$\rho(1700)$

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

A REVIEW GOES HERE – Check our WWW List of Reviews

$\rho(1700)$ MASS

$\eta\rho^0$ AND $\pi^+\pi^-$ MODES

VALUE (MeV)	DOCUMENT ID
1720±20 OUR ESTIMATE	

$\eta\rho^0$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1740±20	ANTONELLI	88	DM2	$e^+e^- \rightarrow \eta\pi^+\pi^-$
1701±15	[1] FUKUI	88	SPEC	8.95 $\pi^- p \rightarrow \eta\pi^+\pi^- n$

[1] Assuming $\rho^+ f_0(1370)$ decay mode interferes with $a_1(1260)^+\pi$ background. From a two Breit-Wigner fit.

$\pi\pi$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1780 ±20 $^{+15}_{-20}$	63.5k	[2] ABRAMOWICZ	12	ZEUS	$e p \rightarrow e\pi^+\pi^- p$
1861 ±17		[3] LEES	12G	BABR	$e^+e^- \rightarrow \pi^+\pi^-\gamma$
1728 ±17 ±89	5.4M	[4,5] FUJIKAWA	08	BELL	$\tau^- \rightarrow \pi^-\pi^0\nu_\tau$
1780 $^{+37}_{-29}$		[6] ABELE	97	CBAR	$\overline{p}n \rightarrow \pi^-\pi^0\pi^0$
1719 ±15		[6] BERTIN	97C	OBLX	0.0 $\overline{p}p \rightarrow \pi^+\pi^-\pi^0$
1730 ±30		CLEGG	94	RVUE	$e^+e^- \rightarrow \pi^+\pi^-$
1768 ±21		BISELLO	89	DM2	$e^+e^- \rightarrow \pi^+\pi^-$
1745.7±91.9		DUBNICKA	89	RVUE	$e^+e^- \rightarrow \pi^+\pi^-$
1546 ±26		GESHKEN...	89	RVUE	
1650		[7] ERKAL	85	RVUE	20–70 $\gamma p \rightarrow \gamma\pi$
1550 ±70		ABE	84B	HYBR	20 $\gamma p \rightarrow \pi^+\pi^- p$
1590 ±20		[8] ASTON	80	OMEG	20–70 $\gamma p \rightarrow p 2\pi$
1600 ±10		[9] ATIYA	79B	SPEC	50 γC $\rightarrow$ C2π
1598 $^{+24}_{-22}$		BECKER	79	ASPK	17 $\pi^- p$ polarized
1659 ±25		[7] LANG	79	RVUE	
1575		[7] MARTIN	78C	RVUE	17 $\pi^- p \rightarrow \pi^+\pi^- n$
1610 ±30		[7] FROGGATT	77	RVUE	17 $\pi^- p \rightarrow \pi^+\pi^- n$
1590 ±20		[10] HYAMS	73	ASPK	17 $\pi^- p \rightarrow \pi^+\pi^- n$

[2] Using the KUHN 90 parametrization of the pion form factor, neglecting $\rho-\omega$ interference.
[3] Using the GOUNARIS 68 parametrization of the pion form factor leaving the masses and widths of the $\rho(1450)$, $\rho(1700)$, and $\rho(2150)$ resonances as free parameters of the fit.
[4] $|F_\pi(0)|^2$ fixed to 1.
[5] From the GOUNARIS 68 parametrization of the pion form factor.
[6] T-matrix pole.
[7] From phase shift analysis of HYAMS 73 data.
[8] Simple relativistic Breit-Wigner fit with constant width.
[9] An additional 40 MeV uncertainty in both the mass and width is present due to the choice of the background shape.
[10] Included in BECKER 79 analysis.

