

a₂(1320)

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

a₂(1320) T-MATRIX POLE \sqrt{s}

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

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
(1305–1321)–i(52–58) OUR ESTIMATE			
(1318.7 ± 1.9 ± 1.3)–i(53.8 ± 2.3 ^{+1.7} _{–0.9})	¹ KOPF	21	RVUE 0.9 $p\bar{p} \rightarrow \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0K^+K^-$ and 191 $\pi^-p \rightarrow$ $\pi^-\pi^-\pi^+p$
(1312.5 ± 0.7 ± 2.6)–i(53.5 ± 0.6 ± 1.9)	² ALBRECHT	20	RVUE 0.9 $\bar{p}p \rightarrow \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0K^+K^-$
(1306.0 ± 0.8 ± 1.3)–i(57.2 ± 0.8 ± 0.0)	³ RODAS	19	RVUE 91 $\pi^-p \rightarrow \eta^{(\prime)}\pi^-p$
(1309 ± 4) – i (55 ± 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.

a₂(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 ± 2 ± 2		CHUNG	02	B852	18.3 $\pi^-p \rightarrow$ $\pi^+\pi^-\pi^-p$
1317 ± 3		BARBERIS	98B		450 $pp \rightarrow$ $p_f\pi^+\pi^-\pi^0p_s$
1323 ± 4 ± 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 ± 1.6 ± 3.0	72.4k	AMELIN	96	VES	36 $\pi^-p \rightarrow$ $\pi^+\pi^-\pi^0n$
1310 ± 5		ARMSTRONG	90	OMEG 0	300.0 $pp \rightarrow$ $pp\pi^+\pi^-\pi^0$

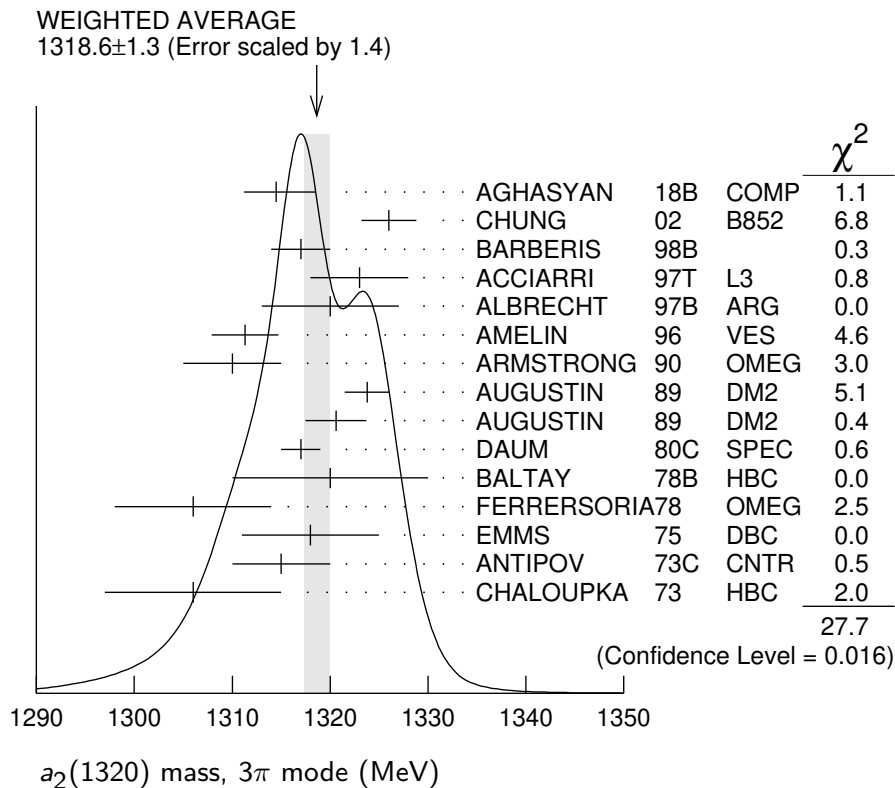
1323.8 ± 2.3	4022	AUGUSTIN	89	DM2	±	$J/\psi \rightarrow \rho^\pm a_2^\mp$
1320.6 ± 3.1	3562	AUGUSTIN	89	DM2	0	$J/\psi \rightarrow \rho^0 a_2^0$
1317 ± 2	25k	² DAUM	80C	SPEC	−	63,94 $\pi^- p \rightarrow 3\pi p$
1320 ± 10	1097	² BALTAY	78B	HBC	+0	15 $\pi^+ p \rightarrow p4\pi$
1306 ± 8		FERRERSORIA	78	OMEG	−	9 $\pi^- p \rightarrow p3\pi$
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 $p p \rightarrow p_f \eta \pi^0 p_S$
1316 ± 9		BARBERIS	00H			450 $p p \rightarrow \Delta_f^{++} \eta \pi^- p_S$
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 $\pi^- p \rightarrow \eta^{(\prime)} \pi^- p$
1324 ± 5		ARMSTRONG	93C	E760	0	$\bar{p} p \rightarrow \pi^0 \eta \eta \rightarrow 6\gamma$
1336.2 ± 1.7	2561	DELFOSSÉ	81	SPEC	+	$\pi^\pm p \rightarrow p \pi^\pm \eta$
1330.7 ± 2.4	1653	DELFOSSÉ	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
 The data in this block is included in the average printed for a previous datablock.

