

# $\rho_3(1690)$

$$I^G(J^{PC}) = 1^+(3^{--})$$

## $\rho_3(1690)$ MASS

VALUE (MeV)                      DOCUMENT ID  
**1688.8 ± 2.1 OUR AVERAGE** Includes data from the 5 datablocks that follow this one.

### 2π MODE

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

#### 1686 ± 4 OUR AVERAGE

1677 ± 14		EVANGELIS...	81	OMEG	−	12	$\pi^- p \rightarrow 2\pi p$
1679 ± 11	476	BALTAY	78B	HBC	0	15	$\pi^+ p \rightarrow$ $\pi^+ \pi^- n$
1678 ± 12	175	1 ANTIPOV	77	CIBS	0	25	$\pi^- p \rightarrow p3\pi$
1690 ± 7	600	1 ENGLER	74	DBC	0	6	$\pi^+ n \rightarrow$ $\pi^+ \pi^- p$
1693 ± 8		2 GRAYER	74	ASPK	0	17	$\pi^- p \rightarrow$ $\pi^+ \pi^- n$
1678 ± 12		MATTHEWS	71c	DBC	0	7	$\pi^+ N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●							
1734 ± 10		3 CORDEN	79	OMEG		12–15	$\pi^- p \rightarrow$ $n2\pi$
1692 ± 12		2,4 ESTABROOKS	75	RVUE		17	$\pi^- p \rightarrow$ $\pi^+ \pi^- n$
1737 ± 23		ARMENISE	70	DBC	0	9	$\pi^+ N$
1650 ± 35	122	BARTSCH	70B	HBC	+	8	$\pi^+ p \rightarrow N2\pi$
1687 ± 21		STUNTEBECK	70	HDBC	0	8	$\pi^- p, 5.4 \pi^+ d$
1683 ± 13		ARMENISE	68	DBC	0	5.1	$\pi^+ d$
1670 ± 30		GOLDBERG	65	HBC	0	6	$\pi^+ d, 8 \pi^- p$

<sup>1</sup> Mass errors enlarged by us to  $\Gamma/\sqrt{N}$ ; see the note with the  $K^*(892)$  mass.

<sup>2</sup> Uses same data as HYAMS 75.

<sup>3</sup> From a phase shift solution containing a  $f'_2(1525)$  width two times larger than the  $K\bar{K}$  result.

<sup>4</sup> From phase-shift analysis. Error takes account of spread of different phase-shift solutions.

### $K\bar{K}$ AND $K\bar{K}\pi$ MODES

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

#### 1696 ± 4 OUR AVERAGE

1699 ± 5		ALPER	80	CNTR	0	62	$\pi^- p \rightarrow$ $K^+ K^- n$
1698 ± 12	6k	5,6 MARTIN	78D	SPEC		10	$\pi p \rightarrow$ $K_S^0 K^- p$
1692 ± 6		BLUM	75	ASPK	0	18.4	$\pi^- p \rightarrow$ $nK^+ K^-$
1690 ± 16		ADERHOLZ	69	HBC	+	8	$\pi^+ p \rightarrow K\bar{K}\pi$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●							
1694 ± 8		7 COSTA...	80	OMEG		10	$\pi^- p \rightarrow$ $K^+ K^- n$

<sup>5</sup> From a fit to  $J^P = 3^-$  partial wave.

<sup>6</sup> Systematic error on mass scale subtracted.

<sup>7</sup> They cannot distinguish between  $\rho_3(1690)$  and  $\omega_3(1670)$ .

### $(4\pi)^\pm$ MODE

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

#### **1686 ± 5 OUR AVERAGE** Error includes scale factor of 1.1.

1694 ± 6		<sup>8</sup> EVANGELIS...	81	OMEG	-	12 $\pi^- p \rightarrow p4\pi$
1665 ± 15	177	BALTAY	78B	HBC	+	15 $\pi^+ p \rightarrow p4\pi$
1670 ± 10		THOMPSON	74	HBC	+	13 $\pi^+ p$
1687 ± 20		CASON	73	HBC	-	8,18.5 $\pi^- p$
1685 ± 14		<sup>9</sup> CASON	73	HBC	-	8,18.5 $\pi^- p$
1680 ± 40	144	BARTSCH	70B	HBC	+	8 $\pi^+ p \rightarrow N4\pi$
1689 ± 20	102	<sup>9</sup> BARTSCH	70B	HBC	+	8 $\pi^+ p \rightarrow N2\rho$
1705 ± 21		CASO	70	HBC	-	11.2 $\pi^- p \rightarrow n\rho2\pi$

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

1718 ± 10		<sup>10</sup> EVANGELIS...	81	OMEG	-	12 $\pi^- p \rightarrow p4\pi$
1673 ± 9		<sup>11</sup> EVANGELIS...	81	OMEG	-	12 $\pi^- p \rightarrow p4\pi$
1733 ± 9	66	<sup>9</sup> KLIGER	74	HBC	-	4.5 $\pi^- p \rightarrow p4\pi$
1630 ± 15		HOLMES	72	HBC	+	10-12 $K^+ p$
1720 ± 15		BALTAY	68	HBC	+	7, 8.5 $\pi^+ p$

<sup>8</sup> From  $\rho^- \rho^0$  mode, not independent of the other two EVANGELISTA 81 entries.