$\pi\omega$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1708±41	7815	[11] ACHASOV	13	SND	1.05–2.00 $e^+e^- \to \pi^0\pi^0\gamma$
1550 to 1620		[12] ACHASOV	00I	SND	$e^+e^- \to \pi^0\pi^0\gamma$
1580 to 1710		[13] ACHASOV	00I	SND	$e^+e^- \to \pi^0\pi^0\gamma$
1710±90		ACHASOV	97	RVUE	$e^+e^- \to \omega\pi^0$

[11] From a phenomenological model based on vector meson dominance with the interfering $\rho(1450)$ and $\rho(1700)$ and their widths fixed at 400 and 250 MeV, respectively. Systematic uncertainty not estimated.
[12] Taking into account both $\rho(1450)$ and $\rho(1700)$ contributions. Using the data of ACHASOV 00I on $e^+e^- \to \omega\pi^0$ and of EDWARDS 00A on $\tau^- \to \omega\pi^-\nu_\tau$. $\rho(1450)$ mass and width fixed at 1400 MeV and 500 MeV respectively.
[13] Taking into account the $\rho(1700)$ contribution only. Using the data of ACHASOV 00I on $e^+e^- \to \omega\pi^0$ and of EDWARDS 00A on $\tau^- \to \omega\pi^-\nu_\tau$.

$K\overline{K}$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1740.8±22.2	27k	[14] ABELE	99D	CBAR	±	0.0 $\overline{p}p \to K^+K^-\pi^0$
1582 ±36	1600	CLELAND	82B	SPEC	±	50 $\pi p \to K^0_S K^\pm p$

[14] K-matrix pole. Isospin not determined, could be $\omega(1650)$ or $\phi(1680)$.

$2(\pi^+\pi^-)$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1851^{+27}_{-24}		ACHASOV	97	RVUE	$e^+e^- \to 2(\pi^+\pi^-)$
1570± 20		[15] CORDIER	82	DM1	$e^+e^- \to 2(\pi^+\pi^-)$
1520± 30		[16] ASTON	81E	OMEG	20–70 $\gamma p \to p4\pi$
1654± 25		[17] DIBIANCA	81	DBC	$\pi^+d \to pp2(\pi^+\pi^-)$
1666± 39		[15] BACCI	80	FRAG	$e^+e^- \to 2(\pi^+\pi^-)$
1780	34	KILLIAN	80	SPEC	11 $e^-p \to 2(\pi^+\pi^-)$
1500		[18] ATIYA	79B	SPEC	50 $\gamma C \to C4\pi^\pm$
1570± 60	65	[19] ALEXANDER	75	HBC	7.5 $\gamma p \to p4\pi$
1550± 60		[16] CONVERSI	74	OSPK	$e^+e^- \to 2(\pi^+\pi^-)$
1550± 50	160	SCHACHT	74	STRC	5.5–9 $\gamma p \to p4\pi$
1450±100	340	SCHACHT	74	STRC	9–18 $\gamma p \to p4\pi$
1430± 50	400	BINGHAM	72B	HBC	9.3 $\gamma p \to p4\pi$

[15] Simple relativistic Breit-Wigner fit with model dependent width.
[16] Simple relativistic Breit-Wigner fit with constant width.
[17] One peak fit result.
[18] Parameters roughly estimated, not from a fit.
[19] Skew mass distribution compensated by Ross-Stodolsky factor.

$\pi^+\pi^-\pi^0\pi^0$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1660±30	ATKINSON	85B	OMEG	20–70 γp

$3(\pi^+\pi^-)$ AND $2(\pi^+\pi^-\pi^0)$ MODES

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1730±34	[20] FRABETTI	04	E687	$\gamma p \rightarrow 3\pi^+ 3\pi^- p$
1783±15	CLEGG	90	RVUE	$e^+ e^- \rightarrow 3(\pi^+\pi^-) 2(\pi^+\pi^-\pi^0)$

[20] From a fit with two resonances with the JACOB 72 continuum.

