

$a_2(1320)$

$$I^G(J^{PC}) = 1^-(2^{++})$$

 $a_2(1320)$ T-MATRIX POLE $\sqrt{s}$ Note that $\Gamma = -2 \operatorname{Im}(\sqrt{s})$.

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
(1305–1321)–i(52–58) OUR ESTIMATE			
$(1318.7 \pm 1.9 \pm 1.3) - i(53.8 \pm 2.3^{+1.7}_{-0.9})$	¹ KOPF	21	RVUE 0.9 $p\bar{p} \rightarrow \pi^0 \pi^0 \eta$, $\pi^0 \eta \eta$, $\pi^0 K^+ K^-$ and 191 $\pi^- p \rightarrow$ $\pi^- \pi^- \pi^+ p$
$(1312.5 \pm 0.7 \pm 2.6) - i(53.5 \pm 0.6 \pm 1.9)$	² ALBRECHT	20	RVUE 0.9 $\bar{p}p \rightarrow \pi^0 \pi^0 \eta$, $\pi^0 \eta \eta$, $\pi^0 K^+ K^-$
$(1306.0 \pm 0.8 \pm 1.3) - i(57.2 \pm 0.8 \pm 0.0)$	³ RODAS	19	RVUE 91 $\pi^- p \rightarrow \eta^{(\prime)} \pi^- p$
$(1309 \pm 4) - i(55 \pm 2)$	⁴ ANISOVICH	09	RVUE $\bar{p}p$, πN
¹ Extraction based on a combined fit of Crystal Barrel and $\pi\pi$ scattering data (ALBRECHT 20), and COMPASS data (ADOLPH 15), using a coupled-channel model of $\eta\pi$, $\eta'\pi$ and $K\bar{K}$ systems.			
² T-matrix pole with 2 poles, 2 channels ($\pi^0 \eta$ and $K\bar{K}$).			
³ Coupled-channel analysis of both the $\eta\pi$ and $\eta'\pi$ systems using ADOLPH 15 data. Supersedes JACKURA 18. Performed by JPAC.			
⁴ Amplitude did not include dispersive corrections. From analysis of $\eta\pi$ mode.			

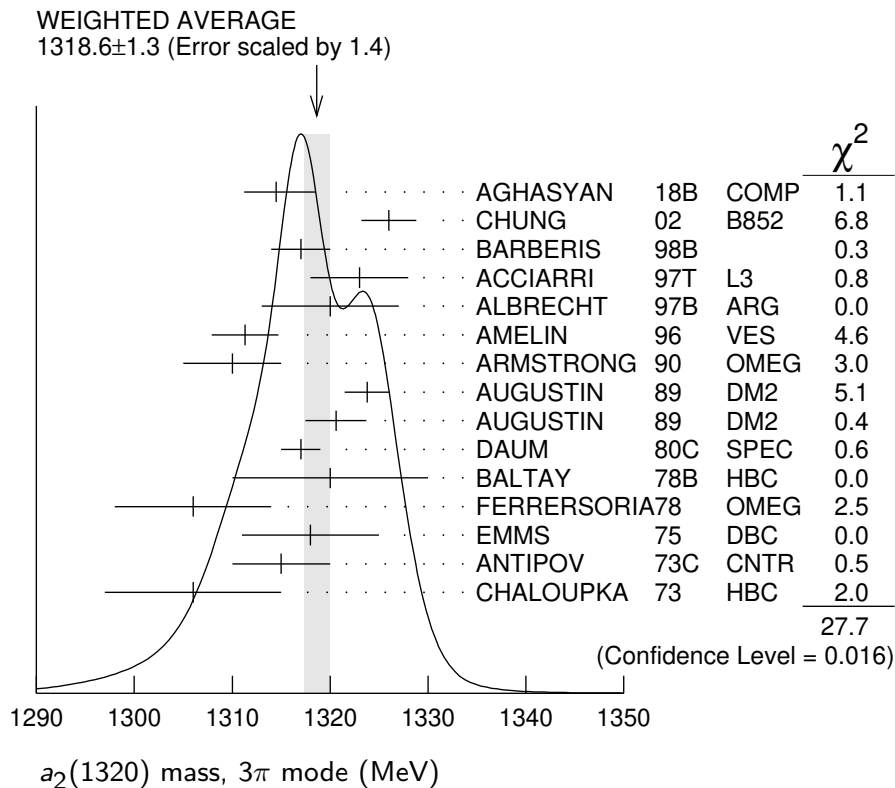
 $a_2(1320)$ MASS

VALUE (MeV)	DOCUMENT ID
1318.2 ± 0.6 OUR AVERAGE	Includes data from the 4 datablocks that follow this one. Error includes scale factor of 1.2.

3 π MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
The data in this block is included in the average printed for a previous datablock.					
1318.6 ± 1.3 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.					
$1314.5^{+4.0}_{-3.3}$	46M	¹ AGHASYAN	18B	COMP	190 $\pi^- p \rightarrow$ $\pi^- \pi^+ \pi^- p$
$1326 \pm 2 \pm 2$		CHUNG	02	B852	18.3 $\pi^- p \rightarrow$ $\pi^+ \pi^- \pi^- p$
1317 ± 3		BARBERIS	98B		450 $pp \rightarrow$ $p_f \pi^+ \pi^- \pi^0 p_s$
$1323 \pm 4 \pm 3$		ACCIARRI	97T	L3	$e^+ e^- \rightarrow$ $e^+ e^- \pi^+ \pi^- \pi^0$
1320 ± 7		ALBRECHT	97B	ARG	$e^+ e^- \rightarrow$ $e^+ e^- \pi^+ \pi^- \pi^0$
$1311.3 \pm 1.6 \pm 3.0$	72.4k	AMELIN	96	VES	36 $\pi^- p \rightarrow$ $\pi^+ \pi^- \pi^0 n$
1310 ± 5		ARMSTRONG	90	OMEG 0	300.0 $pp \rightarrow$ $pp \pi^+ \pi^- \pi^0$

