

$\rho_3(1690)$ 

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

## $\rho_3(1690)$ MASS

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

### 2 $\pi$ MODE

VALUE (MeV)EVTSDOCUMENT IDTECNCHGCOMMENT

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	<sup>1</sup> ANTIPOV	77	CIBS	0	25 $\pi^- p \rightarrow p3\pi$
1690 ± 7	600	<sup>1</sup> ENGLER	74	DBC	0	6 $\pi^+ n \rightarrow$ $\pi^+ \pi^- p$
1693 ± 8		<sup>2</sup> 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		<sup>3</sup> CORDEN	79	OMEG		12–15 $\pi^- p \rightarrow$ $n2\pi$
1692 ± 12		<sup>2,4</sup> 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)EVTSDOCUMENT IDTECNCHGCOMMENT

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	<sup>5,6</sup> 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		<sup>7</sup> 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>
--------------------	-------------	--------------------	-------------	------------	----------------

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>
--------------------	--------------------	-------------	------------	----------------

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 $K^+ p \rightarrow \omega\pi X$
-----------	---------	----	-----	---	------------------------------------

<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.)

VALUE (MeV)                      DOCUMENT ID                      TECN                      CHG                      COMMENT

---

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.

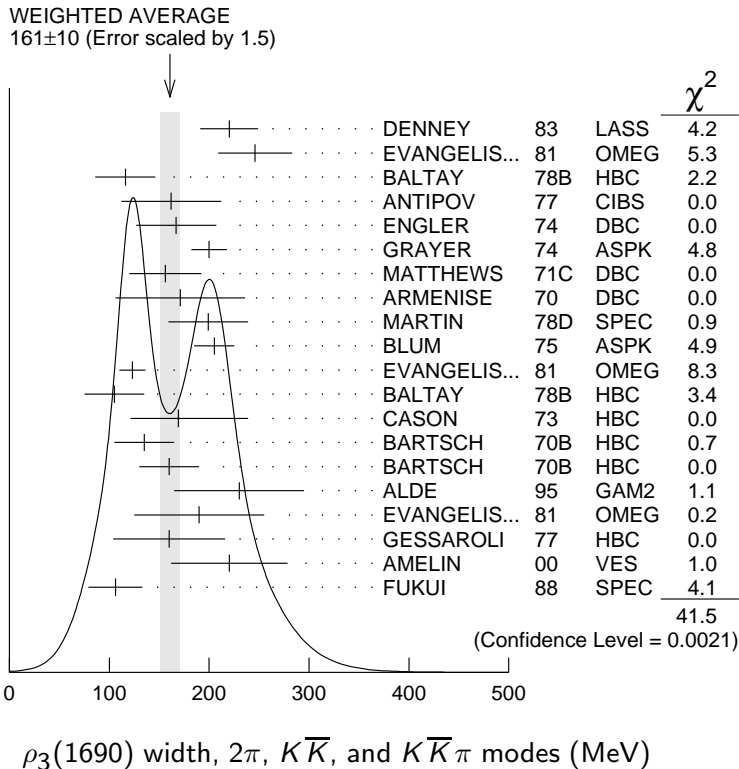
## $\rho_3(1690)$ WIDTH

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

VALUE (MeV)                      DOCUMENT ID

---

**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.



## 2π MODE

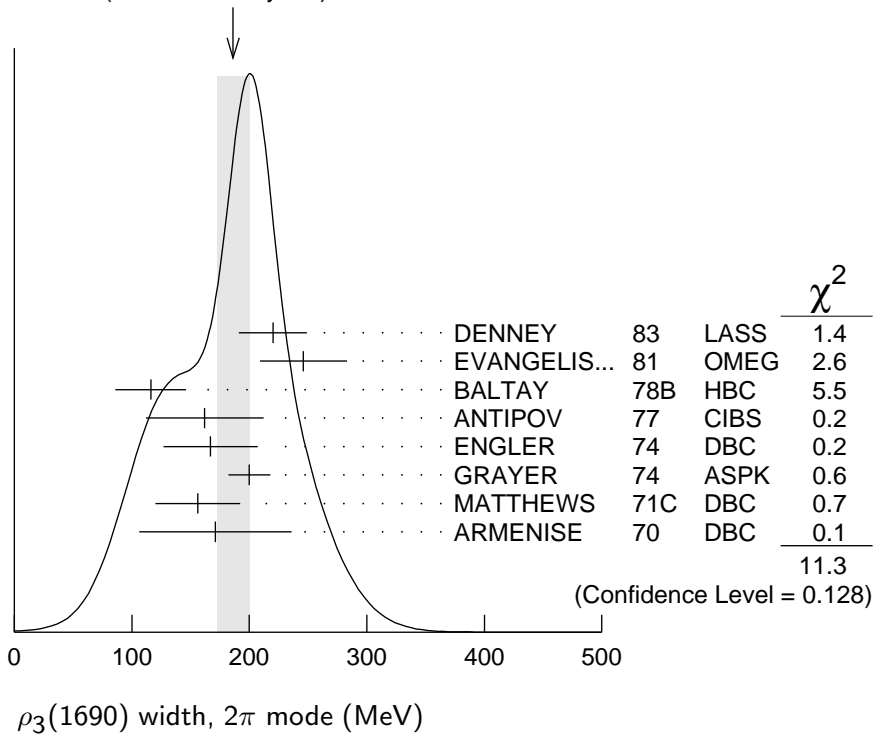
VALUE (MeV)      EVTS      DOCUMENT ID      TECN      CHG      COMMENT

