN 41 419	V.V. Anisovich et al.	
LOCHER	98	EPJ C4 317	M.P. Locher et al.	(PSI)
TROYAN	98	JINRRC 5-91 33	Yu. Troyan et al.	
ALDE	97	PL B397 350	D.M. Alde et al.	(GAMS Collab.)
ISHIDA	97	PTP 98 1005	S. Ishida et al.	(TOKY, MIYA, KEK)
KAMINSKI	97B	PL B413 130	R. Kaminski, L. Lesniak, B. Loiseau	(CRAC, IPN)
Also	96	PTP 95 745	S. Ishida et al.	(TOKY, MIYA, KEK)
SVEC	96	PR D53 2343	M. Svec	(MCGI)
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)
ACHASOV	94	PR D49 5779	N.N. Achasov, G.N. Shestakov	(NOVM)
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.)
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)
ZOU	93	PR D48 R3948	B.S. Zou, D.V. Bugg	(LOQM)
ARMSTRONG	91B	ZPHY C52 389	T.A. Armstrong et al.	(ATHU, BARI, BIRM+)

BOYER 90 PR D42 1350 J. Boyer *et al.* (Mark II Collab.)
MARSISKE 90 PR D41 3324 H. Marsiske *et al.* (Crystal Ball Collab.)
MORGAN 90 ZPHY C48 623 D. Morgan, M.R. Pennington (RAL, DURH)
AUGUSTIN 89 NP B320 1 J.E. Augustin, G. Cosme (DM2 Collab.)
ASTON 88 NP B296 493 D. Aston *et al.* (SLAC, NAGO, CINC, INUS)
FALVARD 88 PR D38 2706 A. Falvard *et al.* (CLER, FRAS, LALO+)
AU 87 PR D35 1633 K.L. Au, D. Morgan, M.R. Pennington (DURH, RAL)
BEVEREN 86 ZPHY C30 615 E. van Beveren *et al.* (NIJM, BIEL)
COURAU 86 NP B271 1 A. Courau *et al.* (CLER, LALO)
CASON 83 PR D28 1586 N.M. Cason *et al.* (NDAM, ANL)
ETKIN 82B PR D25 1786 A. Etkin *et al.* (BNL, CUNY, TUFTS, VAND)
BISWAS 81 PRL 47 1378 N.N. Biswas *et al.* (NDAM, ANL)
COHEN 80 PR D22 2595 D. Cohen *et al.* (ANL) IJP
MUKHIN 80 JETPL 32 601 K.N. Mukhin *et al.* (KIAE)
Translated from ZETFP 32 616.
BECKER 79 NP B151 46 H. Becker *et al.* (MPIM, CERN, ZEEM, CRAC)
CORDEN 79 NP B157 250 M.J. Corden *et al.* (BIRM, RHEL, TELA+) JP
ESTABROOKS 79 PR D19 2678 P. Estabrooks (CARL)
FROGGATT 77 NP B129 89 C.D. Froggatt, J.L. Petersen (GLAS, NORD)
PAWLICKI 77 PR D15 3196 A.J. Pawlicki *et al.* (ANL) IJ
ROSSELET 77 PR D15 574 L. Rosselet *et al.* (GEVA, SACL)
CASON 76 PRL 36 1485 N.M. Cason *et al.* (NDAM, ANL) IJ
ESTABROOKS 75 NP B95 322 P.G. Estabrooks, A.D. Martin (DURH)
HYAMS 75 NP B100 205 B.D. Hyams *et al.* (CERN, MPIM)
SRINIVASAN 75 PR D12 681 V. Srinivasan *et al.* (NDAM, ANL)
ESTABROOKS 74 NP B79 301 P.G. Estabrooks, A.D. Martin (DURH)
GRAYER 74 NP B75 189 G. Grayer *et al.* (CERN, MPIM)
APEL 73 PL 41B 542 W.D. Apel *et al.* (KARL, PISA)
HYAMS 73 NP B64 134 B.D. Hyams *et al.* (CERN, MPIM)
OCHS 73 Thesis W. Ochs (MPIM, MUNI)
PROTOPOP... 73 PR D7 1279 S.D. Protopopescu *et al.* (LBL)
BAILLON 72 PL 38B 555 P.H. Baillon *et al.* (SLAC)
BASDEVANT 72 PL 41B 178 J.L. Basdevant, C.D. Froggatt, J.L. Petersen (CERN)
BEIER 72B PRL 29 511 E.W. Beier *et al.* (PENN)
BENSINGER 71 PL 36B 134 J.R. Bensinger *et al.* (WISC)
COLTON 71 PR D3 2028 E.P. Colton *et al.* (LBL, FNAL, UCLA+)
BATON 70 PL 33B 528 J.P. Baton, G. Laurens, J. Reignier (SACL)
WALKER 67 RMP 39 695 W.D. Walker (WISC)

OTHER RELATED PAPERS

KAMINSKI 03 PL B551 241 R. Kaminski, L. Lesniak, B. Loiseau
AITALA 02 PRL 89 121801 E.M. Aitala *et al.* (FNAL E791 Collab.)