1323.8 ± 2.3	4022	AUGUSTIN	89	DM2	±	$J/\psi \rightarrow \rho^\pm a_2^\mp$
1320.6 ± 3.1	3562	AUGUSTIN	89	DM2	0	$J/\psi \rightarrow \rho^0 a_2^0$
1317 ± 2	25k	² DAUM	80C	SPEC	—	63,94 $\pi^- p \rightarrow 3\pi p$
1320 ± 10	1097	² BALTAY	78B	HBC	+0	15 $\pi^+ p \rightarrow p 4\pi$
1306 ± 8		FERRERSORIA78	OMEG	—		9 $\pi^- p \rightarrow p 3\pi$
1318 ± 7	1.6k	² EMMS	75	DBC	0	4 $\pi^+ n \rightarrow p(3\pi)^0$
1315 ± 5		² ANTIPOV	73C	CNTR	—	25,40 $\pi^- p \rightarrow$ $p \eta \pi^-$
1306 ± 9	1580	CHALOUPKA	73	HBC	—	3.9 $\pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1321 ± 1 $\frac{+0}{-7}$	420k	³ ALEKSEEV	10	COMP		190 $\pi^- Pb \rightarrow$ $\pi^- \pi^- \pi^+ Pb'$
1300 ± 2 ± 4	18k	⁴ SCHEGELSKY	06	RVUE	0	$\gamma\gamma \rightarrow \pi^+ \pi^- \pi^0$
1305 ± 14		CONDO	93	SHF		$\gamma p \rightarrow n \pi^+ \pi^+ \pi^-$
1310 ± 2		² EVANGELIS...	81	OMEG	—	12 $\pi^- p \rightarrow 3\pi p$
1343 ± 11	490	BALTAY	78B	HBC	0	15 $\pi^+ p \rightarrow \Delta 3\pi$
1309 ± 5	5k	BINNIE	71	MMS	—	$\pi^- p$ near a_2 thresh- old
1299 ± 6	28k	BOWEN	71	MMS	—	5 $\pi^- p$
1300 ± 6	24k	BOWEN	71	MMS	+	5 $\pi^+ p$
1309 ± 4	17k	BOWEN	71	MMS	—	7 $\pi^- p$
1306 ± 4	941	ALSTON-...	70	HBC	+	7.0 $\pi^+ p \rightarrow 3\pi p$

¹ Statistical error negligible.² From a fit to $J^P = 2^+ \rho\pi$ partial wave.³ Superseded by AGHASYAN 2018B.⁴ From analysis of L3 data at 183–209 GeV.

$K\bar{K}$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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The data in this block is included in the average printed for a previous datablock.

1318.1 ± 0.7 OUR AVERAGE

1319 ± 5	4700	^{1,2} CLELAND	82B	SPEC	+	50 $\pi^+ p \rightarrow K_S^0 K^+ p$
1324 ± 6	5200	^{1,2} CLELAND	82B	SPEC	−	50 $\pi^- p \rightarrow K_S^0 K^- p$
1320 ± 2	4000	CHABAUD	80	SPEC	−	17 $\pi^- A \rightarrow K_S^0 K^- A$
1312 ± 4	11000	CHABAUD	78	SPEC	−	9.8 $\pi^- p \rightarrow K^- K_S^0 p$
1316 ± 2	4730	CHABAUD	78	SPEC	−	18.8 $\pi^- p \rightarrow K^- K_S^0 p$
1318 ± 1		^{1,3} MARTIN	78D	SPEC	−	10 $\pi^- p \rightarrow K_S^0 K^- p$
1320 ± 2	2724	MARGULIE	76	SPEC	−	23 $\pi^- p \rightarrow K^- K_S^0 p$
1313 ± 4	730	FOLEY	72	CNTR	−	20.3 $\pi^- p \rightarrow K^- K_S^0 p$
1319 ± 3	1500	³ GRAYER	71	ASPK	−	17.2 $\pi^- p \rightarrow K^- K_S^0 p$

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

1304 ± 10	870	⁴ SCHEGELSKY	06A	RVUE	0	$\gamma\gamma \rightarrow K_S^0 K_S^0$
1330 ± 11	1000	^{1,2} CLELAND	82B	SPEC	+	30 $\pi^+ p \rightarrow K_S^0 K^+ p$
1324 ± 5	350	HYAMS	78	ASPK	+	12.7 $\pi^+ p \rightarrow K^+ K_S^0 p$

¹ From a fit to $J^P = 2^+$ partial wave.

² Number of events evaluated by us.

³ Systematic error in mass scale subtracted.

⁴ From analysis of L3 data at 91 and 183–209 GeV.

 $\eta\pi$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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The data in this block is included in the average printed for a previous datablock.

1317.7 ± 1.4 OUR AVERAGE

1308 ± 9		BARBERIS	00H			450 $pp \rightarrow p_f \eta \pi^0 p_s$
1316 ± 9		BARBERIS	00H			450 $pp \rightarrow \Delta_f^{++} \eta \pi^- p_s$
1317 ± 1 ± 2		THOMPSON	97	MPS		18 $\pi^- p \rightarrow \eta \pi^- p$
1315 ± 5 ± 2		¹ AMSLER	94D	CBAR		0.0 $\bar{p} p \rightarrow \pi^0 \pi^0 \eta$
1325.1 ± 5.1		AOYAGI	93	BKEI		$\pi^- p \rightarrow \eta \pi^- p$
1317.7 ± 1.4 ± 2.0		BELADIDZE	93	VES		37 $\pi^- N \rightarrow \eta \pi^- N$
1323 ± 8	1000	² KEY	73	OSPK	−	6 $\pi^- p \rightarrow p \pi^- \eta$
• • •						• • • We do not use the following data for averages, fits, limits, etc. • • •
1307 ± 1 ± 6		³ JACKURA	18	RVUE		$\pi^- p \rightarrow \eta \pi^- p$
1315 ± 12		⁴ ADOLPH	15	COMP		191 $\pi^- p \rightarrow \eta^{(r)} \pi^- p$
1324 ± 5		ARMSTRONG	93C	E760	0	$\bar{p} p \rightarrow \pi^0 \eta \eta \rightarrow 6\gamma$
1336.2 ± 1.7	2561	DELFOSE	81	SPEC	+	$\pi^\pm p \rightarrow p \pi^\pm \eta$
1330.7 ± 2.4	1653	DELFOSE	81	SPEC	−	$\pi^\pm p \rightarrow p \pi^\pm \eta$
1324 ± 8	6200	^{2,5} CONFORTO	73	OSPK	−	6 $\pi^- p \rightarrow p \pi^- \eta$

¹ The systematic error of 2 MeV corresponds to the spread of solutions.

² Error includes 5 MeV systematic mass-scale error.

³ Superseded by RODAS 19.