The data in this block is included in the average printed for a previous datablock.

**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 $\pi^- p \rightarrow p3\pi$
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 $\pi^- p \rightarrow$ $n2\pi$
240±30		16,18 ESTABROOKS	75	RVUE		17 $\pi^- p \rightarrow$ $\pi^+ \pi^- n$
180±30	122	BARTSCH	70B	HBC	+	8 $\pi^+ p \rightarrow N2\pi$
267 <sup>+72</sup> -46		STUNTEBECK	70	HDBC	0	8 $\pi^- p, 5.4 \pi^+ d$
188±49		ARMENISE	68	DBC	0	5.1 $\pi^+ d$
180±40		GOLDBERG	65	HBC	0	6 $\pi^+ d, 8 \pi^- p$

WEIGHTED AVERAGE  
186±14 (Error scaled by 1.3)



<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.

### $K\bar{K}$ 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.

#### 204 ± 18 OUR AVERAGE

199 ± 40	6000	<sup>19</sup> MARTIN	78D	SPEC	10 $\pi^+ p \rightarrow K_S^0 K^- p$
205 ± 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 ± 4		ALPER	80	CNTR 0	62 $\pi^- p \rightarrow K^+ K^- n$
186 ± 11		<sup>20</sup> COSTA...	80	OMEG	10 $\pi^- p \rightarrow K^+ K^- n$
112 ± 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
-------------	------	-------------	------	-----	---------

The data in this block is included in the average printed for a previous datablock.

#### 129 ± 10 OUR AVERAGE

123 ± 13		<sup>21</sup> 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		<sup>22</sup> EVANGELIS...	81	OMEG -	12 $\pi^- p \rightarrow p4\pi$
184 ± 33		<sup>23</sup> EVANGELIS...	81	OMEG -	12 $\pi^- p \rightarrow p4\pi$
150	66	<sup>24</sup> 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>		<sup>24</sup> CASON	73	HBC -	8,18.5 $\pi^- p$
130 ± 30		HOLMES	72	HBC +	10-12 $K^+ p$
180 ± 30	90	<sup>24</sup> 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
-------------	-------------	------	-----	---------

The data in this block is included in the average printed for a previous datablock.