<sup>9</sup> From  $\rho^\pm \rho^0$  mode.

<sup>10</sup> From  $a_2(1320)^- \pi^0$  mode, not independent of the other two EVANGELISTA 81 entries.

<sup>11</sup> From  $a_2(1320)^0 \pi^-$  mode, not independent of the other two EVANGELISTA 81 entries.

### $\omega\pi$ MODE

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

#### **1681 ± 7 OUR AVERAGE**

1670 ± 25		<sup>12</sup> ALDE	95	GAM2		38 $\pi^- p \rightarrow \omega\pi^0 n$
1690 ± 15		EVANGELIS...	81	OMEG	-	12 $\pi^- p \rightarrow \omega\pi p$
1666 ± 14		GESSAROLI	77	HBC		11 $\pi^- p \rightarrow \omega\pi p$
1686 ± 9		THOMPSON	74	HBC	+	13 $\pi^+ p$

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

1654 ± 24		BARNHAM	70	HBC	+	10 $K^+ p \rightarrow \omega\pi X$
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<sup>12</sup> Supersedes ALDE 92C.

## $\eta\pi^+\pi^-$ MODE

(For difficulties with MMS experiments, see the  $a_2(1320)$  mini-review in the 1973 edition.)

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

### **1682±12 OUR AVERAGE**

1685±10±20	AMELIN	00	VES	37 $\pi^- p \rightarrow \eta\pi^+\pi^- n$
1680±15	FUKUI	88	SPEC 0	8.95 $\pi^- p \rightarrow \eta\pi^+\pi^- n$

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

1700±47	<sup>13</sup> ANDERSON	69	MMS	– 16 $\pi^- p$ backward
1632±15	<sup>13,14</sup> FOCACCI	66	MMS	– 7–12 $\pi^- p \rightarrow \rho MM$
1700±15	<sup>13,14</sup> FOCACCI	66	MMS	– 7–12 $\pi^- p \rightarrow \rho MM$
1748±15	<sup>13,14</sup> FOCACCI	66	MMS	– 7–12 $\pi^- p \rightarrow \rho MM$

<sup>13</sup> Seen in 2.5–3 GeV/c  $\bar{p}p$ .  $2\pi^+2\pi^-$ , with 0, 1, 2  $\pi^+\pi^-$  pairs in  $\rho$  band not seen by OREN 74 (2.3 GeV/c  $\bar{p}p$ ) with more statistics. (Jan. 1976)

<sup>14</sup> Not seen by BOWEN 72.

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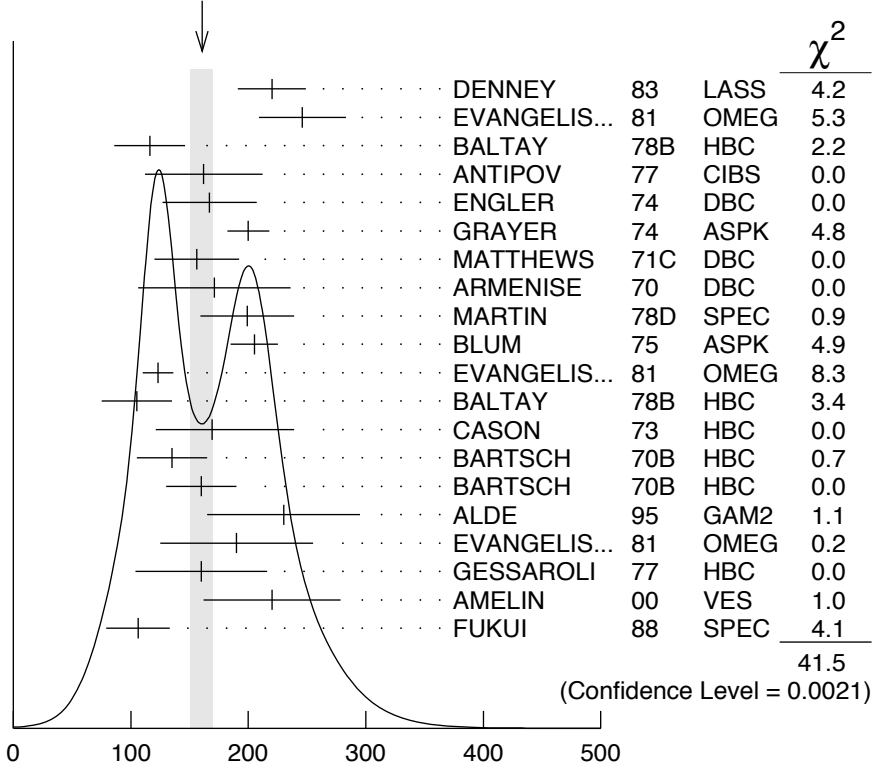
## $\rho_3(1690)$ WIDTH

### **2 $\pi$ , $K\bar{K}$ , AND $K\bar{K}\pi$ MODES**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>
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**161±10 OUR AVERAGE** Includes data from the 5 datablocks that follow this one. Error includes scale factor of 1.5. See the ideogram below.