⁴ ADOLPH 15 value is derived from a Breit-Wigner fit with mass-dependent width taking the $\eta\pi$ and $\rho\pi$ channels into account.

⁵ Missing mass with enriched MMS = $\eta\pi^-$, $\eta = 2\gamma$.

$\eta' \pi$ MODE

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
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The data in this block is included in the average printed for a previous datablock.

1322 $\pm$ 7 OUR AVERAGE

1318 $\pm$ 8 $^{+3}_{-5}$	IVANOV	01	B852	18 $\pi^- p \rightarrow \eta' \pi^- p$
1327.0 $\pm$ 10.7	BELADIDZE	93	VES	37 $\pi^- N \rightarrow \eta' \pi^- N$

 $a_2(1320)$ WIDTH

VALUE (MeV)	DOCUMENT ID
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107 $\pm$ 5 OUR ESTIMATE
107.8 $\pm$ 1.2 OUR AVERAGE Includes data from the 4 datablocks that follow this one.

 3π MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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The data in this block is included in the average printed for a previous datablock.

105.0 $^{+1.7}_{-1.9}$ OUR AVERAGE

106.6 $^{+3.4}_{-7.0}$	46M	¹ AGHASYAN	18B	COMP	190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$
108 $\pm$ 3 $\pm$ 15		CHUNG	02	B852	18.3 $\pi^- p \rightarrow \pi^+ \pi^- \pi^- p$
120 $\pm$ 10		BARBERIS	98B		450 $pp \rightarrow p_f \pi^+ \pi^- \pi^0 p_s$
105 $\pm$ 10 $\pm$ 11		ACCIARRI	97T	L3	$e^+ e^- \rightarrow e^+ e^- \pi^+ \pi^- \pi^0$
120 $\pm$ 10		ALBRECHT	97B	ARG	$e^+ e^- \rightarrow e^+ e^- \pi^+ \pi^- \pi^0$
103.0 $\pm$ 6.0 $\pm$ 3.3	72.4k	AMELIN	96	VES	36 $\pi^- p \rightarrow \pi^+ \pi^- \pi^0 n$
120 $\pm$ 10		ARMSTRONG	90	OMEG 0	300.0 $pp \rightarrow pp \pi^+ \pi^- \pi^0$
107.0 $\pm$ 9.7	4022	AUGUSTIN	89	DM2 $\pm$	$J/\psi \rightarrow \rho^\pm a_2^\mp$
118.5 $\pm$ 12.5	3562	AUGUSTIN	89	DM2 0	$J/\psi \rightarrow \rho^0 a_2^0$
97 $\pm$ 5		² EVANGELIS...	81	OMEG $-$	12 $\pi^- p \rightarrow 3\pi p$
96 $\pm$ 9	25k	² DAUM	80C	SPEC $-$	63,94 $\pi^- p \rightarrow 3\pi p$
110 $\pm$ 15	1097	² BALTAY	78B	HBC $+0$	15 $\pi^+ p \rightarrow p 4\pi$
112 $\pm$ 18	1.6k	² EMMS	75	DBC 0	4 $\pi^+ n \rightarrow p(3\pi)^0$
122 $\pm$ 14	1.2k	^{2,3} WAGNER	75	HBC 0	7 $\pi^+ p \rightarrow \Delta^{++} (3\pi)^0$
115 $\pm$ 15		² ANTIPOV	73C	CNTR $-$	25,40 $\pi^- p \rightarrow p \eta \pi^-$
99 $\pm$ 15	1580	CHALOUPKA	73	HBC $-$	3.9 $\pi^- p$
105 $\pm$ 5	28k	BOWEN	71	MMS $-$	5 $\pi^- p$
99 $\pm$ 5	24k	BOWEN	71	MMS $+$	5 $\pi^+ p$
103 $\pm$ 5	17k	BOWEN	71	MMS $-$	7 $\pi^- p$

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

110 $\pm$ 2 $^{+2}_{-15}$	420k	⁴ ALEKSEEV	10	COMP	190 $\pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$
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117	± 6	± 20	18k	⁵ SCHEGELSKY	06	RVUE	0	$\gamma\gamma \rightarrow \pi^+\pi^-\pi^0$
120	± 40			CONDO	93	SHF		$\gamma p \rightarrow n\pi^+\pi^+\pi^-$
115	± 14	490		BALTAY	78B	HBC	0	$15 \pi^+ p \rightarrow \Delta 3\pi$
72	± 16	5k		BINNIE	71	MMS	—	$\pi^- p$ near a_2 thresh- old
79	± 12	941		ALSTON-...	70	HBC	+	$7.0 \pi^+ p \rightarrow 3\pi p$

¹ Statistical error negligible.² From a fit to $J^P = 2^+$ $\rho\pi$ partial wave.³ Width errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.⁴ Superseded by AGHASYAN 2018B.⁵ From analysis of L3 data at 183–209 GeV.

$K\bar{K}$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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The data in this block is included in the average printed for a previous datablock.

109.8 $\pm$ 2.4 OUR AVERAGE

112	± 20	4700	^{1,2} CLELAND	82B	SPEC	+	$50 \pi^+ p \rightarrow K_S^0 K^+ p$
120	± 25	5200	^{1,2} CLELAND	82B	SPEC	—	$50 \pi^- p \rightarrow K_S^0 K^- p$
106	± 4	4000	CHABAUD	80	SPEC	—	$17 \pi^- A \rightarrow K_S^0 K^- A$
126	± 11	11000	CHABAUD	78	SPEC	—	$9.8 \pi^- p \rightarrow K^- K_S^0 p$
101	± 8	4730	CHABAUD	78	SPEC	—	$18.8 \pi^- p \rightarrow K^- K_S^0 p$
113	± 4		^{1,3} MARTIN	78D	SPEC	—	$10 \pi^- p \rightarrow K_S^0 K^- p$
105	± 8	2724	³ MARGULIE	76	SPEC	—	$23 \pi^- p \rightarrow K^- K_S^0 p$
113	± 19	730	FOLEY	72	CNTR	—	$20.3 \pi^- p \rightarrow K^- K_S^0 p$
123	± 13	1500	³ GRAYER	71	ASPK	—	$17.2 \pi^- p \rightarrow K^- K_S^0 p$

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

120	± 15	870	⁴ SCHEGELSKY	06A	RVUE	0	$\gamma\gamma \rightarrow K_S^0 K_S^0$
121	± 51	1000	^{1,2} CLELAND	82B	SPEC	+	$30 \pi^+ p \rightarrow K_S^0 K^+ p$
110	± 18	350	HYAMS	78	ASPK	+	$12.7 \pi^+ p \rightarrow K^+ K_S^0 p$

¹ From a fit to $J^P = 2^+$ partial wave.² Number of events evaluated by us.³ Width errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.⁴ From analysis of L3 data at 91 and 183–209 GeV.

