

$\rho_3(1690)$

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

$\rho_3(1690)$ MASS

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

2 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.

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 $\pi^- p$

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

² Uses same data as HYAMS 75.

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

⁴ 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 $\pi^- p \rightarrow K^+ K^- n$
----------	--	--------------------	----	------	--	------------------------------------

⁵ From a fit to $J^P = 3^-$ partial wave.

⁶ Systematic error on mass scale subtracted.

⁷ They cannot distinguish between $\rho_3(1690)$ and $\omega_3(1670)$.

(4 π) $^\pm$ 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 \pm 5 OUR AVERAGE Error includes scale factor of 1.1.

1694 \pm 6		⁸ EVANGELIS...	81	OMEG	-	12 $\pi^- p \rightarrow p4\pi$
1665 \pm 15	177	BALTAY	78B	HBC	+	15 $\pi^+ p \rightarrow p4\pi$
1670 \pm 10		THOMPSON	74	HBC	+	13 $\pi^+ p$
1687 \pm 20		CASON	73	HBC	-	8,18.5 $\pi^- p$
1685 \pm 14		⁹ CASON	73	HBC	-	8,18.5 $\pi^- p$
1680 \pm 40	144	BARTSCH	70B	HBC	+	8 $\pi^+ p \rightarrow N4\pi$
1689 \pm 20	102	⁹ BARTSCH	70B	HBC	+	8 $\pi^+ p \rightarrow N2\rho$
1705 \pm 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 \pm 10		¹⁰ EVANGELIS...	81	OMEG	-	12 $\pi^- p \rightarrow p4\pi$
1673 \pm 9		¹¹ EVANGELIS...	81	OMEG	-	12 $\pi^- p \rightarrow p4\pi$
1733 \pm 9	66	⁹ KLIGER	74	HBC	-	4.5 $\pi^- p \rightarrow p4\pi$
1630 \pm 15		HOLMES	72	HBC	+	10-12 $K^+ p$
1720 \pm 15		BALTAY	68	HBC	+	7, 8.5 $\pi^+ p$

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

⁹ From $\rho^\pm \rho^0$ mode.

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

¹¹ 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 \pm 7 OUR AVERAGE

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

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

1654 \pm 24		BARNHAM	70	HBC	+	10 $K^+ p \rightarrow \omega\pi X$
---------------	--	---------	----	-----	---	------------------------------------

¹² 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>
--------------------	--------------------	-------------	------------	----------------

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

1682 \pm 12 OUR AVERAGE

1685 \pm 10 \pm 20	AMELIN	00	VES		37 $\pi^- p \rightarrow \eta\pi^+ \pi^- n$
1680 \pm 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 \pm 47	¹³ ANDERSON	69	MMS	-	16 $\pi^- p$ backward
1632 \pm 15	^{13,14} FOCACCI	66	MMS	-	7-12 $\pi^- p \rightarrow pMM$
1700 \pm 15	^{13,14} FOCACCI	66	MMS	-	7-12 $\pi^- p \rightarrow pMM$
1748 \pm 15	^{13,14} FOCACCI	66	MMS	-	7-12 $\pi^- p \rightarrow pMM$

¹³ Seen in 2.5–3 GeV/c $\bar{p}p$. $2\pi^+2\pi^-$, with 0, 1, 2 $\pi^+\pi^-$ pairs in ρ band not seen by OREN 74 (2.3 GeV/c $\bar{p}p$) with more statistics. (Jan. 1976)
¹⁴ Not seen by BOWEN 72.