1322 ± 7 OUR AVERAGE

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

$a_2(1320)$ WIDTH

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

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.

105.0 $\begin{smallmatrix} + \\ - \end{smallmatrix}$ $\begin{smallmatrix} 1.7 \\ 1.9 \end{smallmatrix}$ OUR AVERAGE

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

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

110	± 2	$\begin{matrix} +2 \\ -15 \end{matrix}$	420k	⁴ ALEKSEEV	10	COMP		190 $\pi^- Pb \rightarrow$ $\pi^- \pi^- \pi^+ Pb'$
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

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

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 ± 5.7	2561	DELFOSSÉ	81	SPEC	+	$\pi^\pm p \rightarrow p\pi^\pm \eta$
116.6 ± 7.7	1653	DELFOSSÉ	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	-	$6 \pi^- p \rightarrow pMM^-$

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

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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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) × 10 ⁻³	
Γ_9 $\pi^\pm \gamma$	(2.91 ± 0.27) × 10 ⁻³	
Γ_{10} $\gamma\gamma$	(9.4 ± 0.7) × 10 ⁻⁶	
Γ_{11} $e^+ e^-$	< 5 × 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 ± 6 ± 42		¹ ADOLPH	14	COMP	- 190 $\pi^- \text{Pb} \rightarrow \pi^+ \pi^- \pi^- \text{Pb}'$
284 ± 25 ± 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}**

<u>VALUE (keV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
1.00±0.06 OUR AVERAGE					
0.98±0.05±0.09		ACCIARRI	97T L3		$e^+e^- \rightarrow e^+e^-\pi^+\pi^-\pi^0$
0.96±0.03±0.13		ALBRECHT	97B ARG		$e^+e^- \rightarrow e^+e^-\pi^+\pi^-\pi^0$
1.26±0.26±0.18	36	BARU	90 MD1		$e^+e^- \rightarrow e^+e^-\pi^+\pi^-\pi^0$
1.00±0.07±0.15	415	BEHREND	90C CELL	0	$e^+e^- \rightarrow e^+e^-\pi^+\pi^-\pi^0$
1.03±0.13±0.21		BUTLER	90 MRK2		$e^+e^- \rightarrow e^+e^-\pi^+\pi^-\pi^0$
1.01±0.14±0.22	85	OEST	90 JADE		$e^+e^- \rightarrow e^+e^-\pi^0\eta$
0.90±0.27±0.15	56	¹ ALTHOFF	86 TASS	0	$e^+e^- \rightarrow e^+e^-3\pi$
1.14±0.20±0.26		² ANTREASYAN	86 CBAL	0	$e^+e^- \rightarrow e^+e^-\pi^0\eta$
1.06±0.18±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±0.19 ^{+0.42} _{-0.11}	35	¹ BEHREND	82C CELL	0	$e^+e^- \rightarrow e^+e^-3\pi$
0.77±0.18±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}**

<u>VALUE (eV)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
< 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	$e^+e^- \rightarrow \pi^0\eta$

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

$\Gamma(3\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ **$\Gamma_1\Gamma_{10}/\Gamma$**

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

$\Gamma(\eta\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ **$\Gamma_5\Gamma_{10}/\Gamma$**

<u>VALUE (keV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● 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 $3.4^{+2.3}_{-1.1}\%$.			

$\Gamma(K\bar{K}) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$							$\Gamma_7\Gamma_{10}/\Gamma$
<u>VALUE (keV)</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>		
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±0.006±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