$\rho(1700)$ WIDTH

$\eta\rho^0$ AND $\pi^+\pi^-$ MODES

VALUE (MeV)	DOCUMENT ID
250±100 OUR ESTIMATE	

$\eta\rho^0$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
150±30	ANTONELLI	88	DM2	$e^+ e^- \rightarrow \eta\pi^+\pi^-$
282±44	[21] FUKUI	88	SPEC	8.95 $\pi^- p \rightarrow \eta\pi^+\pi^- n$

[21] Assuming $\rho^+ f_0(1370)$ decay mode interferes with $a_1(1260)^+\pi$ background. From a two Breit-Wigner fit.

$\pi\pi$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$310 \pm 30 {}^{+25}_{-35}$	63.5k	[22] ABRAMOWICZ	12	ZEUS	$e p \rightarrow e\pi^+\pi^- p$
316 ± 26		[23] LEES	12G	BABR	$e^+ e^- \rightarrow \pi^+\pi^-\gamma$
$164 \pm 21 {}^{+89}_{-26}$	5.4M	[24,25] FUJIKAWA	08	BELL	$\tau^- \rightarrow \pi^-\pi^0\nu_\tau$
275 ± 45		[26] ABELE	97	CBAR	$\overline{p} n \rightarrow \pi^-\pi^0\pi^0$
310 ± 40		[26] BERTIN	97C	OBLX	$0.0\ \overline{p} p \rightarrow \pi^+\pi^-\pi^0$
400 ± 100		CLEGG	94	RVUE	$e^+ e^- \rightarrow \pi^+\pi^-$
224 ± 22		BISELLO	89	DM2	$e^+ e^- \rightarrow \pi^+\pi^-$
242.5 ± 163.0		DUBNICKA	89	RVUE	$e^+ e^- \rightarrow \pi^+\pi^-$
620 ± 60		GESHKEN...	89	RVUE	

<315	[27] ERKAL	85	RVUE	20–70 $\gamma p \rightarrow \gamma \pi$
$280 {+30 \atop -80}$	ABE	84B	HYBR	20 $\gamma p \rightarrow \pi^+ \pi^- p$
230 ± 80	[28] ASTON	80	OMEG	20–70 $\gamma p \rightarrow p 2\pi$
283 ± 14	[29] ATIYA	79B	SPEC	50 γC $\rightarrow$ C2π
$175 {+98 \atop -53}$	BECKER	79	ASPK	17 $\pi^- p$ polarized
232 ± 34	[27] LANG	79	RVUE	
340	[27] MARTIN	78C	RVUE	17 $\pi^- p \rightarrow \pi^+ \pi^- n$
300 ±100	[27] FROGGATT	77	RVUE	17 $\pi^- p \rightarrow \pi^+ \pi^- n$
180 ± 50	[30] HYAMS	73	ASPK	17 $\pi^- p \rightarrow \pi^+ \pi^- n$

[22] Using the KUHN 90 parametrization of the pion form factor, neglecting $\rho-\omega$ interference.
[23] Using the GOUNARIS 68 parametrization of the pion form factor leaving the masses and widths of the $\rho(1450)$, $\rho(1700)$, and $\rho(2150)$ resonances as free parameters of the fit.
[24] $|F_\pi(0)|^2$ fixed to 1.
[25] From the GOUNARIS 68 parametrization of the pion form factor.
[26] T-matrix pole.
[27] From phase shift analysis of HYAMS 73 data.
[28] Simple relativistic Breit-Wigner fit with constant width.
[29] An additional 40 MeV uncertainty in both the mass and width is present due to the choice of the background shape.
[30] Included in BECKER 79 analysis.

$K\overline{K}$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
187.2± 26.7	27k	[31] ABELE	99D	CBAR	±	0.0 $\overline{p} p \rightarrow K^+ K^- \pi^0$
265 ±120	1600	CLELAND	82B	SPEC	±	50 $\pi p \rightarrow K^0_S K^\pm p$

[31] K-matrix pole. Isospin not determined, could be $\omega(1650)$ or $\phi(1680)$.

