NODE=M005

$f_2(1270)$ $I^G(J^{PC}) = 0^+(2^{++})$

$f_2(1270)$ T-MATRIX POLE $\sqrt{s}$

NODE=M005PP

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

NODE=M005PP

NODE=M005PP

→ UNCHECKED ←

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
(1260–1283) − i (90–110) OUR ESTIMATE				
$(1268 \pm 8) - i\,(101 \pm 6)$	RODAS	22	RVUE	$J/\psi(1S) \to \gamma\,(\pi\pi,\ K\overline{K})$
$(1263.3 \pm 0.2 \pm 1.5) - i\,(96.9 \pm 0.2 \pm 0.8)$	ALBRECHT	20	RVUE	$\overline{p}p \to \pi^0\pi^0\eta,\ \pi^0\eta\eta,\ \pi^0 K^+ K^-$
$(1270 \pm 8) - i\,(97 \pm 8)$	[1] ANISOVICH	09	RVUE	$0.0\ \overline{p}p,\ \pi N$
$(1278 \pm 5) - i\,(102 \pm 10)$	[1] BERTIN	97C	OBLX	$0.0\ \overline{p}p \to \pi^+\pi^-\pi^0$

[1] Amplitude did not include dispersive corrections.

NODE=M005PP;LINKAGE=A

$f_2(1270)$ MASS

NODE=M005M

NODE=M005M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1275.4± 0.8 OUR AVERAGE		Error includes scale factor of 1.1.			
$1275.8 \pm 1.0 \pm 0.4$		[1] BOGOLYUB...	13	SPEC	$7\pi^+(K^+,p)A \to n\gamma + X$
$1262\ {}^{+1}_{-2} \pm 8$		[2] ABLIKIM	06V	BES2	$e^+e^- \to J/\psi \to \gamma\pi^+\pi^-$
1275 ± 15		ABLIKIM	05	BES2	$J/\psi \to \phi\pi^+\pi^-$
1283 ± 5		ALDE	98	GAM4	$100\ \pi^- p \to \pi^0\pi^0 n$
1272 ± 8	200k	PROKOSHKIN	94	GAM2	$38\ \pi^- p \to \pi^0\pi^0 n$
1269.7 ± 5.2	5730	AUGUSTIN	89	DM2	$e^+e^- \to 5\pi$
1283 ± 8	400	[3] ALDE	87	GAM4	$100\ \pi^- p \to 4\pi^0 n$
1274 ± 5		[3] AUGUSTIN	87	DM2	$J/\psi \to \gamma\pi^+\pi^-$
1283 ± 6		[4] LONGACRE	86	MPS	$22\ \pi^- p \to n 2K^0_S$
1276 ± 7		COURAU	84	DLCO	$e^+e^- \to e^+e^-\pi^+\pi^-$
1273.3 ± 2.3		[5] CHABAUD	83	ASPK	$17\ \pi^- p$ polarized
1280 ± 4		[6] CASON	82	STRC	$8\ \pi^+ p \to \Delta^{++}\pi^0\pi^0$
1281 ± 7	11600	GIDAL	81	MRK2	J/ψ decay
1282 ± 5		[7] CORDEN	79	OMEG	$12\text{–}15\ \pi^- p \to n 2\pi$
1269 ± 4	10k	APEL	75	NICE	$40\ \pi^- p \to n 2\pi^0$
1272 ± 4	4600	ENGLER	74	DBC	$6\ \pi^+ n \to \pi^+\pi^- p$
1277 ± 4	5300	FLATTE	71	HBC	$7.0\ \pi^+ p$
1273 ± 8		[3] STUNTEBECK	70	HBC	$8\ \pi^- p,\ 5.4\ \pi^+ d$
1265 ± 8		BOESEBECK	68	HBC	$8\ \pi^+ p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1257 ± 6		[8] KLEMPT	22	RVUE	$J/\psi(1S) \to \gamma\pi^0\pi^0,\ \gamma K^0_S K^0_S$
1263 ± 12		CARVER	21	CLAS	$\gamma p \to \pi^0\pi^0 p$
$1259 \pm 4 \pm 4$	1.7k	[9,10] DOBBS	15		$J/\psi \to \gamma\pi^+\pi^-$
$1267 \pm 4 \pm 3$	1.5k	[9,10] DOBBS	15		$\psi(2S) \to \gamma\pi^+\pi^-$ OCCUR=2
1277 ± 6	870	[11] SCHEGELSKY	06A	RVUE	$\gamma\gamma \to K^0_S K^0_S$
1251 ± 10		TIKHOMIROV	03	SPEC	$40.0\ \pi^- C \to K^0_S K^0_S K^0_L X$
1260 ± 10		[12] ALDE	97	GAM2	$450\ pp \to pp\pi^0\pi^0$
1278 ± 6		[12] GRYGOREV	96	SPEC	$40\ \pi^- N \to K^0_S K^0_S X$
1262 ± 11		AGUILAR-...	91	EHS	$400\ pp$
1275 ± 10		AKER	91	CBAR	$0.0\ \overline{p}p \to 3\pi^0$
1220 ± 10		BREAKSTONE	90	SFM	$pp \to pp\pi^+\pi^-$
1288 ± 12		ABACHI	86B	HRS	$e^+e^- \to \pi^+\pi^- X$
1284 ± 30	3k	BINON	83	GAM2	$38\ \pi^- p \to n 2\eta$
1280 ± 20	3k	APEL	82	CNTR	$25\ \pi^- p \to n 2\pi^0$
1284 ± 10	16000	DEUTSCH...	76	HBC	$16\ \pi^+ p$
1258 ± 10	600	TAKAHASHI	72	HBC	$8\ \pi^- p \to n 2\pi$
1275 ± 13		ARMENISE	70	HBC	$9\ \pi^+ n \to p\pi^+\pi^-$ OCCUR=2
1261 ± 5	1960	[3] ARMENISE	68	DBC	$5.1\ \pi^+ n \to p\pi^+ MM^-$
1270 ± 10	360	[3] ARMENISE	68	DBC	$5.1\ \pi^+ n \to p\pi^0 MM$ OCCUR=2
1268 ± 6		[13] JOHNSON	68	HBC	$3.7\text{–}4.2\ \pi^- p$