WEIGHTED AVERAGE  
 $161 \pm 10$  (Error scaled by 1.5)



$\rho_3(1690)$  width,  $2\pi$ ,  $K\bar{K}$ , and  $K\bar{K}\pi$  modes (MeV)

**2 $\pi$  MODE**

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

**186 ± 14 OUR AVERAGE** Error includes scale factor of 1.3. See the ideogram below.

220 ± 29		DENNEY	83	LASS	10	$\pi^+ N$
246 ± 37		EVANGELIS...	81	OMEG	—	12 $\pi^- p \rightarrow 2\pi p$
116 ± 30	476	BALTAY	78B	HBC	0	15 $\pi^+ p \rightarrow$ $\pi^+ \pi^- n$
162 ± 50	175	15 ANTIPOV	77	CIBS	0	25 $\pi^- p \rightarrow p 3\pi$
167 ± 40	600	ENGLER	74	DBC	0	6 $\pi^+ n \rightarrow$ $\pi^+ \pi^- p$
200 ± 18		16 GRAYER	74	ASPK	0	17 $\pi^- p \rightarrow$ $\pi^+ \pi^- n$
156 ± 36		MATTHEWS	71C	DBC	0	7 $\pi^+ N$
171 ± 65		ARMENISE	70	DBC	0	9 $\pi^+ d$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●						
322 ± 35		17 CORDEN	79	OMEG		12–15 $\pi^- p \rightarrow$ $n 2\pi$
240 ± 30		16,18 ESTABROOKS	75	RVUE		17 $\pi^- p \rightarrow$ $\pi^+ \pi^- n$
180 ± 30	122	BARTSCH	70B	HBC	+	8 $\pi^+ p \rightarrow N 2\pi$

$267^{+72}_{-46}$	STUNTEBECK 70	HDBC 0	$8 \pi^- p, 5.4 \pi^+ d$
$188 \pm 49$	ARMENISE 68	DBC 0	$5.1 \pi^+ d$
$180 \pm 40$	GOLDBERG 65	HBC 0	$6 \pi^+ d, 8 \pi^- p$

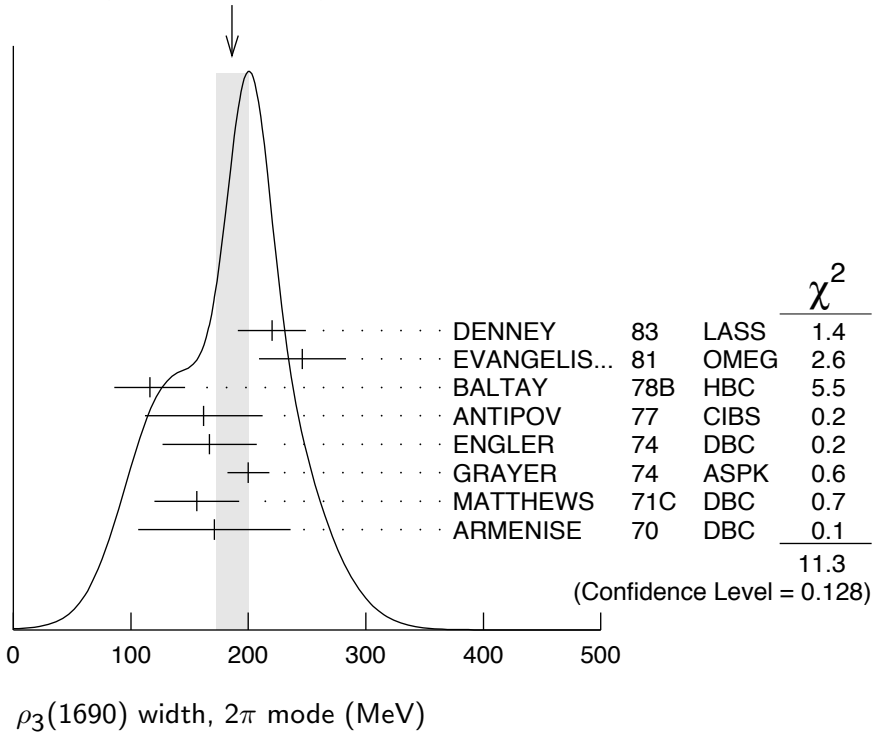
<sup>15</sup> Width errors enlarged by us to  $4\Gamma/\sqrt{N}$ ; see the note with the  $K^*(892)$  mass.