BLACK 02 PRL 88 181603 D. Black, M. Harada, J. Schechter
BRAMON 02 EPJ C26 253 A. Bramon *et al.*
HE 02 PL B536 59 J. He, Z.G. Xiao, H.Q. Zheng
HERNANDEZ 02 PR C66 065201 E. Hernandez, E. Oset, M.J. Vicente Vacas
ISHIDA 02 PL B539 249 S. Ishida, M. Ishida
KAMINSKI 02 EPJ Direct C4 1 R. Kaminski, L. Lesniak, K. Rybicki
LINK 02E PL B535 43 J.M. Link *et al.* (FNAL FOCUS Collab.)
TESHIMA 02 JPG 28 1391 T. Teshima, I. Kitamura, N. Morisita
ABELE 01 EPJ C19 667 A. Abele *et al.* (Crystal Barrel Collab.)
ABELE 01B EPJ C21 261 A. Abele *et al.* (Crystal Barrel Collab.)
CHERRY 01 NP A688 823 S.N. Cherry, M.R. Pennington
DEANDREA 01 PL B502 79 A. Deandrea *et al.*
FAZIO 01 PL B521 15 F. De Fazio, M.R. Pennington
GOKALP 01 PR D64 053017 A. Gokalp, O. Yilmaz
NARISON 01C NPBPS 96 244 S. Narison
XIAO 01 NP A695 273 Z. Xiao, H. Zheng
ACHASOV 00H PL B485 349 M.N. Achasov *et al.* (Novosibirsk SND Collab.)
ALFORD 00 NP B578 367 M. Alford, R.L. Jaffe
BLACK 00B PR D61 074030 D. Black, A. Fariborz, J. Schechter
FANG 00 NP A671 416 Fang Shi *et al.*
JAMIN 00 NP B587 331 M. Jamin *et al.*
MONTANET 00 NPBPS 86 381 L. Montanet
ABREU 99J PL B449 364 P. Abreu *et al.* (DELPHI Collab.)
BLACK 99 PR D59 074026 D. Black *et al.*
DELBOURGO 99 PL B446 332 R. Delbourgo, D. Liu, M. Scadron
IGI 99 PR D59 034005 K. Igi, K. Hikasa
LUCIO 99 PL B454 365 J.L. Lucio, M. Napsuciale
MINKOWSKI 99 EPJ C9 283 P. Minkowski, W. Ochs

SCADRON	99	EPJ C6 141	M. Scadron	
TAKAMATSU	99	PAN 62 435	K. Takamatsu	
ABELE	98	PR D57 3860	A. Abele *et al.*	(Crystal Barrel Collab.)
ACKERSTAFF	98A	EPJ C5 411	K. Ackerstaff *et al.*	(OPAL Collab.)
ACKERSTAFF	98Q	EPJ C4 19	K. Ackerstaff *et al.*	(OPAL Collab.)
ANISOVICH	98	PL B437 209	V.V. Anisovich *et al.*	
DELBOURGO	98	IJMP A13 657	R. Delbourgo *et al.*	
OLLER	98	PRL 80 3452	J.A. Oller *et al.*	
ANISOVICH	97	PL B395 123	A.V. Anisovich, A.V. Sarantsev	(PNPI)
ANISOVICH	97B	ZPHY A357 123	A.V. Anisovich *et al.*	(PNPI)
ANISOVICH	97C	PL B413 137	A.V. Anisovich, A.V. Sarantsev	
ANISOVICH	97D	ZPHY A359 173	A.V. Anisovich, V.V. Anisovich, A.V. Sarantsev	
CLOSE	97B	PR D55 5749	F. Close *et al.*	(RAL, RUTG, BEIJT)
ISHIDA	97B	PTP 98 621	S. Ishida *et al.*	
KAMINSKI	97	ZPHY C74 79	R. Kaminski, L. Lesniak, K. Rybicki	(CRAC)
MALTMAN	97	PL B393 19	K. Maltman, C.E. Wolfe	(YORKC)
OLLER	97	NP A620 438	J.A. Oller *et al.*	(VALE)
SVEC	97	PR D55 4355	M. Svec	
SVEC	97B	PR D55 5727	M. Svec	(MCGI)
ABELE	96	PL B380 453	A. Abele *et al.*	(Crystal Barrel Collab.)