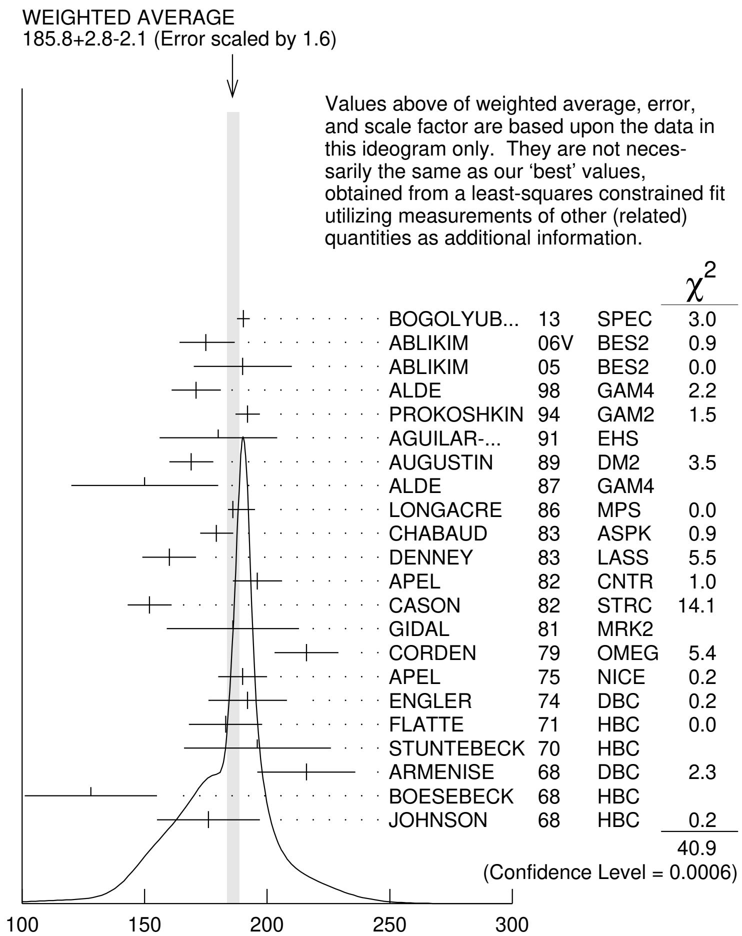
[1] Averaged over six nuclear targets, no statistically significant dependence on target nucleus observed. NODE=M005M;LINKAGE=B
[2] Breit-Wigner mass. NODE=M005M;LINKAGE=K
[3] Mass errors enlarged by us to $\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass. NODE=M005M;LINKAGE=T
[4] From a partial-wave analysis of data using a K-matrix formalism with 5 poles. NODE=M005M;LINKAGE=L
[5] From an energy-independent partial-wave analysis. NODE=M005M;LINKAGE=O
[6] From an amplitude analysis of the reaction $\pi^+\pi^- \rightarrow 2\pi^0$. NODE=M005M;LINKAGE=P
[7] From an amplitude analysis of $\pi^+\pi^- \rightarrow \pi^+\pi^-$ scattering data. NODE=M005M;LINKAGE=S
[8] Fit of the tensor partial waves from BES3 in the multipole basis. NODE=M005M;LINKAGE=Q
[9] Using CLEO-c data but not authored by the CLEO Collaboration. NODE=M005M;LINKAGE=C
[10] From a fit to a Breit-Wigner line shape with fixed Γ = 185 MeV. NODE=M005M;LINKAGE=D
[11] From analysis of L3 data at 91 and 183–209 GeV. NODE=M005M;LINKAGE=SC
[12] Systematic uncertainties not estimated. NODE=M005M;LINKAGE=QQ
[13] JOHNSON 68 includes BONDAR 63, LEE 64, DERADO 65, EISNER 67. NODE=M005M;LINKAGE=J