$\rho_3(1690)$ WIDTH

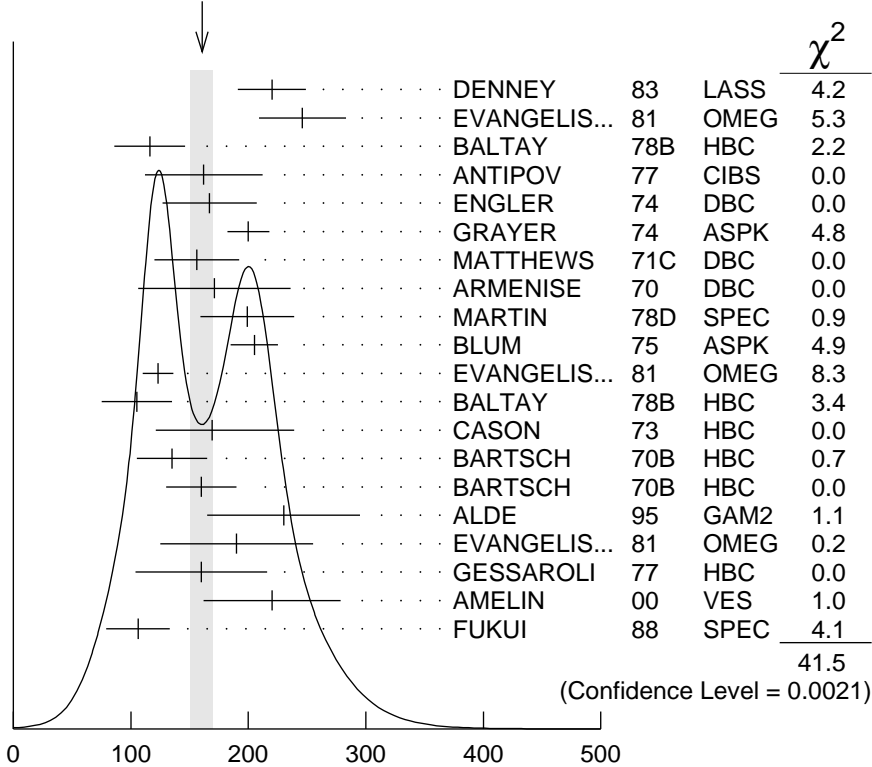
$2\pi, K\bar{K},$ AND $K\bar{K}\pi$ MODES

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.

WEIGHTED AVERAGE
 161 ± 10 (Error scaled by 1.5)



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

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 ⁺⁷² ₋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 $\pi^- p$

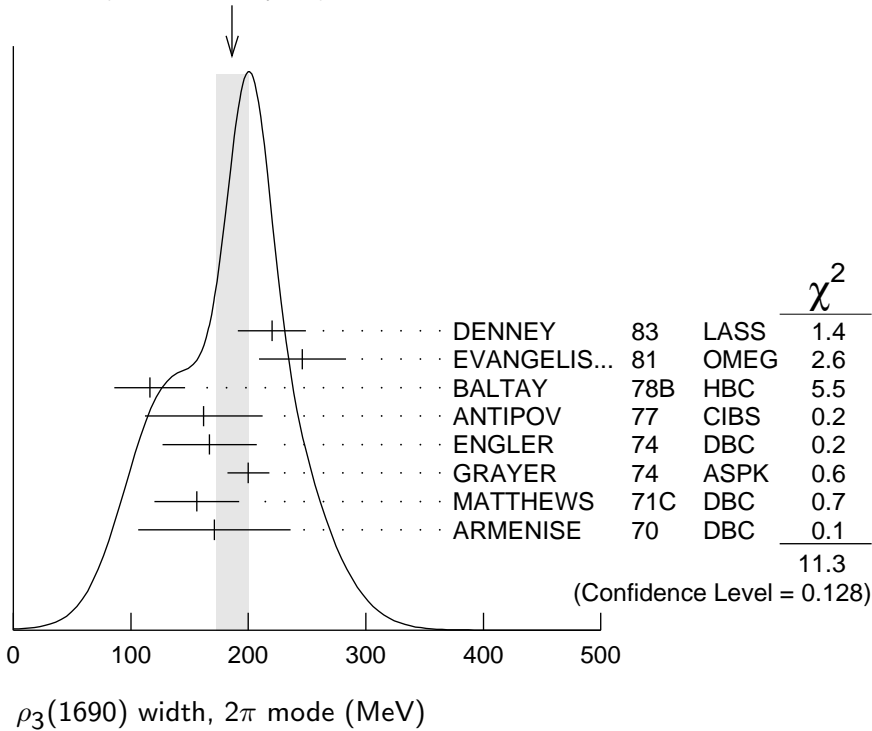
¹⁵ Width errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.

¹⁶ Uses same data as HYAMS 75 and BECKER 79.

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

¹⁸ From phase-shift analysis. Error takes account of spread of different phase-shift solutions.

WEIGHTED AVERAGE
186 ± 14 (Error scaled by 1.3)



$K\bar{K}$ 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	¹⁹ MARTIN	78D	SPEC		10 $\pi p \rightarrow K_S^0 K^- p$
205 ± 20		BLUM	75	ASPK	0	18.4 $\pi^- p \rightarrow nK^+ K^-$

• • • 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		²⁰ COSTA	80	OMEG		10 $\pi^- p \rightarrow K^+ K^- n$
112 ± 60		ADERHOLZ	69	HBC	+	8 $\pi^+ p \rightarrow K\bar{K}\pi$

¹⁹ From a fit to $J^P = 3^-$ partial wave.

²⁰ 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.