<sup>16</sup> Uses same data as HYAMS 75 and BECKER 79.

<sup>17</sup> From a phase shift solution containing a  $f_2'(1525)$  width two times larger than the  $K\bar{K}$  result.

<sup>18</sup> From phase-shift analysis. Error takes account of spread of different phase-shift solutions.

WEIGHTED AVERAGE  
 $186 \pm 14$  (Error scaled by 1.3)



### $K\bar{K}$ AND $K\bar{K}\pi$ MODES

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.

#### **204 ± 18 OUR AVERAGE**

$199 \pm 40$	6000	<sup>19</sup> MARTIN	78D	SPEC	$10 \pi p \rightarrow K_S^0 K^- p$
$205 \pm 20$		BLUM	75	ASPK 0	$18.4 \pi^- p \rightarrow n K^+ K^-$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
$219 \pm 4$		ALPER	80	CNTR 0	$62 \pi^- p \rightarrow K^+ K^- n$
$186 \pm 11$		<sup>20</sup> COSTA...	80	OMEG	$10 \pi^- p \rightarrow K^+ K^- n$
$112 \pm 60$		ADERHOLZ	69	HBC +	$8 \pi^+ p \rightarrow K\bar{K}\pi$

<sup>19</sup> From a fit to  $J^P = 3^-$  partial wave.

<sup>20</sup> They cannot distinguish between  $\rho_3(1690)$  and  $\omega_3(1670)$ .

## $(4\pi)^\pm$ 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.

### 129±10 OUR AVERAGE

123±13		21 EVANGELIS...	81	OMEG	-	12 $\pi^- p \rightarrow p4\pi$
105±30	177	BALTAY	78B	HBC	+	15 $\pi^+ p \rightarrow p4\pi$
169 <sup>+70</sup> <sub>-48</sub>		CASON	73	HBC	-	8,18.5 $\pi^- p$
135±30	144	BARTSCH	70B	HBC	+	8 $\pi^+ p \rightarrow N4\pi$
160±30	102	BARTSCH	70B	HBC	+	8 $\pi^+ p \rightarrow N2\rho$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●						
230±28		22 EVANGELIS...	81	OMEG	-	12 $\pi^- p \rightarrow p4\pi$
184±33		23 EVANGELIS...	81	OMEG	-	12 $\pi^- p \rightarrow p4\pi$
150	66	24 KLIGER	74	HBC	-	4.5 $\pi^- p \rightarrow$ $p4\pi$
106±25		THOMPSON	74	HBC	+	13 $\pi^+ p$
125 <sup>+83</sup> <sub>-35</sub>		24 CASON	73	HBC	-	8,18.5 $\pi^- p$
130±30		HOLMES	72	HBC	+	10-12 $K^+ p$
180±30	90	24 BARTSCH	70B	HBC	+	8 $\pi^+ p \rightarrow$ $Na_2\pi$
100±35		BALTAY	68	HBC	+	7, 8.5 $\pi^+ p$

<sup>21</sup> From  $\rho^- \rho^0$  mode, not independent of the other two EVANGELISTA 81 entries.

<sup>22</sup> From  $a_2(1320)^- \pi^0$  mode, not independent of the other two EVANGELISTA 81 entries.

<sup>23</sup> From  $a_2(1320)^0 \pi^-$  mode, not independent of the other two EVANGELISTA 81 entries.

<sup>24</sup> From  $\rho^\pm \rho^0$  mode.

## $\omega\pi$ MODE

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

### 190±40 OUR AVERAGE

230±65		25 ALDE	95	GAM2		38 $\pi^- p \rightarrow$ $\omega\pi^0 n$
190±65		EVANGELIS...	81	OMEG	-	12 $\pi^- p \rightarrow \omega\pi p$
160±56		GESSAROLI	77	HBC		11 $\pi^- p \rightarrow \omega\pi p$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●						
89±25		THOMPSON	74	HBC	+	13 $\pi^+ p$
130 <sup>+73</sup> <sub>-43</sub>		BARNHAM	70	HBC	+	10 $K^+ p \rightarrow$ $\omega\pi X$

<sup>25</sup> Supersedes ALDE 92C.

## $\eta\pi^+\pi^-$ MODE

(For difficulties with MMS experiments, see the  $a_2(1320)$  mini-review in the 1973 edition.)