$\eta\pi$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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The data in this block is included in the average printed for a previous datablock.

111.1 $\pm$ 2.4 OUR AVERAGE

115	± 20		BARBERIS	00H			$450 p p \rightarrow p_f \eta \pi^0 p_s$
112	± 14		BARBERIS	00H			$450 p p \rightarrow$ $\Delta_f^{++} \eta \pi^- p_s$
112	± 3	± 2	¹ AMSLER	94D	CBAR		$0.0 \bar{p} p \rightarrow \pi^0 \pi^0 \eta$
103	± 6	± 3	BELADIDZE	93	VES		$37 \pi^- N \rightarrow \eta \pi^- N$
112.2 $\pm$ 5.7	2561		DELFOSE	81	SPEC	+	$\pi^\pm p \rightarrow p \pi^\pm \eta$
116.6 $\pm$ 7.7	1653		DELFOSE	81	SPEC	—	$\pi^\pm p \rightarrow p \pi^\pm \eta$
108	± 9	1000	KEY	73	OSPK	—	$6 \pi^- p \rightarrow p \pi^- \eta$

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

112 ± 1 ± 8	² JACKURA	18	RVUE	$\pi^- p \rightarrow \eta \pi^- p$
119 ± 14	³ ADOLPH	15	COMP	191 $\pi^- p \rightarrow \eta^{(\prime)} \pi^- p$
127 ± 2 ± 2	⁴ THOMPSON	97	MPS	18 $\pi^- p \rightarrow \eta \pi^- p$
118 ± 10	ARMSTRONG	93C	E760	0 $\bar{p} p \rightarrow \pi^0 \eta \eta \rightarrow 6\gamma$
104 ± 9 6200	⁵ CONFORTO	73	OSPK	— 6 $\pi^- p \rightarrow p \text{MM}^-$

¹ The systematic error of 2 MeV corresponds to the spread of solutions.

² Superseded by RODAS 19.

³ ADOLPH 15 value is derived from a Breit-Wigner fit with mass-dependent width taking the $\eta\pi$ and $\rho\pi$ channels into account.

⁴ Resolution is not unfolded.

⁵ Missing mass with enriched MMS = $\eta\pi^-$, $\eta = 2\gamma$.

$\eta'\pi$ MODE

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.			

119 ± 25 OUR AVERAGE

140 ± 35 ± 20	IVANOV	01	B852	18 $\pi^- p \rightarrow \eta' \pi^- p$
106 ± 32	BELADIDZE	93	VES	37 $\pi^- N \rightarrow \eta' \pi^- N$

$a_2(1320)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1 3π	(70.1 ± 2.7) %	S=1.2
Γ_2 $\rho(770)\pi$		
Γ_3 $f_2(1270)\pi$		
Γ_4 $\rho(1450)\pi$		
Γ_5 $\eta\pi$	(14.5 ± 1.2) %	
Γ_6 $\omega\pi\pi$	(10.6 ± 3.2) %	S=1.3
Γ_7 $K\bar{K}$	(4.9 ± 0.8) %	
Γ_8 $\eta'(958)\pi$	(5.5 ± 0.9) $\times 10^{-3}$	
Γ_9 $\pi^\pm\gamma$	(2.91 ± 0.27) $\times 10^{-3}$	
Γ_{10} $\gamma\gamma$	(9.4 ± 0.7) $\times 10^{-6}$	
Γ_{11} e^+e^-	< 5 $\times 10^{-9}$	CL=90%

CONSTRAINED FIT INFORMATION

An overall fit to 5 branching ratios uses 18 measurements and one constraint to determine 4 parameters. The overall fit has a $\chi^2 = 9.3$ for 15 degrees of freedom.

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

x_5	10		
x_6	-89	-46	
x_7	-1	-2	-24
	x_1	x_5	x_6

 $a_2(1320)$ PARTIAL WIDTHS **$\Gamma(\eta\pi)$ Γ_5**

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

18.5 ± 3.0	870	¹ SCHEGELSKY 06A	RVUE	0	$\gamma\gamma \rightarrow K_S^0 K_S^0$
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¹ From analysis of L3 data at 91 and 183–209 GeV, using $\Gamma(a_2(1320) \rightarrow \gamma\gamma) = 0.91$ keV and SU(3) relations. **$\Gamma(K\bar{K})$ Γ_7**

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$7.0^{+2.0}_{-1.5}$	870	¹ SCHEGELSKY 06A	RVUE	0	$\gamma\gamma \rightarrow K_S^0 K_S^0$
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¹ From analysis of L3 data at 91 and 183–209 GeV, using $\Gamma(a_2(1320) \rightarrow \gamma\gamma) = 0.91$ keV and SU(3) relations. **$\Gamma(\pi^\pm\gamma)$ Γ_9**

VALUE (keV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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311 ± 25 OUR AVERAGE

$358 \pm 6 \pm 42$		¹ ADOLPH 14	COMP	–	190 $\pi^- \text{Pb} \rightarrow \pi^+ \pi^- \pi^- \text{Pb}'$
$284 \pm 25 \pm 25$	7.1k	MOLCHANOV 01	SELX		600 $\pi^- A \rightarrow \pi^+ \pi^- \pi^- A$
295 ± 60		CIHANGIR 82	SPEC	+	200 $\pi^+ A$

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

461 ± 110		² MAY 77	SPEC	±	9.7 γA
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¹ Primakoff reaction using $a_2(1320) \rightarrow 3\pi$ branching ratio of 70.1%.² Assuming one-pion exchange. **$\Gamma(\gamma\gamma)$ Γ_{10}**

VALUE (keV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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1.00 ± 0.06 OUR AVERAGE