2 $(\pi^+ \pi^-)$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
510± 40		[32] CORDIER	82	DM1	$e^+ e^- \rightarrow 2(\pi^+ \pi^-)$
400± 50		[33] ASTON	81E	OMEG	20–70 $\gamma p \rightarrow p 4\pi$
400±146		[34] DIBIANCA	81	DBC	$\pi^+ d \rightarrow p p 2(\pi^+ \pi^-)$
700±160		[32] BACCI	80	FRAG	$e^+ e^- \rightarrow 2(\pi^+ \pi^-)$
100	34	KILLIAN	80	SPEC	11 $e^- p \rightarrow 2(\pi^+ \pi^-)$
600		[35] ATIYA	79B	SPEC	50 γC $\rightarrow$ C$4\pi^\pm$
340±160	65	[36] ALEXANDER	75	HBC	7.5 $\gamma p \rightarrow p 4\pi$
360±100		[33] CONVERSI	74	OSPK	$e^+ e^- \rightarrow 2(\pi^+ \pi^-)$
400±120	160	[37] SCHACHT	74	STRC	5.5–9 $\gamma p \rightarrow p 4\pi$
850±200	340	[37] SCHACHT	74	STRC	9–18 $\gamma p \rightarrow p 4\pi$
650±100	400	BINGHAM	72B	HBC	9.3 $\gamma p \rightarrow p 4\pi$

[32] Simple relativistic Breit-Wigner fit with model-dependent width.
[33] Simple relativistic Breit-Wigner fit with constant width.
[34] One peak fit result.
[35] Parameters roughly estimated, not from a fit.
[36] Skew mass distribution compensated by Ross-Stodolsky factor.
[37] Width errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.

$\pi^+\pi^-\pi^0\pi^0$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
300±50	ATKINSON	85B	OMEG	20–70 γp

$\omega\pi^0$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
350 to 580	[38] ACHASOV	00I	SND	$e^+e^- \to \pi^0\pi^0\gamma$
490 to 1040	[39] ACHASOV	00I	SND	$e^+e^- \to \pi^0\pi^0\gamma$

[38] Taking into account both $\rho(1450)$ and $\rho(1700)$ contributions. Using the data of ACHASOV 00I on $e^+e^- \to \omega\pi^0$ and of EDWARDS 00A on $\tau^- \to \omega\pi^-\nu_\tau$. $\rho(1450)$ mass and width fixed at 1400 MeV and 500 MeV respectively.

[39] Taking into account the $\rho(1700)$ contribution only. Using the data of ACHASOV 00I on $e^+e^- \to \omega\pi^0$ and of EDWARDS 00A on $\tau^- \to \omega\pi^-\nu_\tau$.

$3(\pi^+\pi^-)$ AND $2(\pi^+\pi^-\pi^0)$ MODES

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
315±100	[40] FRABETTI	04	E687	$\gamma p \to 3\pi^+3\pi^- p$
285± 20	CLEGG	90	RVUE	$e^+e^- \to 3(\pi^+\pi^-)2(\pi^+\pi^-\pi^0)$

[40] From a fit with two resonances with the JACOB 72 continuum.

$\rho(1700)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	4π	
Γ_2	$2(\pi^+\pi^-)$	large
Γ_3	$\rho\pi\pi$	dominant
Γ_4	$\rho^0\pi^+\pi^-$	large
Γ_5	$\rho^0\pi^0\pi^0$	
Γ_6	$\rho^\pm\pi^\mp\pi^0$	large
Γ_7	$a_1(1260)\pi$	seen
Γ_8	$h_1(1170)\pi$	seen
Γ_9	$\pi(1300)\pi$	seen
Γ_{10}	$\rho\rho$	seen
Γ_{11}	$\pi^+\pi^-$	seen
Γ_{12}	$\pi\pi$	seen
Γ_{13}	$K\overline{K}^*(892)+$ c.c.	seen
Γ_{14}	$\eta\rho$	seen
Γ_{15}	$a_2(1320)\pi$	not seen
Γ_{16}	$K\overline{K}$	seen
Γ_{17}	e^+e^-	seen
Γ_{18}	$\pi^0\omega$	seen

$\rho(1700)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

This combination of a partial width with the partial width into e^+e^- and with the total width is obtained from the cross-section into channel$_I$ in e^+e^- annihilation.