**190 $\pm$ 40 OUR AVERAGE**

230 $\pm$ 65	<sup>25</sup> ALDE	95	GAM2	38 $\pi^- p \rightarrow \omega\pi^0 n$
190 $\pm$ 65	EVANGELIS...	81	OMEG -	12 $\pi^- p \rightarrow \omega\pi p$
160 $\pm$ 56	GESSAROLI	77	HBC	11 $\pi^- p \rightarrow \omega\pi p$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
89 $\pm$ 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
-------------	-------------	------	-----	---------

The data in this block is included in the average printed for a previous datablock.

**126 $\pm$ 40 OUR AVERAGE** Error includes scale factor of 1.8.

220 $\pm$ 30 $\pm$ 50	AMELIN	00	VES	37 $\pi^- p \rightarrow \eta\pi^+\pi^- n$
106 $\pm$ 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 $\pi^- p$ backward
< 21	26,27 FOCACCI	66	MMS -	7-12 $\pi^- p \rightarrow \rho MM$
< 30	26,27 FOCACCI	66	MMS -	7-12 $\pi^- p \rightarrow \rho MM$
< 38	26,27 FOCACCI	66	MMS -	7-12 $\pi^- p \rightarrow \rho MM$

<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 $\pm$ 1.9) %	
$\Gamma_2$ $\pi^\pm\pi^+\pi^-\pi^0$	(67 $\pm$ 22) %	
$\Gamma_3$ $\omega\pi$	(16 $\pm$ 6) %	
$\Gamma_4$ $\pi\pi$	(23.6 $\pm$ 1.3) %	
$\Gamma_5$ $K\bar{K}\pi$	( 3.8 $\pm$ 1.2) %	
$\Gamma_6$ $K\bar{K}$	( 1.58 $\pm$ 0.26) %	1.2
$\Gamma_7$ $\eta\pi^+\pi^-$	seen	

$\Gamma_8$	$\rho(770)\eta$	seen
$\Gamma_9$	$\pi\pi\rho$ Excluding $2\rho$ and $a_2(1320)\pi$ .	seen
$\Gamma_{10}$	$a_2(1320)\pi$	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

$\Gamma(\pi\pi) / \Gamma_{\text{total}}$					$\Gamma_4 / \Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	
<b><math>0.236 \pm 0.013</math> OUR FIT</b>					
<b><math>0.243 \pm 0.013</math> OUR AVERAGE</b>					
$0.259^{+0.018}_{-0.019}$	BECKER	79	ASPK 0	17 $\pi^- p$ polarized	
$0.23 \pm 0.02$	CORDEN	79	OMEG	12-15 $\pi^- p \rightarrow n 2\pi$	
$0.22 \pm 0.04$	<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. •••					
$0.245 \pm 0.006$	<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.

$\Gamma(\pi\pi) / \Gamma(\pi^\pm \pi^+ \pi^- \pi^0)$					$\Gamma_4 / \Gamma_2$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>	
<b><math>0.35 \pm 0.11</math></b>	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 $\pi^- p$	