f_2(1270) WIDTH

NODE=M005W

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT	
					NODE=M005W
$186.6^{+2.8}_{-2.2}$ OUR FIT		Error includes scale factor of 1.5.			
$185.8^{+2.8}_{-2.1}$ OUR AVERAGE		Error includes scale factor of 1.6. See the ideogram below.			
$190.3\pm 1.9\pm 1.8$		[1] BOGOLYUB... 13	SPEC	$7\pi^+(K^+,p)A \rightarrow n\gamma + X$	
$175\ ^{+6}_{-4}\ \pm 10$		[2] ABLIKIM 06V	BES2	$e^+e^- \rightarrow J/\psi \rightarrow \gamma\pi^+\pi^-$	
190 ± 20		ABLIKIM 05	BES2	$J/\psi \rightarrow \phi\pi^+\pi^-$	
171 ± 10		ALDE 98	GAM4	$100\ \pi^- p \rightarrow \pi^0\pi^0 n$	
192 ± 5	200k	PROKOSHKIN 94	GAM2	$38\ \pi^- p \rightarrow \pi^0\pi^0 n$	
180 ± 24		AGUILAR-... 91	EHS	$400\ pp$	
169 ± 9	5730	[3] AUGUSTIN 89	DM2	$e^+e^- \rightarrow 5\pi$	
150 ± 30	400	[3] ALDE 87	GAM4	$100\ \pi^- p \rightarrow 4\pi^0 n$	
$186\ ^{+9}_{-2}$		[4] LONGACRE 86	MPS	$22\ \pi^- p \rightarrow n2K^0_S$	
$179.2^{+6.9}_{-6.6}$		[5] CHABAUD 83	ASPK	$17\ \pi^- p$ polarized	
160 ± 11		DENNEY 83	LASS	$10\ \pi^+ N$	
196 ± 10	3k	APEL 82	CNTR	$25\ \pi^- p \rightarrow n2\pi^0$	
152 ± 9		[6] CASON 82	STRC	$8\ \pi^+ p \rightarrow \Delta^{++}\pi^0\pi^0$	
186 ± 27	11600	GIDAL 81	MRK2	J/ψ decay	
216 ± 13		[7] CORDEN 79	OMEG	12–15 $\pi^- p \rightarrow n2\pi$	
190 ± 10	10k	APEL 75	NICE	$40\ \pi^- p \rightarrow n2\pi^0$	
192 ± 16	4600	ENGLER 74	DBC	$6\ \pi^+ n \rightarrow \pi^+\pi^- p$	
183 ± 15	5300	FLATTE 71	HBC	$7\ \pi^+ p \rightarrow \Delta^{++} f_2$	
196 ± 30		[3] STUNTEBECK 70	HBC	$8\ \pi^- p$, $5.4\ \pi^+ d$	
216 ± 20	1960	[3] ARMENISE 68	DBC	$5.1\ \pi^+ n \rightarrow p\pi^+ MM^-$	OCCUR=2
128 ± 27		[3] BOESEBECK 68	HBC	$8\ \pi^+ p$	
176 ± 21		[3,8] JOHNSON 68	HBC	3.7–4.2 $\pi^- p$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
168 ± 7		[9] KLEMPT 22	RVUE	$J/\psi(1S) \rightarrow \gamma\pi^0\pi^0$, $\gamma K^0_S K^0_S$	
183 ± 2		CARVER 21	CLAS	$\gamma p \rightarrow \pi^0\pi^0 p$	
195 ± 15	870	[10] SCHEGELSKY 06A	RVUE	$\gamma\gamma \rightarrow K^0_S K^0_S$	
121 ± 26		TIKHOMIROV 03	SPEC	$40.0\ \pi^- C \rightarrow K^0_S K^0_S K^0_L X$	
187 ± 20		[11] ALDE 97	GAM2	$450\ pp \rightarrow pp\pi^0\pi^0$	
184 ± 10		[11] GRYGOREV 96	SPEC	$40\ \pi^- N \rightarrow K^0_S K^0_S X$	
200 ± 10		AKER 91	CBAR	$0.0\ \overline{p}p \rightarrow 3\pi^0$	
240 ± 40	3k	BINON 83	GAM2	$38\ \pi^- p \rightarrow n2\eta$	
187 ± 30	650	[3] ANTIPOV 77	CIBS	$25\ \pi^- p \rightarrow p3\pi$	
225 ± 38	16000	DEUTSCH... 76	HBC	$16\ \pi^+ p$	
166 ± 28	600	[3] TAKAHASHI 72	HBC	$8\ \pi^- p \rightarrow n2\pi$	
173 ± 53		[3] ARMENISE 70	HBC	$9\ \pi^+ n \rightarrow p\pi^+\pi^-$	OCCUR=2

[1] Averaged over six nuclear targets, no statistically significant dependence on target nucleus observed. NODE=M005W;LINKAGE=C
[2] Breit-Wigner width NODE=M005W;LINKAGE=D
[3] Width errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass. NODE=M005W;LINKAGE=T
[4] From a partial-wave analysis of data using a K-matrix formalism with 5 poles. NODE=M005W;LINKAGE=L
[5] From an energy-independent partial-wave analysis. NODE=M005W;LINKAGE=R
[6] From an amplitude analysis of the reaction $\pi^+\pi^- \rightarrow 2\pi^0$. NODE=M005W;LINKAGE=Q
[7] From an amplitude analysis of $\pi^+\pi^- \rightarrow \pi^+\pi^-$ scattering data. NODE=M005W;LINKAGE=U
[8] JOHNSON 68 includes BONDAR 63, LEE 64, DERADO 65, EISNER 67. NODE=M005W;LINKAGE=J
[9] Fit of the tensor partial waves from BES3 in the multipole basis. NODE=M005W;LINKAGE=M
[10] From analysis of L3 data at 91 and 183–209 GeV. NODE=M005W;LINKAGE=SC
[11] Systematic uncertainties not estimated. NODE=M005W;LINKAGE=QQ



$f_2(1270)$ width (MeV)

$f_2(1270)$ DECAY MODES

NODE=M005215;NODE=M005

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	
Γ_1	$\pi\pi$	$(84.3\ ^{+2.8}_{-1.0})$ %	S=1.2	DESIG=1
Γ_2	$\pi^+\pi^-2\pi^0$	$(7.7\ ^{+1.2}_{-3.1})$ %	S=1.2	DESIG=3
Γ_3	$K\overline{K}$	(4.6 ± 0.4) %	S=2.7	DESIG=4
Γ_4	$2\pi^+2\pi^-$	(2.8 ± 0.4) %	S=1.2	DESIG=2
Γ_5	$\eta\eta$	$(4.0 \pm 0.8) \times 10^{-3}$	S=2.1	DESIG=7
Γ_6	$4\pi^0$	$(3.0 \pm 1.0) \times 10^{-3}$		DESIG=9
Γ_7	$\gamma\gamma$	$(1.42 \pm 0.24) \times 10^{-5}$	S=1.4	DESIG=8
Γ_8	$\eta\pi\pi$	$< 8 \times 10^{-3}$	CL=95%	DESIG=6
Γ_9	$K^0K^-\pi^+ +$ c.c.	$< 3.4 \times 10^{-3}$	CL=95%	DESIG=5
Γ_{10}	e^+e^-	$< 6 \times 10^{-10}$	CL=90%	DESIG=10

CONSTRAINED FIT INFORMATION

An overall fit to the total width, 4 partial widths, a combination of partial widths obtained from integrated cross sections, and 6 branching ratios uses 44 measurements and one constraint to determine 8 parameters. The overall fit has a $\chi^2 = 82.3$ for 37 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle\delta p_i \delta p_j\right\rangle/(\delta p_i \cdot \delta p_j)$, in percent, from the fit to parameters p_i, including the branching fractions, $x_i \equiv \Gamma_i/\Gamma_{\rm total}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_2	−91						
x_3	10	−39					
x_4	10	−38	1				
x_5	1	−6	0	0			
x_6	0	−7	0	0	0		
x_7	4	1	−15	0	0	0	
Γ	−72	66	−10	−7	−1	0	−6
	x_1	x_2	x_3	x_4	x_5	x_6	x_7