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

### 126±40 OUR AVERAGE Error includes scale factor of 1.8.

220±30±50		AMELIN	00	VES		37 $\pi^- p \rightarrow$ $\eta\pi^+\pi^- n$
106±27		FUKUI	88	SPEC	0	8.95 $\pi^- p \rightarrow$ $\eta\pi^+\pi^- n$

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

195	<sup>26</sup> ANDERSON	69	MMS	—	16 $\pi^- \rho$ backward
< 21	<sup>26,27</sup> FOCACCI	66	MMS	—	7–12 $\pi^- \rho \rightarrow \rho MM$
< 30	<sup>26,27</sup> FOCACCI	66	MMS	—	7–12 $\pi^- \rho \rightarrow \rho MM$
< 38	<sup>26,27</sup> FOCACCI	66	MMS	—	7–12 $\pi^- \rho \rightarrow \rho MM$

<sup>26</sup> Seen in 2.5–3 GeV/c  $\bar{p}p$ .  $2\pi^+ 2\pi^-$ , with 0, 1, 2  $\pi^+ \pi^-$  pairs in  $\rho^0$  band not seen by OREN 74 (2.3 GeV/c  $\bar{p}p$ ) with more statistics. (Jan. 1979)

<sup>27</sup> Not seen by BOWEN 72.

### $\rho_3(1690)$ DECAY MODES

Mode	Fraction ( $\Gamma_i/\Gamma$ )	Scale factor
$\Gamma_1$ $4\pi$	(71.1 ± 1.9) %	
$\Gamma_2$ $\pi^\pm \pi^+ \pi^- \pi^0$	(67 ± 22) %	
$\Gamma_3$ $\omega \pi$	(16 ± 6) %	
$\Gamma_4$ $\pi \pi$	(23.6 ± 1.3) %	
$\Gamma_5$ $K \bar{K} \pi$	( 3.8 ± 1.2 ) %	
$\Gamma_6$ $K \bar{K}$	( 1.58 ± 0.26 ) %	1.2
$\Gamma_7$ $\eta \pi^+ \pi^-$	seen	
$\Gamma_8$ $\rho(770)\eta$	seen	
$\Gamma_9$ $\pi \pi \rho$	seen	
Excluding $2\rho$ and $a_2(1320)\pi$ .		
$\Gamma_{10}$ $a_2(1320)\pi$	seen	
$\Gamma_{11}$ $\rho \rho$	seen	
$\Gamma_{12}$ $\phi \pi$		
$\Gamma_{13}$ $\eta \pi$		
$\Gamma_{14}$ $\pi^\pm 2\pi^+ 2\pi^- \pi^0$		

### CONSTRAINED FIT INFORMATION

An overall fit to 5 branching ratios uses 10 measurements and one constraint to determine 4 parameters. The overall fit has a  $\chi^2 = 14.7$  for 7 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients  $\langle \delta x_i \delta x_j \rangle / (\delta x_i \cdot \delta x_j)$ , 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.

$x_4$	−77		
$x_5$	−74	17	
$x_6$	−15	2	0
	$x_1$	$x_4$	$x_5$

## $\rho_3(1690)$ BRANCHING RATIOS

$\Gamma(\pi\pi)/\Gamma_{\text{total}}$   $\Gamma_4/\Gamma$   
VALUE DOCUMENT ID TECN CHG COMMENT

**0.236 ± 0.013 OUR FIT**

**0.243 ± 0.013 OUR AVERAGE**

0.259<sup>+0.018</sup><sub>-0.019</sub>

BECKER 79 ASPK 0 17  $\pi^- p$  polarized

0.23 ± 0.02

CORDEN 79 OMEG 12-15  $\pi^- p \rightarrow$

0.22 ± 0.04

<sup>28</sup> MATTHEWS 71C HDBC 0 7  $\pi^+ n \rightarrow \pi^- p$

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

0.245 ± 0.006

<sup>29</sup> ESTABROOKS 75 RVUE 17  $\pi^- p \rightarrow \pi^+ \pi^- n$

<sup>28</sup> One-pion-exchange model used in this estimation.

<sup>29</sup> From phase-shift analysis of HYAMS 75 data.

$\Gamma(\pi\pi)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$   $\Gamma_4/\Gamma_2$