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

$\Gamma_4/\Gamma_1$

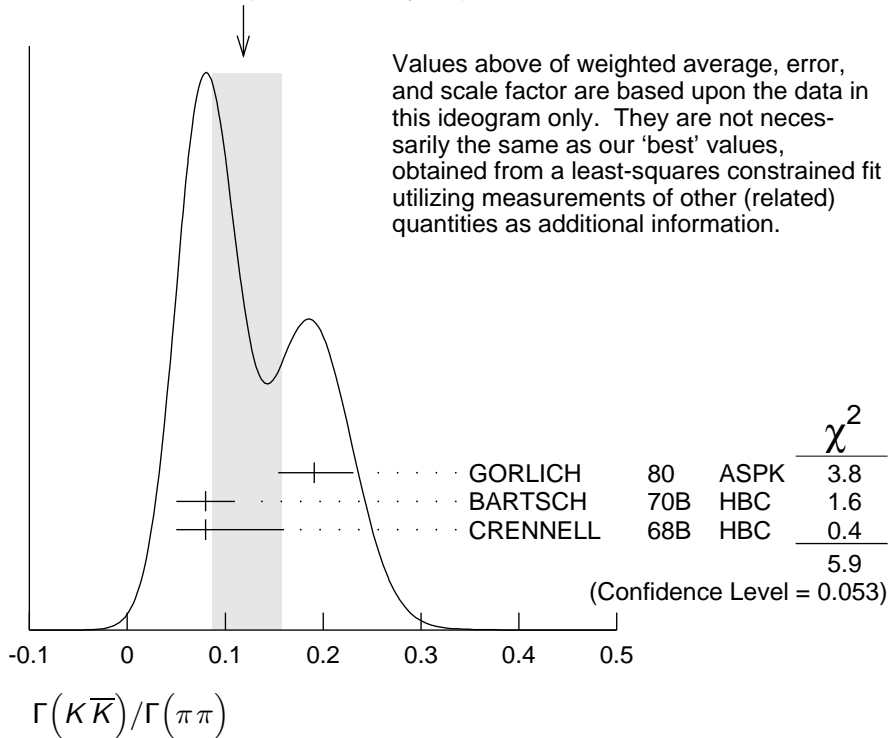
VALUE	DOCUMENT ID	TECN	CHG	COMMENT
<b>0.332±0.026 OUR FIT</b>				Error includes scale factor of 1.1.
<b>0.30 ±0.10</b>	BALTAY	78B	HBC	0 15 $\pi^+ p \rightarrow p4\pi$

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

$\Gamma_6/\Gamma_4$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
<b>0.067±0.011 OUR FIT</b>				Error includes scale factor of 1.2.
<b>0.118<sup>+0.040</sup><sub>-0.032</sub> OUR AVERAGE</b>				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 $\pi^- p$

WEIGHTED AVERAGE  
0.118+0.040-0.032 (Error scaled by 1.7)



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

$\Gamma_5/\Gamma_4$

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  $B(\rho_3(1690) \rightarrow \pi\pi)=0.24$ .



$$\frac{[\Gamma(\pi\pi\rho) + \Gamma(a_2(1320)\pi) + \Gamma(\rho\rho)]/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)}{(\Gamma_9 + \Gamma_{10} + \Gamma_{11})/\Gamma_2}$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
<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 $\pi^- p$

$$\frac{\Gamma(\rho\rho)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)}{\Gamma_{11}/\Gamma_2}$$

<u>VALUE</u>	<u>EVTS</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. ● ● ●					
0.12±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.					

$$\frac{\Gamma(\rho\rho)/[\Gamma(\pi\pi\rho) + \Gamma(a_2(1320)\pi) + \Gamma(\rho\rho)]}{\Gamma_{11}/(\Gamma_9 + \Gamma_{10} + \Gamma_{11})}$$

<u>VALUE</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. ● ● ●				
0.48±0.16	CASO 68	HBC	-	11 $\pi^- p$

$$\frac{\Gamma(a_2(1320)\pi)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)}{\Gamma_{10}/\Gamma_2}$$

<u>VALUE</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. ● ● ●				
0.66±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.				

$$\frac{\Gamma(\omega\pi)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)}{\Gamma_3/\Gamma_2}$$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
<b>0.23±0.05 OUR AVERAGE</b>		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 $\pi^- p \rightarrow p4\pi$

$$\frac{\Gamma(\phi\pi)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)}{\Gamma_{12}/\Gamma_2}$$

<u>VALUE</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. ● ● ●				
<0.11	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
-------	-------------	------	-----	---------

**0.0158 ± 0.0026 OUR FIT** Error includes scale factor of 1.2.

**0.0130 ± 0.0024 OUR AVERAGE**

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
-------	-------------	------	-----	---------

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

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 Beaugard <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+)
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+)

---