	Mode	Rate (MeV)	Scale factor	
Γ_1	$\pi\pi$	$157.2\ ^{+5.0}_{-1.0}$		DESIG=1
Γ_2	$\pi^+\pi^-2\pi^0$	$14.3\ ^{+2.3}_{-6.0}$	1.3	DESIG=3
Γ_3	$K\overline{K}$	$8.5\ \pm 0.8$	2.8	DESIG=4
Γ_4	$2\pi^+2\pi^-$	$5.2\ \pm 0.7$	1.2	DESIG=2
Γ_5	$\eta\eta$	$0.75\ \pm 0.14$	2.1	DESIG=7
Γ_6	$4\pi^0$	$0.56\ \pm 0.19$		DESIG=9
Γ_7	$\gamma\gamma$	0.0026 ± 0.0005	1.4	DESIG=8

$f_2(1270)$ PARTIAL WIDTHS

NODE=M005220

$\Gamma(\pi\pi)$ — Γ_1

NODE=M005W1
NODE=M005W1

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$157.2^{+5.0}_{-1.0}$ OUR FIT					
$157.0^{+6.0}_{-1.0}$		[1] LONGACRE	86	MPS	$22\ \pi^- p \rightarrow n 2K^0_S$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
152 ±8	870	[2] SCHEGELSKY	06A	RVUE	$\gamma\gamma \rightarrow K^0_S K^0_S$

[1] From a partial-wave analysis of data using a K-matrix formalism with 5 poles.
[2] From analysis of L3 data at 91 and 183–209 GeV and using SU(3) relations.

NODE=M005W1;LINKAGE=L
NODE=M005W1;LINKAGE=SC

$\Gamma(K\overline{K})$ — Γ_3

NODE=M005W4
NODE=M005W4

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
8.5±0.8 OUR FIT Error includes scale factor of 2.8.					
$9.0^{+0.7}_{-0.3}$		[1] LONGACRE	86	MPS	$22\ \pi^- p \rightarrow n 2K^0_S$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
7.5±2.0	870	[2] SCHEGELSKY	06A	RVUE	$\gamma\gamma \rightarrow K^0_S K^0_S$

[1] From a partial-wave analysis of data using a K-matrix formalism with 5 poles.
[2] From analysis of L3 data at 91 and 183–209 GeV and using SU(3) relations.

NODE=M005W4;LINKAGE=L
NODE=M005W4;LINKAGE=SC

$\Gamma(\eta\eta)$ — Γ_5

NODE=M005W7
NODE=M005W7

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.75±0.14 OUR FIT Error includes scale factor of 2.1.					
1.0 ±0.1		[1] LONGACRE	86	MPS	$22\ \pi^- p \rightarrow n 2K^0_S$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.8 ±0.4	870	[2] SCHEGELSKY	06A	RVUE	$\gamma\gamma \rightarrow K^0_S K^0_S$

[1] From a partial-wave analysis of data using a K-matrix formalism with 5 poles.
[2] From analysis of L3 data at 91 and 183–209 GeV and using SU(3) relations.

NODE=M005W7;LINKAGE=L
NODE=M005W7;LINKAGE=SC

$\Gamma(\gamma\gamma)$ Γ_7

NODE=M005W8

NODE=M005W8

The value of this width depends on the theoretical model used. Unitary approaches with scalars typically (with exception of PENNINGTON 08) give values clustering around 2.6 keV; without an S-wave contribution, values are systematically higher (typically around 3 keV).

NODE=M005W8

VALUE (keV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*	
2.6 ±0.5 OUR FIT	Error includes scale factor of 1.4.					
2.93±0.40		[1] DAI	14A	RVUE	Compilation	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
3.14±0.20		[2,3] PENNINGTON	08	RVUE	Compilation	OCCUR=2
3.82±0.30		[3,4] PENNINGTON	08	RVUE	Compilation	OCCUR=3
2.55±0.15	870	[5] SCHEGELSKY	06A	RVUE	$\gamma\gamma \to K^0_S K^0_S$	
2.84±0.35		BOGLIONE	99	RVUE	$\gamma\gamma \to \pi^+\pi^-$, $\pi^0\pi^0$	
2.93±0.23±0.32		[6] YABUKI	95	VNS		
$2.58\pm0.13^{+0.36}_{-0.27}$		[7] BEHREND	92	CELL	$e^+e^- \to e^+e^-\pi^+\pi^-$	
3.10±0.35±0.35		[8] BLINOV	92	MD1	$e^+e^- \to e^+e^-\pi^+\pi^-$	
2.27±0.47±0.11		ADACHI	90D	TOPZ	$e^+e^- \to e^+e^-\pi^+\pi^-$	
3.15±0.04±0.39		BOYER	90	MRK2	$e^+e^- \to e^+e^-\pi^+\pi^-$	
$3.19\pm0.16^{+0.29}_{-0.28}$		MARSISKE	90	CBAL	$e^+e^- \to e^+e^-\pi^0\pi^0$	
2.35±0.65		[9] MORGAN	90	RVUE	$\gamma\gamma \to \pi^+\pi^-$, $\pi^0\pi^0$	
$3.19\pm0.09^{+0.22}_{-0.38}$	2177	OEST	90	JADE	$e^+e^- \to e^+e^-\pi^0\pi^0$	
3.2 ±0.1 ±0.4		[10] AIHARA	86B	TPC	$e^+e^- \to e^+e^-\pi^+\pi^-$	
2.5 ±0.1 ±0.5		BEHREND	84B	CELL	$e^+e^- \to e^+e^-\pi^+\pi^-$	
2.85±0.25±0.5		[11] BERGER	84	PLUT	$e^+e^- \to e^+e^-2\pi$	
2.70±0.05±0.20		COURAU	84	DLCO	$e^+e^- \to e^+e^-\pi^+\pi^-$	
2.52±0.13±0.38		[12] SMITH	84C	MRK2	$e^+e^- \to e^+e^-\pi^+\pi^-$	
2.7 ±0.2 ±0.6		EDWARDS	82F	CBAL	$e^+e^- \to e^+e^-2\pi^0$	
$2.9\ ^{+0.6}_{-0.4}\pm0.6$		[13] EDWARDS	82F	CBAL	$e^+e^- \to e^+e^-2\pi^0$	OCCUR=2
3.2 ±0.2 ±0.6		BRANDELIK	81B	TASS	$e^+e^- \to e^+e^-\pi^+\pi^-$	
3.6 ±0.3 ±0.5		ROUSSARIE	81	MRK2	$e^+e^- \to e^+e^-\pi^+\pi^-$	
2.3 ±0.8		[14] BERGER	80B	PLUT	e^+e^-	