$0.98 \pm 0.05 \pm 0.09$		ACCIARRI 97T	L3		$e^+ e^- \rightarrow e^+ e^- \pi^+ \pi^- \pi^0$
$0.96 \pm 0.03 \pm 0.13$		ALBRECHT 97B	ARG		$e^+ e^- \rightarrow e^+ e^- \pi^+ \pi^- \pi^0$
$1.26 \pm 0.26 \pm 0.18$	36	BARU 90	MD1		$e^+ e^- \rightarrow e^+ e^- \pi^+ \pi^- \pi^0$
$1.00 \pm 0.07 \pm 0.15$	415	BEHREND 90C	CELL	0	$e^+ e^- \rightarrow e^+ e^- \pi^+ \pi^- \pi^0$
$1.03 \pm 0.13 \pm 0.21$		BUTLER 90	MRK2		$e^+ e^- \rightarrow e^+ e^- \pi^+ \pi^- \pi^0$
$1.01 \pm 0.14 \pm 0.22$	85	OEST 90	JADE		$e^+ e^- \rightarrow e^+ e^- \pi^0 \eta$
$0.90 \pm 0.27 \pm 0.15$	56	¹ ALTHOFF 86	TASS	0	$e^+ e^- \rightarrow e^+ e^- 3\pi$
$1.14 \pm 0.20 \pm 0.26$		² ANTREASYAN 86	CBAL	0	$e^+ e^- \rightarrow e^+ e^- \pi^0 \eta$

$1.06 \pm 0.18 \pm 0.19$ BERGER 84C PLUT 0 $e^+e^- \rightarrow e^+e^-3\pi$

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

$0.81 \pm 0.19^{+0.42}_{-0.11}$ 35 ¹ BEHREND 82C CELL 0 $e^+e^- \rightarrow e^+e^-3\pi$

$0.77 \pm 0.18 \pm 0.27$ 22 ² EDWARDS 82F CBAL 0 $e^+e^- \rightarrow e^+e^-\pi^0\eta$

¹ From $\rho\pi$ decay mode.

² From $\eta\pi^0$ decay mode.

$\Gamma(e^+e^-)$

Γ_{11}

VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
< 0.56	90	ACHASOV	00K	SND $e^+e^- \rightarrow \pi^0\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<25	90	VOROBYEV	88	ND $e^+e^- \rightarrow \pi^0\eta$

$a_2(1320) \Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$\Gamma(3\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$

$\Gamma_1\Gamma_{10}/\Gamma$

VALUE (keV)	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.65 \pm 0.02 \pm 0.02$	18k	¹ SCHEGELSKY	06	RVUE $\gamma\gamma \rightarrow \pi^+\pi^-\pi^0$
¹ From analysis of L3 data at 183–209 GeV.				

$\Gamma(\eta\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$

$\Gamma_5\Gamma_{10}/\Gamma$

VALUE (keV)	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.145^{+0.097}_{-0.034}$	¹ UEHARA	09A	BELL $e^+e^- \rightarrow e^+e^-\eta\pi^0$
¹ From the D_2 -wave. The fraction of the D_0 -wave is $3.4^{+2.3}_{-1.1}\%$.			

$\Gamma(K\bar{K}) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$

$\Gamma_7\Gamma_{10}/\Gamma$

VALUE (keV)	DOCUMENT ID	TECN	COMMENT
0.126 ± 0.007 ± 0.028	¹ ALBRECHT	90G	ARG $e^+e^- \rightarrow e^+e^-K^+K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.081 \pm 0.006 \pm 0.027$	² ALBRECHT	90G	ARG $e^+e^- \rightarrow e^+e^-K^+K^-$
¹ Using an incoherent background.			
² Using a coherent background.			

$a_2(1320)$ BRANCHING RATIOS

$[\Gamma(f_2(1270)\pi) + \Gamma(\rho(1450)\pi)]/\Gamma(\rho(770)\pi)$

$(\Gamma_3 + \Gamma_4)/\Gamma_2$

VALUE	CL%	DOCUMENT ID	TECN	CHG	COMMENT
<0.12	90	ABRAMOVI...	70B	HBC	— $3.93 \pi^- p$

$\Gamma(\rho(770)\pi)/\Gamma(f_2(1270)\pi)$

Γ_2/Γ_3

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
16.5^{+1.2}_{-2.4}	46M	¹ AGHASYAN	18B	COMP 190 $\pi^- p \rightarrow \pi^- \pi^+ \pi^- p$

¹ Statistical error negligible.