$\Gamma(2(\pi^+\pi^-)) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_2\Gamma_{17}/\Gamma$

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.6 ±0.2	DELCOURT	81B	DM1	$e^+e^- \rightarrow 2(\pi^+\pi^-)$
2.83±0.42	BACCI	80	FRAG	$e^+e^- \rightarrow 2(\pi^+\pi^-)$

$\Gamma(\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{11}\Gamma_{17}/\Gamma$

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.13	[41] DIEKMAN	88	RVUE	$e^+e^- \rightarrow \pi^+\pi^-$
$0.029^{+0.016}_{-0.012}$	KURDADZE	83	OLYA	0.64–1.4 $e^+e^- \rightarrow \pi^+\pi^-$

[41] Using total width = 220 MeV.

$\Gamma(K\overline{K}^*(892)+\text{c.c.}) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{13}\Gamma_{17}/\Gamma$

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.305±0.071	[42] BIZOT	80	DM1	e^+e^-

[42] Model dependent.

$\Gamma(\eta\rho) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{14}\Gamma_{17}/\Gamma$

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
7±3	ANTONELLI	88	DM2	$e^+e^- \rightarrow \eta\pi^+\pi^-$

$\Gamma(K\overline{K}) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{16}\Gamma_{17}/\Gamma$

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.035±0.029	[43] BIZOT	80	DM1	e^+e^-

[43] Model dependent.

$\Gamma(\rho\pi\pi) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_3\Gamma_{17}/\Gamma$

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3.510±0.090	[44] BIZOT	80	DM1	e^+e^-

[44] Model dependent.

$\rho(1700)$ $\Gamma(i)/\Gamma(\text{total}) \times \Gamma(e^+e^-)/\Gamma(\text{total})$

$\Gamma(\pi^0\omega)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ — $\Gamma_{18}/\Gamma \times \Gamma_{17}/\Gamma$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.7 ± 0.4	7815	[45] ACHASOV	13	SND	1.05–2.00 $e^+e^- \to \pi^0\pi^0\gamma$

[45] From a phenomenological model based on vector meson dominance with the interfering $\rho(1450)$ and $\rho(1700)$ and their widths fixed at 400 and 250 MeV, respectively. Systematic uncertainty not estimated.

$\rho(1700)$ BRANCHING RATIOS

$\Gamma(\rho\pi\pi)/\Gamma(4\pi)$ — Γ_3/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.28 ± 0.06	[46] ABELE	01B	CBAR	0.0 $\bar{p}n \to 5\pi$

[46] $\omega\pi$ not included.

$\Gamma(\rho^0\pi^+\pi^-)/\Gamma(2(\pi^+\pi^-))$ — Γ_4/Γ_2

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 1.0		DELCOURT	81B	DM1	$e^+e^- \to 2(\pi^+\pi^-)$
$0.7\ \pm0.1$	500	SCHACHT	74	STRC	5.5–18 $\gamma p \to p4\pi$
0.80		[47] BINGHAM	72B	HBC	9.3 $\gamma p \to p4\pi$

[47] The $\pi\pi$ system is in S-wave.

$\Gamma(\rho^0\pi^0\pi^0)/\Gamma(\rho^\pm\pi^\mp\pi^0)$ — Γ_5/Γ_6

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.10	ATKINSON	85B	OMEG		20–70 γp
<0.15	ATKINSON	82	OMEG	0	20–70 $\gamma p \to p4\pi$

$\Gamma(a_1(1260)\pi)/\Gamma(4\pi)$ — Γ_7/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.16 ± 0.05	[48] ABELE	01B	CBAR	0.0 $\bar{p}n \to 5\pi$

[48] $\omega\pi$ not included.

$\Gamma(h_1(1170)\pi)/\Gamma(4\pi)$ — Γ_8/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.17 ± 0.06	[49] ABELE	01B	CBAR	0.0 $\bar{p}n \to 5\pi$

[49] $\omega\pi$ not included.