VALUE DOCUMENT ID TECN CHG COMMENT

**0.35 ± 0.11**

CASON 73 HBC - 8,18.5  $\pi^- p$

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

<0.2

HOLMES 72 HBC + 10-12  $K^+ p$

<0.12

BALLAM 71B HBC - 16  $\pi^- p$

$\Gamma(\pi\pi)/\Gamma(4\pi)$   $\Gamma_4/\Gamma_1$

VALUE DOCUMENT ID TECN CHG COMMENT

**0.332 ± 0.026 OUR FIT** Error includes scale factor of 1.1.

**0.30 ± 0.10**

BALTAY 78B HBC 0 15  $\pi^+ p \rightarrow p4\pi$

$\Gamma(K\bar{K})/\Gamma(\pi\pi)$   $\Gamma_6/\Gamma_4$

VALUE DOCUMENT ID TECN CHG COMMENT

**0.067 ± 0.011 OUR FIT** Error includes scale factor of 1.2.

**0.118<sup>+0.040</sup><sub>-0.032</sub> OUR AVERAGE** Error includes scale factor of 1.7. See the ideogram below.

0.191<sup>+0.040</sup><sub>-0.037</sub>

GORLICH 80 ASPK 0 17,18  $\pi^- p$  polarized

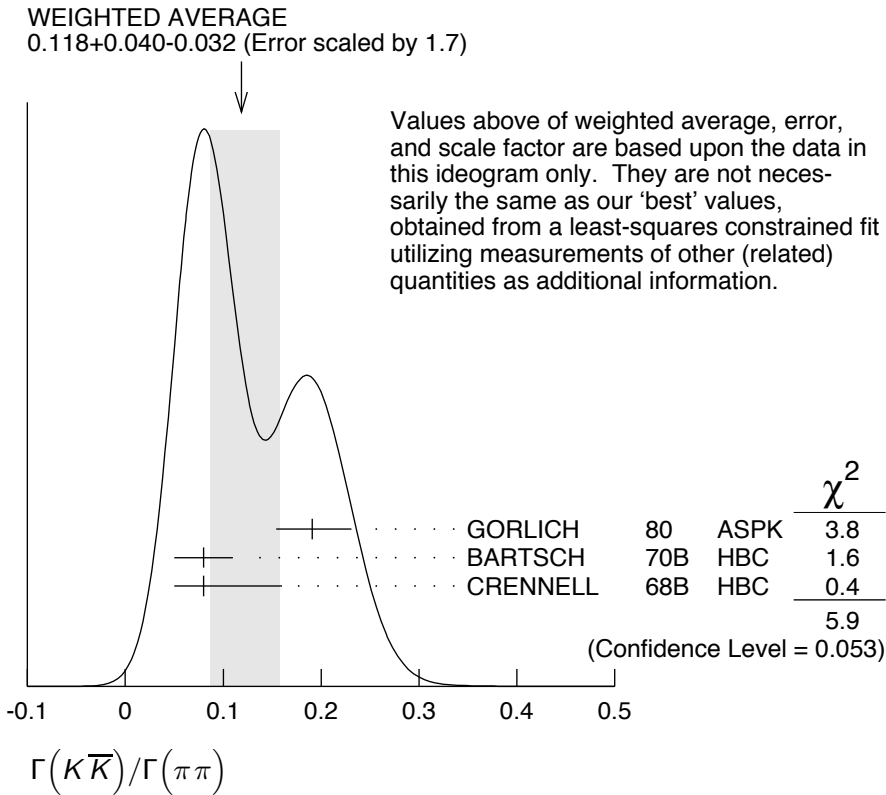
0.08 ± 0.03

BARTSCH 70B HBC + 8  $\pi^+ p$

0.08<sup>+0.08</sup><sub>-0.03</sub>

CRENNELL 68B HBC 6.0  $\pi^- p$





**$\Gamma(K\bar{K}\pi)/\Gamma(\pi\pi)$**

**$\Gamma_5/\Gamma_4$**

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
<b>0.16±0.05 OUR FIT</b>				
<b>0.16±0.05</b>	<sup>30</sup> BARTSCH	70B HBC	+	8 $\pi^+ p$

<sup>30</sup> Increased by us to correspond to  $B(\rho_3(1690) \rightarrow \pi\pi)=0.24$ .

**$[\Gamma(\pi\pi\rho) + \Gamma(a_2(1320)\pi) + \Gamma(\rho\rho)]/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$**

**$(\Gamma_9+\Gamma_{10}+\Gamma_{11})/\Gamma_2$**

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
<b>0.94±0.09 OUR AVERAGE</b>				
0.96±0.21	BALTAY	78B HBC	+	15 $\pi^+ p \rightarrow p4\pi$
0.88±0.15	BALLAM	71B HBC	-	16 $\pi^- p$
1 ±0.15	BARTSCH	70B HBC	+	8 $\pi^+ p$
consistent with 1	CASO	68 HBC	-	11 $\pi^- p$

**$\Gamma(\rho\rho)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$**

**$\Gamma_{11}/\Gamma_2$**

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
0.12±0.11		BALTAY	78B HBC	+	15 $\pi^+ p \rightarrow p4\pi$
0.56	66	KLIGER	74 HBC	-	4.5 $\pi^- p \rightarrow p4\pi$
0.13±0.09		<sup>31</sup> THOMPSON	74 HBC	+	13 $\pi^+ p$
0.7 ±0.15		BARTSCH	70B HBC	+	8 $\pi^+ p$

<sup>31</sup>  $\rho\rho$  and  $a_2(1320)\pi$  modes are indistinguishable.