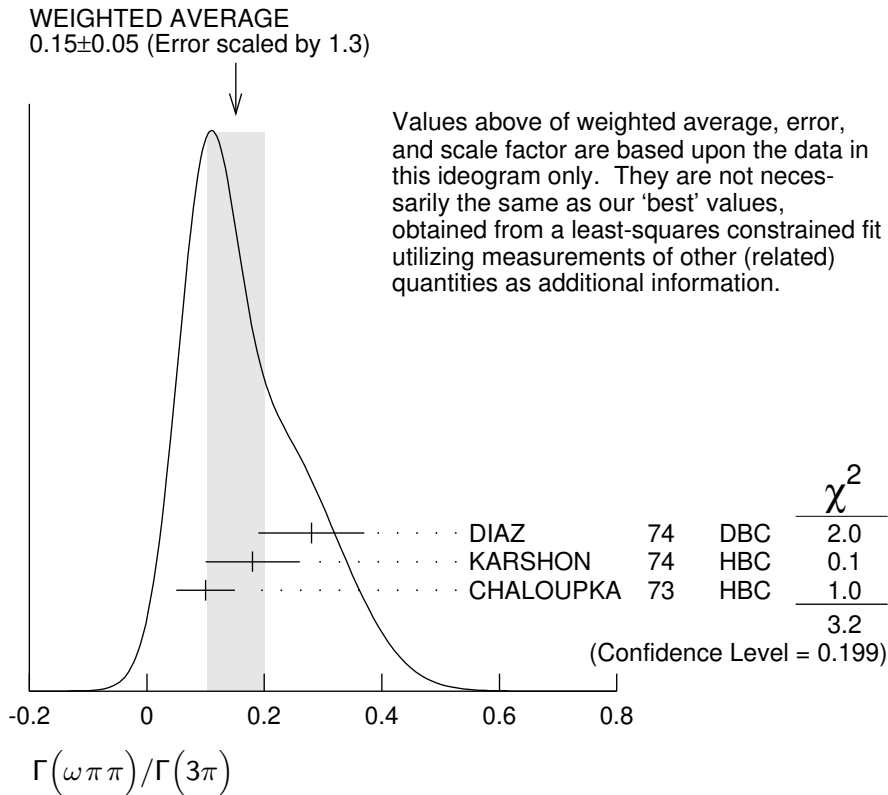
$[\Gamma(f_2(1270)\pi) + \Gamma(\rho(1450)\pi)]/\Gamma(\rho(770)\pi)$							$(\Gamma_3+\Gamma_4)/\Gamma_2$
<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>		
<0.12	90	ABRAMOVI...	70B	HBC	-	3.93 π^-p	

$\Gamma(\rho(770)\pi)/\Gamma(f_2(1270)\pi)$							Γ_2/Γ_3
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>		
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
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>		
0.207±0.018 OUR FIT							
0.213±0.020 OUR AVERAGE							
0.18 ±0.05		FORINO	76	HBC		11 π^-p	
0.22 ±0.05	52	ANTIPOV	73	CNTR	-	40 π^-p	
0.211±0.044	149	CHALOUPKA	73	HBC	-	3.9 π^-p	
0.246±0.042	167	ALSTON-...	71	HBC	+	7.0 π^+p	
0.25 ±0.09	15	BOECKMANN	70	HBC	+	5.0 π^+p	
0.23 ±0.08	22	ASCOLI	68	HBC	-	5 π^-p	
0.12 ±0.08		CHUNG	68	HBC	-	3.2 π^-p	
0.22 ±0.09		CONTE	67	HBC	-	11.0 π^-p	

$\Gamma(\omega\pi\pi)/\Gamma(3\pi)$							Γ_6/Γ_1
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>		
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 π^+n	
0.18±0.08		¹ KARSHON	74	HBC		Avg. of above two	
0.10±0.05	279	² CHALOUPKA	73	HBC	-	3.9 π^-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 π^+p	
0.10±0.04	60	¹ KARSHON	74	HBC	+	4.9 π^+p	
0.19±0.08		DEFOIX	73	HBC	0	0.7 $\bar{p}p$	

- ¹ KARSHON 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.
² Decays 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	$3.2 \pi^- p$

¹ Using 4π data from BERTIN 97D.

² Included 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 $\begin{smallmatrix} +0.09 \\ -0.11 \end{smallmatrix}$	¹ KOPF	21	RVUE	0.9	$p\bar{p} \rightarrow \pi^0\pi^0\eta, \pi^0\eta\eta,$ $\pi^0K^+K^-$ and 191 $\pi^-p \rightarrow$ $\pi^-\pi^-\pi^+p$
0.352±0.011±0.175	² ALBRECHT	20	RVUE	0.9	$\bar{p}p \rightarrow \pi^0\pi^0\eta, \pi^0\eta\eta,$ $\pi^0K^+K^-$
0.08 ±0.02	³ BERTIN	98B	OBLX	0.0	$\bar{p}p \rightarrow K^\pm K_S^0 \pi^\mp$

¹ 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.

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

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

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

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
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 π^+p

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

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
0.054±0.009 OUR FIT					
0.048±0.012 OUR AVERAGE					
0.05 ±0.02		TOET	73	HBC	+ 5 π^+p
0.09 ±0.04		TOET	73	HBC	0 5 π^+p
0.03 ±0.02	8	¹ DAMERI	72	HBC	- 11 π^-p
0.06 ±0.03	17	BARNHAM	71	HBC	+ 3.7 π^+p

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

0.020±0.004		² ESPIGAT	72	HBC	± 0.0 $\bar{p}p$
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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

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

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

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)