[1] Based on a K-matrix analysis of BELLE data from MORI 07, UEHARA 08A, UEHARA 09 and UEHARA 13. The width is derived for the pole on the third sheet which is closest to the physical axis. Supersedes PENNINGTON 08. NODE=M005W8;LINKAGE=A

[2] Solution A (preferred solution based on χ^2-analysis). NODE=M005W8;LINKAGE=P1

[3] Dispersion theory based amplitude analysis of BOYER 90, MARSISKE 90, BEHREND 92, and MORI 07. NODE=M005W8;LINKAGE=P3

[4] Solution B (worse than solution A; still acceptable when systematic uncertainties are included). NODE=M005W8;LINKAGE=P2

[5] From analysis of L3 data at 91 and 183–209 GeV and using SU(3) relations. NODE=M005W8;LINKAGE=SC

[6] With a narrow scalar state around 1220 MeV. NODE=M005W8;LINKAGE=YA

[7] Using a unitarized model with a 300 - 500 keV wide scalar at 1100 MeV. NODE=M005W;LINKAGE=B

[8] Using the unitarized model of LYTH 85. NODE=M005W;LINKAGE=A

[9] Error includes spread of different solutions. Data of MARK2 and CRYSTAL BALL used in the analysis. Authors report strong correlations with $\gamma\gamma$ width of $f_0(1370)$: $\Gamma(f_2)$ + 1/4 $\Gamma(f^0)$ = 3.6 ± 0.3 KeV. NODE=M005PW;LINKAGE=C

[10] Radiative corrections modify the partial widths; for instance the COURAU 84 value becomes 2.66 ± 0.21 in the calculation of LANDRO 86. NODE=M005PW;LINKAGE=B

[11] Using the MENNESSIER 83 model. NODE=M005PW;LINKAGE=X

[12] Superseded by BOYER 90. NODE=M005PW;LINKAGE=V

[13] If helicity = 2 assumption is not made. NODE=M005PW;LINKAGE=H

[14] Using mass, width and B($f_2(1270) \to 2\pi$) from PDG 78. NODE=M005PW;LINKAGE=A

$\Gamma(e^+e^-)$ Γ_{10}

NODE=M005W9

NODE=M005W9

VALUE (eV)	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.11	90	ACHASOV	00K	SND	$e^+e^- \to \pi^0\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.7	90	VOROBYEV	88	ND	$e^+e^- \to \pi^0\pi^0$

$f_2(1270)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

NODE=M005223

$\Gamma(K\overline{K}) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ — $\Gamma_3\Gamma_7/\Gamma$

NODE=M005G1
NODE=M005G1

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
0.121±0.020 OUR FIT Error includes scale factor of 1.3.				
0.091±0.007±0.027	[1] ALBRECHT	90G	ARG	$e^+e^- \to e^+e^-K^+K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.104±0.007±0.072	[2] ALBRECHT	90G	ARG	$e^+e^- \to e^+e^-K^+K^-$

OCCUR=2

[1] Using an incoherent background.
[2] Using a coherent background.

NODE=M005G1;LINKAGE=A
NODE=M005G1;LINKAGE=K

$\Gamma(\eta\eta) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ — $\Gamma_5\Gamma_7/\Gamma$

NODE=M005G02
NODE=M005G02

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
$11.5^{+1.8+4.5}_{-2.0-3.7}$	[1] UEHARA	10A	BELL	10.6 $e^+e^- \to e^+e^-\eta\eta$

[1] Including interference with the $f'_2(1525)$ (parameters fixed to the values from the 2008 edition of this review, PDG 08) and $f_0(Y)$.

NODE=M005G02;LINKAGE=UE

Helicity-0/Helicity-2 RATIO IN $\gamma\gamma \to f_2(1270) \to \pi\pi$

NODE=M005HR0
NODE=M005HR0

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
$3.7\pm0.3^{+15.9}_{-2.9}$	UEHARA	08A	BELL	10.6 $e^+e^- \to e^+e^-\pi^0\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
9.5±1.8	[1] DAI	14A	RVUE	Compilation
13	[2,3] PENNINGTON	08	RVUE	Compilation
26	[3,4] PENNINGTON	08	RVUE	Compilation

OCCUR=2
OCCUR=3

[1] Based on a K-matrix analysis of BELLE data from MORI 07, UEHARA 08A, UEHARA 09 and UEHARA 13. The width is derived for the pole on the third sheet which is closest to the physical axis.

NODE=M005HR0;LINKAGE=A

[2] Solution A (preferred solution based on χ^2-analysis).

NODE=M005HR0;LINKAGE=P1

[3] Dispersion theory based amplitude analysis of BOYER 90, MARSISKE 90, BEHREND 92, and MORI 07.

NODE=M005HR0;LINKAGE=P3

[4] Solution B (worse than solution A; still acceptable when systematic uncertainties are included).

NODE=M005HR0;LINKAGE=P2

$f_2(1270)$ BRANCHING RATIOS

NODE=M005225

$\Gamma(\pi\pi)/\Gamma_{\text{total}}$ — Γ_1/Γ

NODE=M005R10
NODE=M005R10

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.843^{+0.028}_{-0.010}$ OUR FIT Error includes scale factor of 1.2.					
0.837±0.020 OUR AVERAGE					
0.849±0.025		CHABAUD	83	ASPK	17 π^-p polarized
0.85 ±0.05	250	BEAUPRE	71	HBC	8 $\pi^+p \to \Delta^{++}f_2$
0.8 ±0.04	600	OH	70	HBC	1.26 $\pi^-p \to \pi^+\pi^-n$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.856±0.001±0.05		[1] ALBRECHT	20	RVUE	0.9 $\overline{p}p \to \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0K^+K^-$

[1] Residue from T-matrix pole, 4 poles, 4 channels, including scattering data from HYAMS 75 ($\pi\pi$), LONGACRE 86 ($K\overline{K}$), BINON 83 ($\eta\eta$).