$\Gamma(\eta\pi)/\Gamma(3\pi)$

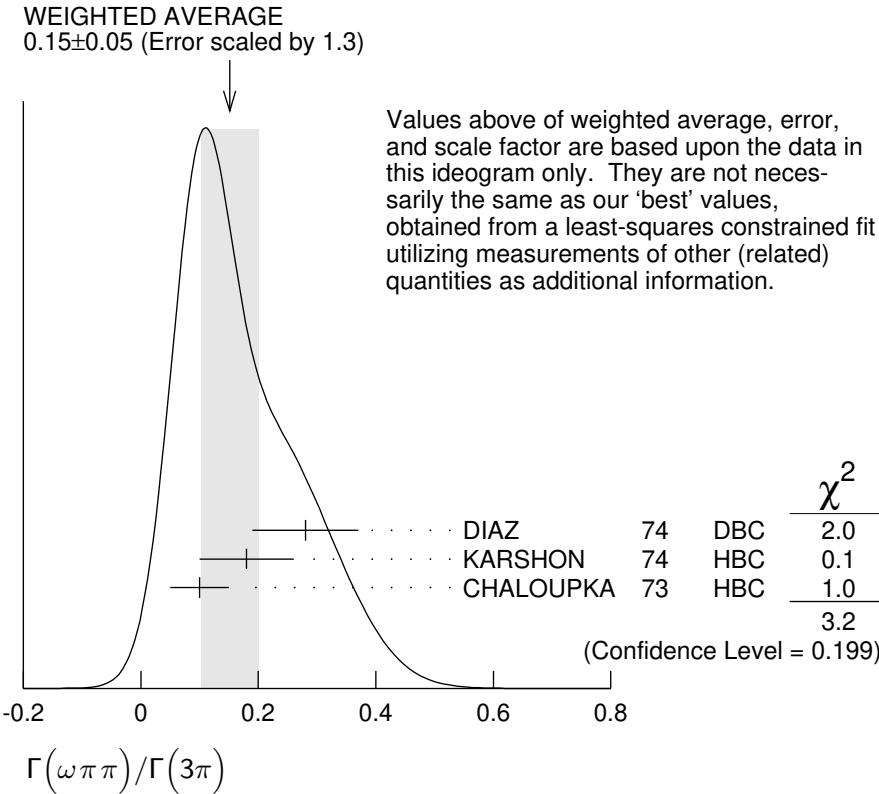
Γ_5/Γ_1

VALUE	EVTs	DOCUMENT ID	TECN	CHG	COMMENT
0.207±0.018 OUR FIT					
0.213±0.020 OUR AVERAGE					
0.18 ±0.05		FORINO	76	HBC	11 $\pi^- p$
0.22 ±0.05	52	ANTIPOV	73	CNTR	— 40 $\pi^- p$
0.211±0.044	149	CHALOUKKA	73	HBC	— 3.9 $\pi^- p$
0.246±0.042	167	ALSTON-...	71	HBC	+ 7.0 $\pi^+ p$
0.25 ±0.09	15	BOECKMANN	70	HBC	+ 5.0 $\pi^+ p$
0.23 ±0.08	22	ASCOLI	68	HBC	— 5 $\pi^- p$
0.12 ±0.08		CHUNG	68	HBC	— 3.2 $\pi^- p$
0.22 ±0.09		CONTE	67	HBC	— 11.0 $\pi^- p$

$\Gamma(\omega\pi\pi)/\Gamma(3\pi)$

Γ_6/Γ_1

VALUE	EVTs	DOCUMENT ID	TECN	CHG	COMMENT
0.15±0.05 OUR FIT	Error includes scale factor of 1.3.				
0.15±0.05 OUR AVERAGE	Error includes scale factor of 1.3. See the ideogram below.				
0.28±0.09	60	DIAZ	74	DBC	0 6 $\pi^+ n$
0.18±0.08		¹ KARSHON	74	HBC	Avg. of above two
0.10±0.05	279	² CHALOUKKA	73	HBC	— 3.9 $\pi^- p$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
0.29±0.08	140	¹ KARSHON	74	HBC	0 4.9 $\pi^+ p$
0.10±0.04	60	¹ KARSHON	74	HBC	+ 4.9 $\pi^+ p$
0.19±0.08		DEFOIX	73	HBC	0 0.7 $\bar{p} p$



¹KARSHON 74 suggest an additional $I = 0$ state strongly coupled to $\omega\pi\pi$ which could explain discrepancies in branching ratios and masses. We use a central value and a systematic spread.

²Decays to $b_1(1040)\pi$, $b_1 \rightarrow \omega\pi$. Error increased to account for possible systematic errors of complicated analysis.

 $\Gamma(K\bar{K})/\Gamma(3\pi)$ Γ_7/Γ_1

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
0.070±0.012 OUR FIT					
0.078±0.017		CHABAUD 78	RVUE		
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.011±0.003		¹ BERTIN 98B	OBLX		0.0 $\bar{p}p \rightarrow K^\pm K_s \pi^\mp$
0.056±0.014	50	² CHALOUPKA 73	HBC	—	3.9 $\pi^- p$
0.097±0.018	113	² ALSTON-... 71	HBC	+	7.0 $\pi^+ p$
0.06 ±0.03		² ABRAMOVI... 70B	HBC	—	3.93 $\pi^- p$
0.054±0.022		² CHUNG 68	HBC	—	3.2 $\pi^- p$

¹Using 4π data from BERTIN 97D.

²Included in CHABAUD 78 review.

 $\Gamma(K\bar{K})/\Gamma(\eta\pi)$ Γ_7/Γ_5

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.31 ±0.22 $^{+0.09}_{-0.11}$	¹ KOPF 21	RVUE	0.9 $p\bar{p} \rightarrow \pi^0 \pi^0 \eta, \pi^0 \eta \eta,$ $\pi^0 K^+ K^-$ and 191 $\pi^- p \rightarrow$ $\pi^- \pi^- \pi^+ p$
0.352±0.011±0.175	² ALBRECHT 20	RVUE	0.9 $\bar{p}p \rightarrow \pi^0 \pi^0 \eta, \pi^0 \eta \eta,$ $\pi^0 K^+ K^-$
0.08 ±0.02	³ BERTIN 98B	OBLX	0.0 $\bar{p}p \rightarrow K^\pm K_s \pi^\mp$

¹From T-matrix pole based on combined fit of Crystal Barrel and $\pi\pi$ scattering data (ALBRECHT 20), and COMPASS data (ADOLPH 15), using a coupled-channel model of $\eta\pi, \eta'\pi$ and $K\bar{K}$ systems.

²Residues from T-matrix pole with 2 poles, 2 channels ($\pi^0 \eta$ and $K\bar{K}$).

³Using $\eta\pi\pi$ data from AMSLER 94D.

 $\Gamma(\eta\pi)/[\Gamma(3\pi) + \Gamma(\eta\pi) + \Gamma(K\bar{K})]$ $\Gamma_5/(\Gamma_1+\Gamma_5+\Gamma_7)$

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
0.162±0.012 OUR FIT					
0.140±0.028 OUR AVERAGE					
0.13 ±0.04		ESPIGAT 72	HBC	±	0.0 $\bar{p}p$
0.15 ±0.04	34	BARNHAM 71	HBC	+	3.7 $\pi^+ p$

 $\Gamma(K\bar{K})/[\Gamma(3\pi) + \Gamma(\eta\pi) + \Gamma(K\bar{K})]$ $\Gamma_7/(\Gamma_1+\Gamma_5+\Gamma_7)$

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
0.054±0.009 OUR FIT					
0.048±0.012 OUR AVERAGE					
0.05 ±0.02		TOET 73	HBC	+	5 $\pi^+ p$
0.09 ±0.04		TOET 73	HBC	0	5 $\pi^+ p$
0.03 ±0.02	8	¹ DAMERI 72	HBC	—	11 $\pi^- p$
0.06 ±0.03	17	BARNHAM 71	HBC	+	3.7 $\pi^+ p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.020±0.004		² ESPIGAT 72	HBC	±	0.0 $\bar{p}p$

¹ Montanet agrees. Vlada.² Not averaged because of discrepancy between masses from $K\bar{K}$ and $\rho\pi$ modes. $\Gamma(\eta'(958)\pi)/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE	CL%	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.006	95	ALDE	92B	GAM2	$38,100 \pi^- p \rightarrow \eta' \pi^0 n$
<0.02	97	BARNHAM	71	HBC	$+ 3.7 \pi^+ p$
0.004 ± 0.004		¹ BOESEBECK	68	HBC	$+ 8 \pi^+ p$