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 ⁺⁷⁰ -48		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 ⁺⁸³ -35		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 $\pi^+ p$

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

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

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

²⁴ From $\rho^\pm \rho^0$ mode.

 $\omega\pi$ 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.

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 ⁺⁷³ -43		BARNHAM	70	HBC	+	10 $K^+ p \rightarrow \omega\pi X$

²⁵ 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>
--------------------	--------------------	-------------	------------	----------------

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

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

²⁷ Not seen by BOWEN 72.

$\rho_3(1690)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)	Scale factor
Γ_1 4π	(71.1 \pm 1.9) %	
Γ_2 $\pi^\pm \pi^+ \pi^- \pi^0$	(67 \pm 22) %	
Γ_3 $\omega \pi$	(16 \pm 6) %	
Γ_4 $\pi \pi$	(23.6 \pm 1.3) %	
Γ_5 $K \bar{K} \pi$	(3.8 \pm 1.2) %	
Γ_6 $K \bar{K}$	(1.58 \pm 0.26) %	1.2
Γ_7 $\eta \pi^+ \pi^-$	seen	
Γ_8 $\rho(770)\eta$	seen	
Γ_9 $\pi \pi \rho$ Excluding 2ρ and $a_2(1320)\pi$.	seen	
Γ_{10} $a_2(1320)\pi$	seen	
Γ_{11} $\rho \rho$	seen	
Γ_{12} $\phi \pi$		
Γ_{13} $\eta \pi$		
Γ_{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 $\Gamma(\pi\pi)/\Gamma_{\text{total}}$ Γ_4/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
--------------	--------------------	-------------	------------	----------------

0.236±0.013 OUR FIT**0.243±0.013 OUR AVERAGE**

0.259 ^{+0.018} _{-0.019}	BECKER	79	ASPK	0	17 $\pi^- p$ polarized
---	--------	----	------	---	------------------------

0.23 ±0.02	CORDEN	79	OMEG		12–15 $\pi^- p \rightarrow n2\pi$
------------	--------	----	------	--	-----------------------------------

0.22 ±0.04	²⁸ 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	²⁹ ESTABROOKS	75	RVUE		17 $\pi^- p \rightarrow \pi^+ \pi^- n$
-------------	--------------------------	----	------	--	--

²⁸One-pion-exchange model used in this estimation.²⁹From phase-shift analysis of HYAMS 75 data. $\Gamma(\pi\pi)/\Gamma(\pi^\pm\pi^+\pi^-\pi^0)$ Γ_4/Γ_2

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
--------------	--------------------	-------------	------------	----------------

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 $\pi^- p$
-------	--------	-----	-----	---	--------------

 $\Gamma(\pi\pi)/\Gamma(4\pi)$ Γ_4/Γ_1

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
--------------	--------------------	-------------	------------	----------------

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

0.30 ±0.10	BALTAY	78B	HBC	0	15 $\pi^+ p \rightarrow p4\pi$
-------------------	--------	-----	-----	---	--------------------------------

 $\Gamma(K\bar{K})/\Gamma(\pi\pi)$ Γ_6/Γ_4

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
--------------	--------------------	-------------	------------	----------------

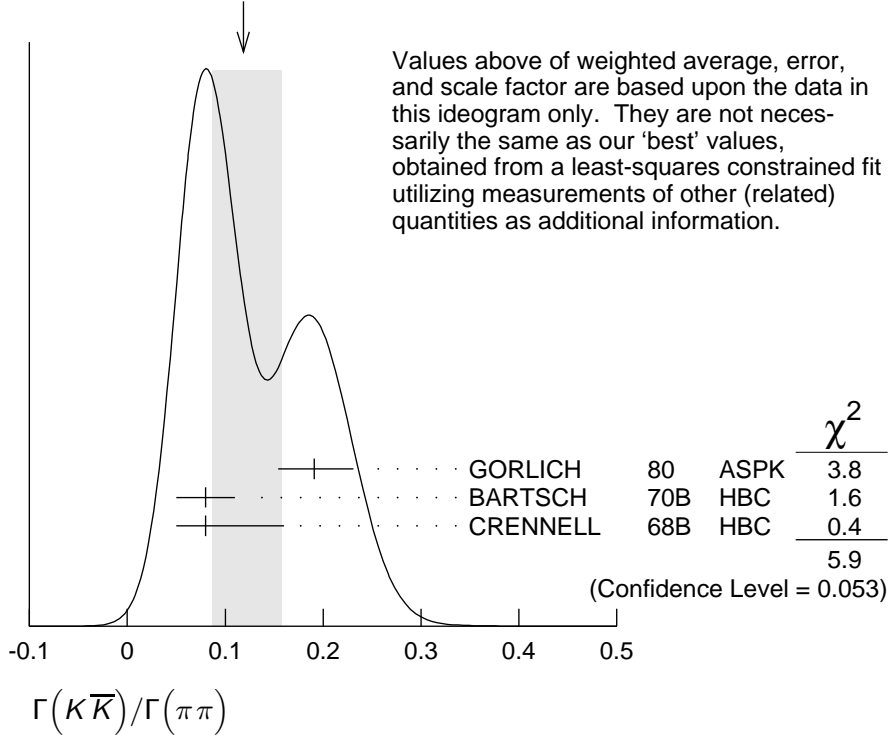
0.067±0.011 OUR FIT Error includes scale factor of 1.2.**0.118^{+0.040}_{-0.032} OUR AVERAGE** Error includes scale factor of 1.7. See the ideogram below.