NODE=M005R10;LINKAGE=A

$\Gamma(\pi^+\pi^-2\pi^0)/\Gamma(\pi\pi)$ — Γ_2/Γ_1

NODE=M005R2

Should be twice $\Gamma(2\pi^+2\pi^-)/\Gamma(\pi\pi)$ if decay is $\rho\rho$. (See ASCOLI 68D.)

NODE=M005R2
NODE=M005R2

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.091^{+0.015}_{-0.040}$ OUR FIT Error includes scale factor of 1.2.					
0.15 ±0.06	600	EISENBERG	74	HBC	4.9 $\pi^+p \to \Delta^{++}f_2$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.07		EMMS	75D	DBC	4 $\pi^+n \to pf_2$

$\Gamma(K\overline{K})/\Gamma_{\text{total}}$ — Γ_3/Γ

NODE=M005R00
NODE=M005R00

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.033±0.001±0.005	[1] ALBRECHT	20	RVUE	0.9 $\overline{p}p \to \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0K^+K^-$

[1] Residue from T-matrix pole, 4 poles, 4 channels, including scattering data from HYAMS 75 ($\pi\pi$), LONGACRE 86 ($K\overline{K}$), BINON 83 ($\eta\eta$).

NODE=M005R00;LINKAGE=A

$\Gamma(K\overline{K})/\Gamma(\pi\pi)$ Γ_3/Γ_1

NODE=M005R3

We average only experiments which either take into account $f_2(1270)$-$a_2(1320)$ interference explicitly or demonstrate that $a_2(1320)$ production is negligible.

NODE=M005R3

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$0.054^{+0.005}_{-0.006}$ OUR FIT Error includes scale factor of 2.7.					
$0.041^{+0.004}_{-0.005}$ OUR AVERAGE					
0.045 ± 0.01		[1] BARGIOTTI	03	OBLX	$\overline{p}p$
$0.037^{+0.008}_{-0.021}$		ETKIN	82B	MPS	$23\ \pi^- p \to n 2K^0_S$
0.045 ± 0.009		CHABAUD	81	ASPK	$17\ \pi^- p$ polarized
0.039 ± 0.008		LOVERRE	80	HBC	$4\ \pi^- p \to K\overline{K}N$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.052 ± 0.025		ABLIKIM	04E	BES2	$J/\psi \to \omega K^+ K^-$
0.036 ± 0.005		[2] COSTA	80	OMEG	1–2.2 $\pi^- p \to K^+ K^- n$
0.030 ± 0.005		[3] MARTIN	79	RVUE	
0.027 ± 0.009		[4] POLYCHRO...	79	STRC	$7\ \pi^- p \to n 2K^0_S$
0.025 ± 0.015		EMMS	75D	DBC	$4\ \pi^+ n \to p f_2$
0.031 ± 0.012	20	ADERHOLZ	69	HBC	$8\ \pi^+ p \to K^+ K^- \pi^+ p$

NODE=M005R3

[1] Coupled channel analysis of $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, and $K^\pm K^0_S \pi^\mp$. NODE=M005R;LINKAGE=BG

[2] Re-evaluated by CHABAUD 83. NODE=M005R3;LINKAGE=D

[3] Includes PAWLICKI 77 data. NODE=M005R3;LINKAGE=F

[4] Takes into account the $f_2(1270)$-$f'_2(1525)$ interference. NODE=M005R3;LINKAGE=M

$\Gamma(2\pi^+ 2\pi^-)/\Gamma(\pi\pi)$ Γ_4/Γ_1

NODE=M005R1

NODE=M005R1

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.033 ± 0.005 OUR FIT Error includes scale factor of 1.2.					
0.033 ± 0.004 OUR AVERAGE Error includes scale factor of 1.1.					
0.024 ± 0.006	160	EMMS	75D	DBC	$4\ \pi^+ n \to p f_2$
0.051 ± 0.025	70	EISENBERG	74	HBC	$4.9\ \pi^+ p \to \Delta^{++} f_2$
$0.043^{+0.007}_{-0.011}$	285	[1] LOUIE	74	HBC	$3.9\ \pi^- p \to n f_2$
0.037 ± 0.007	154	ANDERSON	73	DBC	$6\ \pi^+ n \to p f_2$
0.047 ± 0.013		OH	70	HBC	$1.26\ \pi^- p \to \pi^+\pi^- n$

[1] LOUIE 74 was quoted as 0.065 in PDG 74. Factor 2/3 to go from $\pi^+\pi^- \to \pi\pi$ forgotten. Mike L. NODE=M005R1;LINKAGE=02

$\Gamma(\eta\eta)/\Gamma_{\text{total}}$ Γ_5/Γ

NODE=M005R7

NODE=M005R7

VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
4.0 ± 0.8 OUR FIT Error includes scale factor of 2.1.				
2.9 ± 0.5 OUR AVERAGE				
2.7 ± 0.7	BINON	05	GAMS	$33\ \pi^- p \to \eta\eta n$
2.8 ± 0.7	ALDE	86D	GAM4	$100\ \pi^- p \to 2\eta n$
5.2 ± 1.7	BINON	83	GAM2	$38\ \pi^- p \to 2\eta n$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$4.0\pm1.0\pm2.0$	[1] ALBRECHT	20	RVUE	$0.9\ \overline{p}p \to \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0 K^+ K^-$

[1] Residue from T-matrix pole, 4 poles, 4 channels, including scattering data from HYAMS 75 ($\pi\pi$), LONGACRE 86 ($K\overline{K}$), BINON 83 ($\eta\eta$). NODE=M005R7;LINKAGE=A

$\Gamma(\eta\eta)/\Gamma(\pi\pi)$ Γ_5/Γ_1

NODE=M005R6

NODE=M005R6

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.003 ± 0.001		BARBERIS	00E		$450\ pp \to p_f \eta\eta p_s$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.05	95	EDWARDS	82F	CBAL	$e^+e^- \to e^+e^- 2\eta$
<0.016	95	EMMS	75D	DBC	$4\ \pi^+ n \to p f_2$
<0.09	95	EISENBERG	74	HBC	$4.9\ \pi^+ p \to \Delta^{++} f_2$