¹ No longer valid since $\Gamma(K\bar{K})/\Gamma(3\pi)$ value has changed (MORRISON 71). $\Gamma(\eta'(958)\pi)/\Gamma(3\pi)$ Γ_8/Γ_1

VALUE	CL%	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.011	90	EISENSTEIN	73	HBC	$- 5 \pi^- p$
<0.04		ALSTON-...	71	HBC	$+ 7.0 \pi^+ p$
$0.04^{+0.03}_{-0.04}$		BOECKMANN	70	HBC	$0 5.0 \pi^+ p$

 $\Gamma(\eta'(958)\pi)/\Gamma(\eta\pi)$ Γ_8/Γ_5

VALUE	DOCUMENT ID	TECN	COMMENT
0.038 ± 0.005 OUR AVERAGE			
0.05 ± 0.02	ADOLPH	15	COMP $191 \pi^- p \rightarrow \eta^{(\prime)} \pi^- p$
0.032 ± 0.009	ABELE	97C	CBAR $0.0 \bar{p} p \rightarrow \pi^0 \pi^0 \eta'$
$0.047 \pm 0.010 \pm 0.004$	¹ BELADIDZE	93	VES $37 \pi^- N \rightarrow a_2^- N$
$0.034 \pm 0.008 \pm 0.005$	BELADIDZE	92	VES $36 \pi^- C \rightarrow a_2^- C$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.046 \pm 0.015^{+0.07}_{-0.006}$	² KOPF	21	RVUE $0.9 p \bar{p} \rightarrow \pi^0 \pi^0 \eta, \pi^0 \eta \eta,$ $\pi^0 K^+ K^-$ and $191 \pi^- p \rightarrow \pi^- \pi^- \pi^+ p$

¹ Using $B(\eta' \rightarrow \pi^+ \pi^- \eta) = 0.441$, $B(\eta \rightarrow \gamma \gamma) = 0.389$ and $B(\eta \rightarrow \pi^+ \pi^- \pi^0) = 0.236$.² From T-matrix pole based on combined fit of Crystal Barrel and $\pi\pi$ scattering data (ALBRECHT 20), and COMPASS data (ADOLPH 15), using a coupled-channel model of $\eta\pi$, $\eta'\pi$ and $K\bar{K}$ systems. $\Gamma(\pi^\pm \gamma)/\Gamma_{\text{total}}$ Γ_9/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.005^{+0.005}_{-0.003}$	¹ EISENBERG	72	HBC $4.3, 5.25, 7.5 \gamma p$

¹ Pion-exchange model used in this estimation. $\Gamma(e^+ e^-)/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE (units 10^{-9})	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<6	90	ACHASOV	00K	SND $e^+ e^- \rightarrow \pi^0 \pi^0$