$\Gamma(\rho\rho)/[\Gamma(\pi\pi\rho) + \Gamma(a_2(1320)\pi) + \Gamma(\rho\rho)]$   $\Gamma_{11}/(\Gamma_9+\Gamma_{10}+\Gamma_{11})$   
VALUE DOCUMENT ID TECN CHG COMMENT

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

0.48±0.16 CASO 68 HBC - 11  $\pi^- p$

$\Gamma(a_2(1320)\pi)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$   $\Gamma_{10}/\Gamma_2$   
VALUE DOCUMENT ID TECN CHG COMMENT

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

0.66±0.08 BALTAY 78B HBC + 15  $\pi^+ p \rightarrow p4\pi$   
 0.36±0.14 <sup>32</sup> THOMPSON 74 HBC + 13  $\pi^+ p$   
 not seen CASON 73 HBC - 8,18.5  $\pi^- p$   
 0.6 ±0.15 BARTSCH 70B HBC + 8  $\pi^+ p$   
 0.6 BALTAY 68 HBC + 7,8.5  $\pi^+ p$

<sup>32</sup>  $\rho\rho$  and  $a_2(1320)\pi$  modes are indistinguishable.

$\Gamma(\omega\pi)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$   $\Gamma_3/\Gamma_2$   
VALUE CL% DOCUMENT ID TECN CHG COMMENT

**0.23±0.05 OUR AVERAGE** Error includes scale factor of 1.2.

0.33±0.07 THOMPSON 74 HBC + 13  $\pi^+ p$   
 0.12±0.07 BALLAM 71B HBC - 16  $\pi^- p$   
 0.25±0.10 BALTAY 68 HBC + 7,8.5  $\pi^+ p$   
 0.25±0.10 JOHNSTON 68 HBC - 7.0  $\pi^- p$

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

<0.11 95 BALTAY 78B HBC + 15  $\pi^+ p \rightarrow p4\pi$   
 <0.09 KLIGER 74 HBC - 4.5  $\pi^- p \rightarrow p4\pi$

$\Gamma(\phi\pi)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$   $\Gamma_{12}/\Gamma_2$   
VALUE DOCUMENT ID TECN CHG COMMENT

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

<0.11 BALTAY 68 HBC + 7,8.5  $\pi^+ p$

$\Gamma(\pi^\pm 2\pi^+ 2\pi^- \pi^0)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$   $\Gamma_{14}/\Gamma_2$   
VALUE DOCUMENT ID TECN CHG COMMENT

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

<0.15 BALTAY 68 HBC + 7,8.5  $\pi^+ p$

$\Gamma(\eta\pi)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$   $\Gamma_{13}/\Gamma_2$   
VALUE DOCUMENT ID TECN CHG COMMENT

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

<0.02 THOMPSON 74 HBC + 13  $\pi^+ p$

$\Gamma(K\bar{K})/\Gamma_{\text{total}}$					$\Gamma_6/\Gamma$
VALUE	DOCUMENT ID	TECN	CHG	COMMENT	
<b>0.0158 ± 0.0026 OUR FIT</b>	Error includes scale factor of 1.2.				
<b>0.0130 ± 0.0024 OUR AVERAGE</b>					
0.013 ± 0.003	COSTA...	80	OMEG 0	10 $\pi^- p \rightarrow K^+ K^- n$	
0.013 ± 0.004	<sup>33</sup> MARTIN	78B	SPEC -	10 $\pi p \rightarrow K_S^0 K^- p$	

<sup>33</sup>From  $(\Gamma_4 \Gamma_6)^{1/2} = 0.056 \pm 0.034$  assuming  $B(\rho_3(1690) \rightarrow \pi\pi) = 0.24$ .

$\Gamma(\omega\pi)/[\Gamma(\omega\pi) + \Gamma(\rho\rho)]$					$\Gamma_3/(\Gamma_3 + \Gamma_{11})$
VALUE	DOCUMENT ID	TECN	CHG	COMMENT	
0.22 ± 0.08	CASON	73	HBC -	8,18.5 $\pi^- p$	

$\Gamma(\eta\pi^+\pi^-)/\Gamma_{\text{total}}$					$\Gamma_7/\Gamma$
VALUE	DOCUMENT ID	TECN	COMMENT		
<b>seen</b>	FUKUI	88	SPEC	8.95 $\pi^- p \rightarrow \eta\pi^+\pi^- n$	

$\Gamma(a_2(1320)\pi)/\Gamma(\rho(770)\eta)$					$\Gamma_{10}/\Gamma_8$
VALUE	DOCUMENT ID	TECN	COMMENT		
<b>5.5 ± 2.0</b>	AMELIN	00	VES	37 $\pi^- p \rightarrow \eta\pi^+\pi^- n$	