$\Gamma(4\pi^0)/\Gamma_{\text{total}}$ Γ_6/Γ

NODE=M005R11

NODE=M005R11

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.0030 ± 0.0010 OUR FIT					
$0.003\ \pm0.001$	400 ± 50	ALDE	87	GAM4	$100\ \pi^- p \to 4\pi^0 n$

$\Gamma(\gamma\gamma)/\Gamma_{total}$ Γ_7/Γ

NODE=M005R13
NODE=M005R13

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.57 \pm 0.01 {}^{+1.39}_{-0.14}$	UEHARA	08A	BELL	10.6 $e^+ e^- \to e^+ e^- \pi^0 \pi^0$

$\Gamma(\eta\pi\pi)/\Gamma(\pi\pi)$ Γ_8/Γ_1

NODE=M005R5
NODE=M005R5

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.010	95	EMMS	75D	DBC	$4\,\pi^+ n \to p f_2$

$\Gamma(K^0 K^- \pi^+ + c.c.)/\Gamma(\pi\pi)$ Γ_9/Γ_1

NODE=M005R4
NODE=M005R4

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.004	95	EMMS	75D	DBC	$4\,\pi^+ n \to p f_2$

$\Gamma(e^+ e^-)/\Gamma_{total}$ Γ_{10}/Γ

NODE=M005R12
NODE=M005R12

VALUE (units 10^{-10})	CL%	DOCUMENT ID		TECN	COMMENT
<6	90	ACHASOV	00K	SND	$e^+ e^- \to \pi^0 \pi^0$

$f_2(1270)$ REFERENCES

NODE=M005

KLEMPT 22 PL B830 137171 E. Klempt *et al.* (BONN) REFID=61646
RODAS 22 EPJ C82 80 A. Rodas *et al.* (JPAC Collab.) REFID=61610
CARVER 21 PRL 126 082002 M. Carver *et al.* (CLAS Collab.) REFID=61097
ALBRECHT 20 EPJ C80 453 M. Albrecht *et al.* (Crystal Barrel Collab.) REFID=60439
DOBBS 15 PR D91 052006 S. Dobbs *et al.* (NWES) REFID=56805
DAI 14A PR D90 036004 L.-Y. Dai, M.R. Pennington (CEBAF) REFID=55923
BOGOLYUB... 13 PAN 76 1324 M.Yu. Bogolyubsky *et al.* (HYPERON-M Collab.) REFID=55585
Translated from YAF 76 1389.
UEHARA 13 PTEP 2013 123C01 S. Uehara *et al.* (BELLE Collab.) REFID=55592
UEHARA 10A PR D82 114031 S. Uehara *et al.* (BELLE Collab.) REFID=53641
ANISOVICH 09 IJMP A24 2481 V.V. Anisovich, A.V. Sarantsev (PNPI) REFID=52719
UEHARA 09 PR D79 052009 S. Uehara *et al.* (BELLE Collab.) REFID=52761
PDG 08 PL B667 1 C. Amsler *et al.* (PDG Collab.) REFID=52166
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
MORI 07 PR D75 051101 T. Mori *et al.* (BELLE Collab.) REFID=51652
ABLIKIM 06V PL B642 441 M. Ablikim *et al.* (BES Collab.) REFID=51507
SCHEGELSKY 06A EPJ A27 207 V.A. Schegelsky *et al.* REFID=51185
ABLIKIM 05 PL B607 243 M. Ablikim *et al.* (BES Collab.) REFID=50450
BINON 05 PAN 68 960 F. Binon *et al.* REFID=50780
Translated from YAF 68 998.
ABLIKIM 04E PL B603 138 M. Ablikim *et al.* (BES Collab.) REFID=50174
BARGIOTTI 03 EPJ C26 371 M. Bargiotti *et al.* (OBELIX Collab.) REFID=49217
TIKHOMIROV 03 PAN 66 828 G.D. Tikhomirov *et al.* REFID=49423
Translated from YAF 66 860.
ACHASOV 00K PL B492 8 M.N. Achasov *et al.* (Novosibirsk SND Collab.) REFID=47933
BARBERIS 00E PL B479 59 D. Barberis *et al.* (WA 102 Collab.) REFID=47961
BOGLIONE 99 EPJ C9 11 M. Boglione, M.R. Pennington REFID=46931
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.
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
GRYGOREV 96 PAN 59 2105 V.K. Grigoriev, O.N. Baloshin, B.P. Barkov (ITEP) REFID=45566
Translated from YAF 59 2187.
YABUKI 95 JPSJ 64 435 F. Yabuki *et al.* (VENUS Collab.) REFID=46384
PROKOSHKIN 94 PD 39 420 Y.D. Prokoshkin, A.A. Kondashov (SERP) REFID=44094
Translated from DANS 336 613.
BEHREND 92 ZPHY C56 381 H.J. Behrend (CELLO Collab.) REFID=43172
BLINOV 92 ZPHY C53 33 A.E. Blinov *et al.* (NOVO) REFID=41858
AGUILAR-... 91 ZPHY C50 405 M. Aguilar-Benitez *et al.* (LEBC-EHS Collab.) REFID=41637
AKER 91 PL B260 249 E. Aker *et al.* (Crystal Barrel Collab.) REFID=41587
ADACHI 90D PL B234 185 I. Adachi *et al.* (TOPAZ Collab.) REFID=41345
ALBRECHT 90G ZPHY C48 183 H. Albrecht *et al.* (ARGUS Collab.) REFID=41374
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
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.
ALDE 87 PL B198 286 D.M. Alde *et al.* (LANL, BRUX, SERP, LAPP) REFID=40221
AUGUSTIN 87 ZPHY C36 369 J.E. Augustin *et al.* (LALO, CLER, FRAS+) REFID=40268
ABACHI 86B PRL 57 1990 S. Abachi *et al.* (PURD, ANL, IND, MICH+) REFID=20394
AIHARA 86B PRL 57 404 H. Aihara *et al.* (TPC-2γ Collab.) REFID=20764
ALDE 86D NP B269 485 D.M. Alde *et al.* (BELG, LAPP, SERP, CERN+) REFID=20765
LANDRO 86 PL B172 445 M. Landro, K.J. Mork, H.A. Olsen (UTRO) REFID=20767
LONGACRE 86 PL B177 223 R.S. Longacre *et al.* (BNL, BRAN, CUNY+) REFID=20768
LYTH 85 JP G11 459 D.H. Lyth REFID=42169
BEHREND 84B ZPHY C23 223 H.J. Behrend *et al.* (CELLO Collab.) REFID=20757
BERGER 84 ZPHY C26 199 C. Berger *et al.* (PLUTO Collab.) REFID=20760
COURAU 84 PL 147B 227 A. Courau *et al.* (CIT, SLAC) REFID=20758
SMITH 84C PR D30 851 J.R. Smith *et al.* (SLAC, LBL, HARV) REFID=20759
BINON 83 NC 78A 313 F.G. Binon *et al.* (BELG, LAPP, SERP+) REFID=20750
Also SJNP 38 561 F.G. Binon *et al.* (BELG, LAPP, SERP+) REFID=20751
Translated from YAF 38 934.