$\Gamma(\pi(1300)\pi)/\Gamma(4\pi)$ — Γ_9/Γ_1

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.30 ± 0.10	[50] ABELE 01B	CBAR	$0.0\ \overline{p}n \rightarrow 5\pi$

[50] $\omega\pi$ not included.

$\Gamma(\rho\rho)/\Gamma(4\pi)$ — Γ_{10}/Γ_1

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.09 ± 0.03	[51] ABELE 01B	CBAR	$0.0\ \overline{p}n \rightarrow 5\pi$

[51] $\omega\pi$ not included.

$\Gamma(\pi^+\pi^-)/\Gamma_{total}$ — Γ_{11}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.287^{+0.043}_{-0.042}$	BECKER 79	ASPK	$17\ \pi^- p$ polarized
0.15 to 0.30	[52] MARTIN 78C	RVUE	$17\ \pi^- p \rightarrow \pi^+\pi^- n$
<0.20	[53] COSTA... 77B	RVUE	$e^+e^- \rightarrow 2\pi, 4\pi$
$0.30\ \pm0.05$	[52] FROGGATT 77	RVUE	$17\ \pi^- p \rightarrow \pi^+\pi^- n$
<0.15	[54] EISENBERG 73	HBC	$5\ \pi^+ p \rightarrow \Delta^{++} 2\pi$
$0.25\ \pm0.05$	[55] HYAMS 73	ASPK	$17\ \pi^- p \rightarrow \pi^+\pi^- n$

[52] From phase shift analysis of HYAMS 73 data.
[53] Estimate using unitarity, time reversal invariance, Breit-Wigner.
[54] Estimated using one-pion-exchange model.
[55] Included in BECKER 79 analysis.

$\Gamma(\pi^+\pi^-)/\Gamma(2(\pi^+\pi^-))$ — Γ_{11}/Γ_2

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.13 ± 0.05	ASTON 80	OMEG	20–70 $\gamma p \rightarrow p 2\pi$
<0.14	[56] DAVIER 73	STRC	6–18 $\gamma p \rightarrow p 4\pi$
<0.2	[57] BINGHAM 72B	HBC	9.3 $\gamma p \rightarrow p 2\pi$

[56] Upper limit is estimate.
[57] 2σ upper limit.

$\Gamma(\pi\pi)/\Gamma(4\pi)$ — Γ_{12}/Γ_1

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.16 ± 0.04	[58,59] ABELE 01B	CBAR	$0.0\ \overline{p}n \rightarrow 5\pi$

[58] Using ABELE 97.
[59] $\omega\pi$ not included.

$\Gamma(K\overline{K}^*(892)+\text{c.c.})/\Gamma_{total}$ — Γ_{13}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
possibly seen	COAN 04	CLEO	$\tau^- \rightarrow K^-\pi^- K^+ \nu_\tau$

$\Gamma(K\overline{K}^*(892)+\text{c.c.})/\Gamma(2(\pi^+\pi^-))$ — Γ_{13}/Γ_2

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.15 ± 0.03	[60] DELCOURT	81B	DM1	$e^+e^- \rightarrow \overline{K}K\pi$

[60] Assuming $\rho(1700)$ and ω radial excitations to be degenerate in mass.

$\Gamma(\eta\rho)/\Gamma_{\text{total}}$ — Γ_{14}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
possibly seen		AKHMETSHIN	00D	CMD2	$e^+e^- \rightarrow \eta\pi^+\pi^-$
<0.04		DONNACHIE	87B	RVUE	
<0.02	58	ATKINSON	86B	OMEG	20–70 γp

$\Gamma(\eta\rho)/\Gamma(2(\pi^+\pi^-))$ — Γ_{14}/Γ_2

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.123 ± 0.027	DELCOURT	82	DM1	$e^+e^- \rightarrow \pi^+\pi^-$ MM
~ 0.1	ASTON	80	OMEG	20–70 γp

$\Gamma(\pi^+\pi^-\text{ neutrals})/\Gamma(2(\pi^+\pi^-))$ — $(\Gamma_5+\Gamma_6+0.714\Gamma_{14})/\Gamma_2$

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.6 ± 0.4	[61] BALLAM	74	HBC	9.3 γp

[61] Upper limit. Background not subtracted.