### $\rho_3(1690)$ REFERENCES

AMELIN	00	NP A668 83	D. Amelin <i>et al.</i>	(VES Collab.)
ALDE	95	ZPHY C66 379	D.M. Alde <i>et al.</i>	(GAMS Collab.) JP
ALDE	92C	ZPHY C54 553	D.M. Alde <i>et al.</i>	(BELG, SERP, KEK, LANL+)
FUKUI	88	PL B202 441	S. Fukui <i>et al.</i>	(SUGI, NAGO, KEK, KYOT+)
DENNEY	83	PR D28 2726	D.L. Denney <i>et al.</i>	(IOWA, MICH)
EVANGELIS...	81	NP B178 197	C. Evangelista <i>et al.</i>	(BARI, BONN, CERN+)
ALPER	80	PL 94B 422	B. Alper <i>et al.</i>	(AMST, CERN, CRAC, MPIM+)
COSTA...	80	NP B175 402	G. Costa de Beauregard <i>et al.</i>	(BARI, BONN+)
GORLICH	80	NP B174 16	L. Gorlich <i>et al.</i>	(CRAC, MPIM, CERN+)
BECKER	79	NP B151 46	H. Becker <i>et al.</i>	(MPIM, CERN, ZEEM, CRAC)
CORDEN	79	NP B157 250	M.J. Corden <i>et al.</i>	(BIRM, RHEL, TELA+) JP
BALTAY	78B	PR D17 62	C. Baltay <i>et al.</i>	(COLU, BING)
MARTIN	78B	NP B140 158	A.D. Martin <i>et al.</i>	(DURH, GEVA)
MARTIN	78D	PL 74B 417	A.D. Martin <i>et al.</i>	(DURH, GEVA)
ANTIPOV	77	NP B119 45	Y.M. Antipov <i>et al.</i>	(SERP, GEVA)
GESSAROLI	77	NP B126 382	R. Gessaroli <i>et al.</i>	(BGNA, FIRZ, GENO+)
BLUM	75	PL 57B 403	W. Blum <i>et al.</i>	(CERN, MPIM) JP
ESTABROOKS	75	NP B95 322	P.G. Estabrooks, A.D. Martin	(DURH)
HYAMS	75	NP B100 205	B.D. Hyams <i>et al.</i>	(CERN, MPIM)
ENGLER	74	PR D10 2070	A. Engler <i>et al.</i>	(CMU, CASE)
GRAYER	74	NP B75 189	G. Grayer <i>et al.</i>	(CERN, MPIM)
KLIGER	74	SJNP 19 428	G.K. Kliger <i>et al.</i>	(ITEP)
OREN	74	NP B71 189	Y. Oren <i>et al.</i>	(ANL, OXF)
THOMPSON	74	NP B69 220	G. Thompson <i>et al.</i>	(PURD)
CASON	73	PR D7 1971	N.M. Cason <i>et al.</i>	(NDAM)
BOWEN	72	PRL 29 890	D.R. Bowen <i>et al.</i>	(NEAS, STON)
HOLMES	72	PR D6 3336	R. Holmes <i>et al.</i>	(ROCH)
BALLAM	71B	PR D3 2606	J. Ballam <i>et al.</i>	(SLAC)
MATTHEWS	71C	NP B33 1	J.A.J. Matthews <i>et al.</i>	(TNTO, WISC) JP

ARMENISE	70	LNC 4 199	N. Armenise <i>et al.</i>	(BARI, BGNA, FIRZ)
BARNHAM	70	PRL 24 1083	K.W.J. Barnham <i>et al.</i>	(BIRM)
BARTSCH	70B	NP B22 109	J. Bartsch <i>et al.</i>	(AACH, BERL, CERN)
CASO	70	LNC 3 707	C. Caso <i>et al.</i>	(GENO, HAMB, MILA, SACL)
STUNTEBECK	70	PL 32B 391	P.H. Stuntebeck <i>et al.</i>	(NDAM)
ADERHOLZ	69	NP B11 259	M. Aderholz <i>et al.</i>	(AACH3, BERL, CERN+)
ANDERSON	69	PRL 22 1390	E.W. Anderson <i>et al.</i>	(BNL, CMU)
ARMENISE	68	NC 54A 999	N. Armenise <i>et al.</i>	(BARI, BGNA, FIRZ+) I
BALTAY	68	PRL 20 887	C. Baltay <i>et al.</i>	(COLU, ROCH, RUTG, YALE) I
CASO	68	NC 54A 983	C. Caso <i>et al.</i>	(GENO, HAMB, MILA, SACL)
CRENNELL	68B	PL 28B 136	D.J. Crennell <i>et al.</i>	(BNL)
JOHNSTON	68	PRL 20 1414	T.F. Johnston <i>et al.</i>	(TNTO, WISC) IJP
FOCACCI	66	PRL 17 890	M.N. Focacci <i>et al.</i>	(CERN)
GOLDBERG	65	PL 17 354	M. Goldberg <i>et al.</i>	(CERN, EPOL, ORSAY+)

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