CHABAUD	83	NP B223 1	V. Chabaud *et al.*	(CERN, CRAC, MPIM)	REFID=20131
DENNEY	83	PR D28 2726	D.L. Denney *et al.*	(IOWA, MICH)	REFID=20754
MENNESSIER	83	ZPHY C16 241	G. Mennessier	(MONP)	REFID=20393
APEL	82	NP B201 197	W.D. Apel *et al.*	(KARLK, KARLE, PISA, SERP+)	REFID=20745
CASON	82	PRL 48 1316	N.M. Cason *et al.*	(NDAM, ANL)	REFID=20746
EDWARDS	82F	PL 110B 82	C. Edwards *et al.*	(CIT, HARV, PRIN+)	REFID=20747
ETKIN	82B	PR D25 1786	A. Etkin *et al.*	(BNL, CUNY, TUFTS, VAND)	REFID=20390
BRANDELIK	81B	ZPHY C10 117	R. Brandelik *et al.*	(TASSO Collab.)	REFID=20741
CHABAUD	81	APP B12 575	V. Chabaud *et al.*	(CERN, CRAC, MPIM)	REFID=20742
GIDAL	81	PL 107B 153	G. Gidal *et al.*	(SLAC, LBL)	REFID=20386
ROUSSARIE	81	PL 105B 304	A. Roussarie *et al.*	(SLAC, LBL)	REFID=20388
BERGER	80B	PL 94B 254	C. Berger *et al.*	(PLUTO Collab.)	REFID=20736
COSTA	80	NP B175 402	G. Costa *et al.*	(BARI, BONN, CERN, GLAS+)	REFID=20737
LOVERRE	80	ZPHY C6 187	P.F. Loverre *et al.*	(CERN, CDEF, MADR+)	REFID=20382
CORDEN	79	NP B157 250	M.J. Corden *et al.*	(BIRM, RHEL, TELA+)	REFID=20374
MARTIN	79	NP B158 520	A.D. Martin, E.N. Ozmutlu	(DURH)	REFID=20377
POLYCHRO...	79	PR D19 1317	V.A. Polychronakos *et al.*	(NDAM, ANL)	REFID=20378
PDG	78	PL 75B 1	C. Bricman *et al.*		REFID=40124
ANTIPOV	77	NP B119 45	Y.M. Antipov *et al.*	(SERP, GEVA)	REFID=20728
PAWLICKI	77	PR D15 3196	A.J. Pawlicki *et al.*	(ANL)	REFID=20367
DEUTSCH...	76	NP B103 426	M. Deutschmann *et al.*	(AACH3, BERL, BONN+)	REFID=20119
APEL	75	PL 57B 398	W.D. Apel *et al.*	(KARLK, KARLE, PISA, SERP+)	REFID=20720
EMMS	75D	NP B96 155	M.J. Emms *et al.*	(BIRM, DURH, RHEL)	REFID=20721
HYAMS	75	NP B100 205	B.D. Hyams *et al.*	(CERN, MPIM)	REFID=20355
EISENBERG	74	PL 52B 239	Y. Eisenberg *et al.*	(REHO)	REFID=20715
ENGLER	74	PR D10 2070	A. Engler *et al.*	(CMU, CASE)	REFID=20110
LOUIE	74	PL 48B 385	J. Louie *et al.*	(SACL, CERN)	REFID=20719
PDG	74	PL 50B 1	V. Chaloupka *et al.*		REFID=40125
ANDERSON	73	PRL 31 562	J.C. Anderson *et al.*	(CMU, CASE)	REFID=20710
TAKAHASHI	72	PR D6 1266	K. Takahashi *et al.*	(TOHOK, PENN, NDAM+)	REFID=20103
BEAUPRE	71	NP B28 77	J.V. Beaupre *et al.*	(AACH, BERL, CERN)	REFID=20698
FLATTE	71	PL 34B 551	S.M. Flatte *et al.*	(LBL)	REFID=20700
ARMENISE	70	LNC 4 199	N. Armenise *et al.*	(BARI, BGNA, FIRZ)	REFID=20693
OH	70	PR D1 2494	B.Y. Oh *et al.*	(WISC, TNTO) JP	REFID=20335
STUNTEBECK	70	PL 32B 391	P.H. Stuntebeck *et al.*	(NDAM)	REFID=20696
ADERHOLZ	69	NP B11 259	M. Aderholz *et al.*	(AACH3, BERL, CERN+)	REFID=20687
ARMENISE	68	NC 54A 999	N. Armenise *et al.*	(BARI, BGNA, FIRZ+)	REFID=20054
ASCOLI	68D	PRL 21 1712	G. Ascoli *et al.*	(ILL)	REFID=20681
BOESEBECK	68	NP B4 501	K. Boesebeck *et al.*	(AACH, BERL, CERN)	REFID=20585
JOHNSON	68	PR 176 1651	P.B. Johnson *et al.*	(NDAM, PURD, SLAC)	REFID=20065
EISNER	67	PR 164 1699	R.L. Eisner *et al.*	(PURD)	REFID=20046
DERADO	65	PRL 14 872	I. Derado *et al.*	(NDAM)	REFID=20668
LEE	64	PRL 12 342	Y.Y. Lee *et al.*	(MICH)	REFID=20663
BONDAR	63	PL 5 153	L. Bondar *et al.*	(AACH, BIRM, BONN, DESY+)	REFID=20657