$a_2(1320)$ REFERENCES

KOPF	21	EPJ C81 1056	B. Kopf <i>et al.</i>	(BOCH)
ALBRECHT	20	EPJ C80 453	M. Albrecht <i>et al.</i>	(Crystal Barrel Collab.)
RODAS	19	PRL 122 042002	A. Rodas <i>et al.</i>	(JPAC Collab.)
AGHASYAN	18B	PR D98 092003	M. Aghasyan <i>et al.</i>	(COMPASS Collab.)
JACKURA	18	PL B779 464	A. Jackura <i>et al.</i>	(JPAC and COMPASS Collab.)
ADOLPH	15	PL B740 303	M. Adolph <i>et al.</i>	(COMPASS Collab.)
ADOLPH	14	EPJ A50 79	C. Adolph <i>et al.</i>	(COMPASS Collab.)
ALEKSEEV	10	PRL 104 241803	M.G. Alekseev <i>et al.</i>	(COMPASS Collab.)
ANISOVICH	09	IJMP A24 2481	V.V. Anisovich, A.V. Sarantsev	(PNPI)
UEHARA	09A	PR D80 032001	S. Uehara <i>et al.</i>	(BELLE Collab.)
SCHEGELSKY	06	EPJ A27 199	V.A. Schegelsky <i>et al.</i>	
SCHEGELSKY	06A	EPJ A27 207	V.A. Schegelsky <i>et al.</i>	
CHUNG	02	PR D65 072001	S.U. Chung <i>et al.</i>	(BNL E852 Collab.)
IVANOV	01	PRL 86 3977	E.I. Ivanov <i>et al.</i>	(BNL E852 Collab.)
MOLCHANOV	01	PL B521 171	V.V. Molchanov <i>et al.</i>	(FNAL SELEX Collab.)
ACHASOV	00K	PL B492 8	M.N. Achasov <i>et al.</i>	(Novosibirsk SND Collab.)
BARBERIS	00H	PL B488 225	D. Barberis <i>et al.</i>	(WA 102 Collab.)
BARBERIS	98B	PL B422 399	D. Barberis <i>et al.</i>	(WA 102 Collab.)
BERTIN	98B	PL B434 180	A. Bertin <i>et al.</i>	(OBELIX Collab.)
ABELE	97C	PL B404 179	A. Abele <i>et al.</i>	(Crystal Barrel Collab.)
ACCIARRI	97T	PL B413 147	M. Acciarri <i>et al.</i>	(L3 Collab.)
ALBRECHT	97B	ZPHY C74 469	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
THOMPSON	97	PRL 79 1630	D.R. Thompson <i>et al.</i>	(BNL E852 Collab.)
AMELIN	96	ZPHY C70 71	D.V. Amelin <i>et al.</i>	(SERP, TBIL)
AMSLER	94D	PL B333 277	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
AOYAGI	93	PL B314 246	H. Aoyagi <i>et al.</i>	(BKEI Collab.)
ARMSTRONG	93C	PL B307 394	T.A. Armstrong <i>et al.</i>	(FNAL, FERR, GENO+)
BELADIDZE	93	PL B313 276	G.M. Beladidze <i>et al.</i>	(VES Collab.)
CONDO	93	PR D48 3045	G.T. Condo <i>et al.</i>	(SLAC Hybrid Collab.)
ALDE	92B	ZPHY C54 549	D.M. Alde <i>et al.</i>	(SERP, BELG, LANL, LAPP+)
BELADIDZE	92	ZPHY C54 235	G.M. Beladidze <i>et al.</i>	(VES Collab.)
ALBRECHT	90G	ZPHY C48 183	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ARMSTRONG	90	ZPHY C48 213	T.A. Armstrong, M. Benayoun, W. Beusch	(WA76 Coll.)
BARU	90	ZPHY C48 581	S.E. Baru <i>et al.</i>	(MD-1 Collab.)
BEHREND	90C	ZPHY C46 583	H.J. Behrend <i>et al.</i>	(CELLO Collab.)
BUTLER	90	PR D42 1368	F. Butler <i>et al.</i>	(Mark II Collab.)
OEST	90	ZPHY C47 343	T. Oest <i>et al.</i>	(JADE Collab.)
AUGUSTIN	89	NP B320 1	J.E. Augustin, G. Cosme	(DM2 Collab.)
VOROBYEV	88	SJNP 48 273	P.V. Vorobiev <i>et al.</i>	(NOVO)
ALTHOFF	86	ZPHY C31 537	M. Althoff <i>et al.</i>	(TASSO Collab.)
ANTREASYAN	86	PR D33 1847	D. Antreasyan <i>et al.</i>	(Crystal Ball Collab.)
BERGER	84C	PL 149B 427	C. Berger <i>et al.</i>	(PLUTO Collab.)
BEHREND	82C	PL 114B 378	H.J. Behrend <i>et al.</i>	(CELLO Collab.)
Also		PL 125B 518 (errat.)	H.J. Behrend <i>et al.</i>	(CELLO Collab.)
CIHANGIR	82	PL 117B 123	S. Cihangir <i>et al.</i>	(FNAL, MINN, ROCH)
CLELAND	82B	NP B208 228	W.E. Cleland <i>et al.</i>	(DURH, GEVA, LAUS+)
EDWARDS	82F	PL 110B 82	C. Edwards <i>et al.</i>	(CIT, HARV, PRIN+)
DELFOSSÉ	81	NP B183 349	A. Delfosse <i>et al.</i>	(GEVA, LAUS)
EVANGELIS...	81	NP B178 197	C. Evangelista <i>et al.</i>	(BARI, BONN, CERN+)
CHABAUD	80	NP B175 189	V. Chabaud <i>et al.</i>	(CERN, MPIM, AMST)
DAUM	80C	PL 89B 276	C. Daum <i>et al.</i>	(AMST, CERN, CRAC, MPIM+) JP
BALTAY	78B	PR D17 62	C. Baltay <i>et al.</i>	(COLU, BING)
CHABAUD	78	NP B145 349	V. Chabaud <i>et al.</i>	(CERN, MPIM)
FERRERSORIA	78	PL 74B 287	A. Ferrer Soria <i>et al.</i>	(ORSAY, CERN, CDEF+)
HYAMS	78	NP B146 303	B.D. Hyams <i>et al.</i>	(CERN, MPIM, ATEN)
MARTIN	78D	PL 74B 417	A.D. Martin <i>et al.</i>	(DURH, GEVA) JP
MAY	77	PR D16 1983	E.N. May <i>et al.</i>	(ROCH, CORN)
FORINO	76	NC 35A 465	A. Forino <i>et al.</i>	(BGNA, FIRZ, GENO, MILA+)
MARGULIE	76	PR D14 667	M. Margulies <i>et al.</i>	(BNL, CUNY)
EMMS	75	PL 58B 117	M.J. Emms <i>et al.</i>	(BIRM, DURH, RHEL) JP
WAGNER	75	PL 58B 201	F. Wagner, M. Tabak, D.M. Chew	(LBL) JP
DIAZ	74	PRL 32 260	J. Diaz <i>et al.</i>	(CASE, CMU)
KARSHON	74	PRL 32 852	U. Karshon <i>et al.</i>	(REHO)
ANTIPOV	73	NP B63 175	Y.M. Antipov <i>et al.</i>	(CERN, SERP) JP
ANTIPOV	73C	NP B63 153	Y.M. Antipov <i>et al.</i>	(CERN, SERP) JP
CHALOUPKA	73	PL 44B 211	V. Chaloupka <i>et al.</i>	(CERN)
CONFORTO	73	PL 45B 154	G. Conforto <i>et al.</i>	(EFI, FNAL, TNTO+)

DEFOIX	73	PL 43B 141	C. Defoix <i>et al.</i>	(CDEF)
EISENSTEIN	73	PR D7 278	L. Eisenstein <i>et al.</i>	(ILL)
KEY	73	PRL 30 503	A.W. Key <i>et al.</i>	(TNTO, EFI, FNAL, WISC)
TOET	73	NP B63 248	D.Z. Toet <i>et al.</i>	(NIJM, BONN, DURH, TORI)
DAMERI	72	NC 9A 1	M. Dameri <i>et al.</i>	(GENO, MILA, SACL)
EISENBERG	72	PR D5 15	Y. Eisenberg <i>et al.</i>	(REHO, SLAC, TELA)
ESPIGAT	72	NP B36 93	P. Espigat <i>et al.</i>	(CERN, CDEF)
FOLEY	72	PR D6 747	K.J. Foley <i>et al.</i>	(BNL, CUNY)
ALSTON-...	71	PL 34B 156	M. Alston-Garnjost <i>et al.</i>	(LRL)
BARNHAM	71	PRL 26 1494	K.W.J. Barnham <i>et al.</i>	(LBL)
BINNIE	71	PL 36B 257	D.M. Binnie <i>et al.</i>	(LOIC, SHMP)
BOWEN	71	PRL 26 1663	D.R. Bowen <i>et al.</i>	(NEAS, STON)
GRAYER	71	PL 34B 333	G. Grayer <i>et al.</i>	(CERN, MPIM)
ABRAMOVI...	70B	NP B23 466	M. Abramovich <i>et al.</i>	(CERN) JP
ALSTON-...	70	PL 33B 607	M. Alston-Garnjost <i>et al.</i>	(LRL)
BOECKMANN	70	NP B16 221	K. Boeckmann <i>et al.</i>	(BONN, DURH, NIJM+)
ASCOLI	68	PRL 20 1321	G. Ascoli <i>et al.</i>	(ILL) JP
BOESEBECK	68	NP B4 501	K. Boesebeck <i>et al.</i>	(AACH, BERL, CERN)
CHUNG	68	PR 165 1491	S.U. Chung <i>et al.</i>	(LRL)
CONTE	67	NC 51A 175	F. Conte <i>et al.</i>	(GENO, HAMB, MILA, SACL)