AMSLER	96	PR D53 295	C. Amsler, F.E. Close	(ZURI, RAL)
BIJNENS	96	PL B374 210	J. Bijnens *et al.*	(NORD, BERN, WIEN+)
BONUTTI	96	PRL 77 603	F. Bonutti *et al.*	(TRSTI, TRSTT, TRIU)
BUGG	96	NP B471 59	D.V. Bugg, A.V. Sarantsev, B.S. Zou	(LOQM, PNPI)
HARADA	96	PR D54 1991	M. Harasa *et al.*	(SYRA)
ISHIDA	96	PTP 95 745	S. Ishida *et al.*	(TOKY, MIYA, KEK)
AMSLER	95C	PL B353 571	C. Amsler *et al.*	(Crystal Barrel Collab.)
AMSLER	95F	PL B358 389	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)
GASPERO	95	NP A588 861	M. Gaspero	(ROMA)
TORNQVIST	95	ZPHY C68 647	N.A. Tornqvist	(HELS)
AMSLER	94	PL B322 431	C. Amsler *et al.*	(Crystal Barrel Collab.)
BUGG	94	PR D50 4412	D.V. Bugg *et al.*	(LOQM)
ADAMO	93	NP A558 13C	A. Adamo *et al.*	(OBELIX Collab.)
GASPERO	93	NP A562 407	M. Gaspero	(ROMAI)
MORGAN	93	PR D48 1185	D. Morgan, M.R. Pennington	(RAL, DURH)
Also	93C	NC A Conf. Suppl.	D. Morgan	(RAL)
BOLTON	92B	PRL 69 1328	T. Bolton *et al.*	(Mark III Collab.)
SVEC	92	PR D45 55	M. Svec, A. de Lesquen, L. van Rossum	(MCGI+)
SVEC	92B	PR D45 1518	M. Svec, A. de Lesquen, L. van Rossum	(MCGI+)
SVEC	92C	PR D46 949	M. Svec, A. de Lesquen, L. van Rossum	(MCGI+)
RIGGENBACH	91	PR D43 127	C. Riggenbach *et al.*	(BERN, CERN, MASA)
BAI	90C	PRL 65 2507	Z. Bai *et al.*	(Mark III Collab.)
WEINSTEIN	90	PR D41 2236	J. Weinstein, N. Isgur	(TNTO)
WEINSTEIN	89	UTPT 89 03	J. Weinstein, N. Isgur	(TNTO)
ASTON	88D	NP B301 525	D. Aston *et al.*	(SLAC, NAGO, CINC, INUS)
LONGACRE	86	PL B177 223	R.S. Longacre *et al.*	(BNL, BRAN, CUNY+)
ACHASOV	84	ZPHY C22 53	N.N. Achasov, S.A. Devyanin, G.N. Shestakov	(NOVM)
GASSER	84	ANP 158 142	J. Gasser, H. Leutwyler	
BINON	83	NC 78A 313	F.G. Binon *et al.*	(BELG, LAPP, SERP+)
TORNQVIST	82	PRL 49 624	N.A. Tornqvist	(HELS)
COSTA	80	NP B175 402	G. Costa *et al.*	(BARI, BONN, CERN, GLAS+)
BECKER	79B	NP B150 301	H. Becker *et al.*	(MPIM, CERN, ZEEM, CRAC)
NAGELS	79	PR D20 1633	M.M. Nagels, T.A. Rijken, J.J. de Swart	(NIJM)
POLYCHRO...	79	PR D19 1317	V.A. Polychronakos *et al.*	(NDAM, ANL) IJP
CORDEN	78	NP B144 253	M.J. Corden *et al.*	(BIRM, RHEL, TELA+)
JAFFE	77	PR D15 267,281	R. Jaffe	(MIT)
FLATTE	76	PL 63B 224	S.M. Flatte	(CERN)
WETZEL	76	NP B115 208	W. Wetzel *et al.*	(ETH, CERN, LOIC)
DEFOIX	72	NP B44 125	C. Defoix *et al.*	(CDEF, CERN)