$\Gamma(a_2(1320)\pi)/\Gamma_{\text{total}}$ — Γ_{15}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	AMELIN	00	VES	37 $\pi^- p \rightarrow \eta\pi^+\pi^- n$

$\Gamma(K\overline{K})/\Gamma(2(\pi^+\pi^-))$ — Γ_{16}/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
0.015 ± 0.010		[62] DELCOURT	81B	DM1		$e^+e^- \rightarrow \overline{K}K$
<0.04	95	BINGHAM	72B	HBC	0	9.3 γp

[62] Assuming $\rho(1700)$ and ω radial excitations to be degenerate in mass.

$\Gamma(K\overline{K})/\Gamma(K\overline{K}^*(892)+\text{c.c.})$ — Γ_{16}/Γ_{13}

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.052 ± 0.026	BUON	82	DM1	$e^+e^- \rightarrow$ hadrons

$\Gamma(\pi^0\omega)/\Gamma_{\text{total}}$ — Γ_{18}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	1.6k	ACHASOV	12	SND	$e^+e^- \rightarrow \pi^0\pi^0\gamma$
not seen	2382	AKHMETSHIN	03B	CMD2	$e^+e \rightarrow \pi^0\pi^0\gamma$
seen		ACHASOV	97	RVUE	$e^+e^- \rightarrow \omega\pi^0$