0.191 ^{+0.040} _{-0.037}	GORLICH	80	ASPK	0	17,18 $\pi^- p$ polarized
---	---------	----	------	---	---------------------------

0.08 ±0.03	BARTSCH	70B	HBC	+	8 $\pi^+ p$
------------	---------	-----	-----	---	-------------

0.08 ^{+0.08} _{-0.03}	CRENNELL	68B	HBC		6.0 $\pi^- p$
--	----------	-----	-----	--	---------------

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



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

Γ_5/Γ_4

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
0.16±0.05 OUR FIT				
0.16±0.05	³⁰ BARTSCH	70B	HBC	+ 8 $\pi^+ \rho$

³⁰ 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
0.94±0.09 OUR AVERAGE				
0.96±0.21	BALTAY	78B	HBC	+ 15 $\pi^+ \rho \rightarrow p4\pi$
0.88±0.15	BALLAM	71B	HBC	- 16 $\pi^- \rho$
1 ±0.15	BARTSCH	70B	HBC	+ 8 $\pi^+ \rho$
consistent with 1	CASO	68	HBC	- 11 $\pi^- \rho$

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

Γ_{11}/Γ_2

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
0.12±0.11		BALTAY	78B	HBC	+ 15 $\pi^+ \rho \rightarrow p4\pi$
0.56	66	KLIGER	74	HBC	- 4.5 $\pi^- \rho \rightarrow p4\pi$
0.13±0.09		³¹ THOMPSON	74	HBC	+ 13 $\pi^+ \rho$
0.7 ±0.15		BARTSCH	70B	HBC	+ 8 $\pi^+ \rho$

³¹ $\rho\rho$ and $a_2(1320)\pi$ modes are indistinguishable.

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

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 $\pi^- p$
-----------	------	----	-----	---	--------------

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

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	³² 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 $\pi^+ p$
-----	--------	----	-----	---	-----------------

³² $\rho\rho$ and $a_2(1320)\pi$ modes are indistinguishable.

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

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 $\pi^- p \rightarrow p4\pi$
-------	--	--------	----	-----	---	---------------------------------

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

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 $\pi^+ p$
-------	--------	----	-----	---	-----------------

$$\frac{\Gamma(\pi^\pm 2\pi^+ 2\pi^- \pi^0)}{\Gamma(\pi^\pm\pi^+\pi^-\pi^0)} \quad \Gamma_{14}/\Gamma_2$$

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 $\pi^+ p$
-------	--------	----	-----	---	-----------------

$$\frac{\Gamma(\eta\pi)}{\Gamma(\pi^\pm\pi^+\pi^-\pi^0)} \quad \Gamma_{13}/\Gamma_2$$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
-------	-------------	------	-----	---------

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

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

$$\frac{\Gamma(K\bar{K})}{\Gamma_{\text{total}}} \quad \Gamma_6/\Gamma$$

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	³³ MARTIN	78B	SPEC	–	10 $\pi p \rightarrow K_S^0 K^- p$
--------------	----------------------	-----	------	---	------------------------------------

³³ 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 $\pi^- p$

$\Gamma(\eta\pi^+\pi^-)/\Gamma_{\text{total}}$	Γ_7/Γ
VALUE	DOCUMENT ID TECN COMMENT
seen	FUKUI 88 SPEC 8.95 $\pi^- p \rightarrow \eta\pi^+\pi^- n$

$\Gamma(a_2(1320)\pi)/\Gamma(\rho(770)\eta)$	Γ_{10}/Γ_8
VALUE	DOCUMENT ID TECN COMMENT
5.5 \pm 2.0	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 <i>et al.</i>	(BARI, BONN, CERN, GLAS+)
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)
		Translated from YAF 19 839.		
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+)