$\rho(1700)$ REFERENCES

ACHASOV	13	PR D88 054013	M.N. Achasov *et al.*	(SND Collab.)
ABRAMOWICZ	12	EPJ C72 1869	H. Abramowicz *et al.*	(ZEUS Collab.)
ACHASOV	12	JETPL 94 734	M.N. Achasov *et al.*	
		Translated from ZETFP 94 796.		
LEES	12G	PR D86 032013	J.P. Lees *et al.*	(BABAR Collab.)
FUJIKAWA	08	PR D78 072006	M. Fujikawa *et al.*	(BELLE Collab.)
COAN	04	PRL 92 232001	T.E. Coan *et al.*	(CLEO Collab.)
FRABETTI	04	PL B578 290	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
AKHMETSHIN	03B	PL B562 173	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
ABELE	01B	EPJ C21 261	A. Abele *et al.*	(Crystal Barrel Collab.)
ACHASOV	00I	PL B486 29	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
AKHMETSHIN	00D	PL B489 125	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
AMELIN	00	NP A668 83	D. Amelin *et al.*	(VES Collab.)
EDWARDS	00A	PR D61 072003	K.W. Edwards *et al.*	(CLEO Collab.)
ABELE	99D	PL B468 178	A. Abele *et al.*	(Crystal Barrel Collab.)
ABELE	97	PL B391 191	A. Abele *et al.*	(Crystal Barrel Collab.)
ACHASOV	97	PR D55 2663	N.N. Achasov *et al.*	(NOVM)
BERTIN	97C	PL B408 476	A. Bertin *et al.*	(OBELIX Collab.)
CLEGG	94	ZPHY C62 455	A.B. Clegg, A. Donnachie	(LANC, MCHS)
CLEGG	90	ZPHY C45 677	A.B. Clegg, A. Donnachie	(LANC, MCHS)
KUHN	90	ZPHY C48 445	J.H. Kuhn *et al.*	(MPIM)
BISELLO	89	PL B220 321	D. Bisello *et al.*	(DM2 Collab.)
DUBNICKA	89	JP G15 1349	S. Dubnicka *et al.*	(JINR, SLOV)
GESHKEN...	89	ZPHY C45 351	B.V. Geshkenbein	(ITEP)
ANTONELLI	88	PL B212 133	A. Antonelli *et al.*	(DM2 Collab.)
DIEKMAN	88	PRPL 159 99	B. Diekmann	(BONN)
FUKUI	88	PL B202 441	S. Fukui *et al.*	(SUGI, NAGO, KEK, KYOT+)
DONNACHIE	87B	ZPHY C34 257	A. Donnachie, A.B. Clegg	(MCHS, LANC)
ATKINSON	86B	ZPHY C30 531	M. Atkinson *et al.*	(BONN, CERN, GLAS+)
ATKINSON	85B	ZPHY C26 499	M. Atkinson *et al.*	(BONN, CERN, GLAS+)
ERKAL	85	ZPHY C29 485	C. Erkal, M.G. Olsson	(WISC)
ABE	84B	PRL 53 751	K. Abe *et al.*	(SLAC HFP Collab.)
KURDADZE	83	JETPL 37 733	L.M. Kurdadze *et al.*	(NOVO)
		Translated from ZETFP 37 613.		
ATKINSON	82	PL 108B 55	M. Atkinson *et al.*	(BONN, CERN, GLAS+)
BUON	82	PL 118B 221	J. Buon *et al.*	(LALO, MONP)
CLELAND	82B	NP B208 228	W.E. Cleland *et al.*	(DURH, GEVA, LAUS+)
CORDIER	82	PL 109B 129	A. Cordier *et al.*	(LALO)
DELCOURT	82	PL 113B 93	B. Delcourt *et al.*	(LALO)
ASTON	81E	NP B189 15	D. Aston	(BONN, CERN, EPOL, GLAS, LANC+)
DELCOURT	81B	Bonn Conf. 205	B. Delcourt	(ORSAY)
Also		PL 109B 129	A. Cordier *et al.*	(LALO)
DIBIANCA	81	PR D23 595	F.A. di Bianca *et al.*	(CASE, CMU)
ASTON	80	PL 92B 215	D. Aston	(BONN, CERN, EPOL, GLAS, LANC+)
BACCI	80	PL 95B 139	C. Bacci *et al.*	(ROMA, FRAS)
BIZOT	80	Madison Conf. 546	J.C. Bizot *et al.*	(LALO, MONP)
KILLIAN	80	PR D21 3005	T.J. Killian *et al.*	(CORN)
ATIYA	79B	PRL 43 1691	M.S. Atiya *et al.*	(COLU, ILL, FNAL)
BECKER	79	NP B151 46	H. Becker *et al.*	(MPIM, CERN, ZEEM, CRAC)
LANG	79	PR D19 956	C.B. Lang, A. Mas-Parareda	(GRAZ)
MARTIN	78C	ANP 114 1	A.D. Martin, M.R. Pennington	(CERN)
COSTA...	77B	PL 71B 345	B. Costa de Beauregard, B. Pire, T.N. Truong	(EPOL)
FROGGATT	77	NP B129 89	C.D. Froggatt, J.L. Petersen	(GLAS, NORD)
ALEXANDER	75	PL 57B 487	G. Alexander *et al.*	(TELA)
BALLAM	74	NP B76 375	J. Ballam *et al.*	(SLAC, LBL, MPIM)
CONVERSI	74	PL 52B 493	M. Conversi *et al.*	(ROMA, FRAS)
SCHACHT	74	NP B81 205	P. Schacht *et al.*	(MPIM)
DAVIER	73	NP B58 31	M. Davier *et al.*	(SLAC)
EISENBERG	73	PL 43B 149	Y. Eisenberg *et al.*	(REHO)
HYAMS	73	NP B64 134	B.D. Hyams *et al.*	(CERN, MPIM)
BINGHAM	72B	PL 41B 635	H.H. Bingham *et al.*	(LBL, UCB, SLAC) IGJP
JACOB	72	PR D5 1847	M. Jacob, R. Slansky	
GOUNARIS	68	PRL 21 244	G.J. Gounaris, J.J. Sakurai	