$\rho(1700)$

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

See the related review(s):

$\rho(1450)$ and $\rho(1700)$

$\rho(1700)$ MASS

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

VALUE (MeV)	DOCUMENT ID
1720±20 OUR ESTIMATE	

$\eta\rho^0$ 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. • • •				
1840±10	7.4k	[1] ACHASOV 18	SND	1.22–2.00 $e^+e^- \to \eta\pi^+\pi^-$
1740±20		ANTONELLI 88	DM2	$e^+e^- \to \eta\pi^+\pi^-$
1701±15		[2] FUKUI 88	SPEC	8.95 $\pi^- p \to \eta\pi^+\pi^- n$

[1] From the combined fit of AULCHENKO 15 and ACHASOV 18 in the model with the interfering $\rho(1450)$, $\rho(1700)$ and $\rho(2150)$ with the parameters of the $\rho(1450)$ and $\rho(1700)$ floating and the mass and width of the $\rho(2150)$ fixed at 2155 MeV and 320 MeV, respectively. The phases of the resonances are π, 0 and π, respectively.

[2] 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. • • •				
1770.54± 5.49		[1] BARTOS 17	RVUE	$e^+e^- \to \pi^+\pi^-$
1718.50±65.44		[2] BARTOS 17A	RVUE	$e^+e^- \to \pi^+\pi^-$
1766.80±52.36		[3] BARTOS 17A	RVUE	$\tau^- \to \pi^-\pi^0\nu_\tau$
1644 ±36	20K	[4] LEES 17C	BABR	$J/\psi \to \pi^+\pi^-\pi^0$
1780 ±20 $^{+15}_{-20}$	63.5k	[5] ABRAMOWICZ 12	ZEUS	$e p \to e\pi^+\pi^- p$
1861 ±17		[6] LEES 12G	BABR	$e^+e^- \to \pi^+\pi^-\gamma$
1728 ±17 ±89	5.4M	[7,8] FUJIKAWA 08	BELL	$\tau^- \to \pi^-\pi^0\nu_\tau$
1780 $^{+37}_{-29}$		[9] ABELE 97	CBAR	$\overline{p}n \to \pi^-\pi^0\pi^0$
1719 ±15		[9] BERTIN 97C	OBLX	0.0 $\overline{p}p \to \pi^+\pi^-\pi^0$
1730 ±30		CLEGG 94	RVUE	$e^+e^- \to \pi^+\pi^-$
1768 ±21		BISELLO 89	DM2	$e^+e^- \to \pi^+\pi^-$
1745.7 ±91.9		DUBNICKA 89	RVUE	$e^+e^- \to \pi^+\pi^-$
1546 ±26		GESHKEN... 89	RVUE	

1650		[10] ERKAL	85	RVUE	20–70 $\gamma p \rightarrow \gamma \pi$
1550	± 70	ABE	84B	HYBR	20 $\gamma p \rightarrow \pi^+ \pi^- p$
1590	± 20	[11] ASTON	80	OMEG	20–70 $\gamma p \rightarrow p 2\pi$
1600	± 10	[12] ATIYA	79B	SPEC	50 $\gamma C \rightarrow C 2\pi$
1598	$^{+24}_{-22}$	BECKER	79	ASPK	17 $\pi^- p$ polarized
1659	± 25	[10] LANG	79	RVUE	
1575		[10] MARTIN	78C	RVUE	17 $\pi^- p \rightarrow \pi^+ \pi^- n$
1610	± 30	[10] FROGGATT	77	RVUE	17 $\pi^- p \rightarrow \pi^+ \pi^- n$
1590	± 20	[13] HYAMS	73	ASPK	17 $\pi^- p \rightarrow \pi^+ \pi^- n$

[1] Applies the Unitary & Analytic Model of the pion electromagnetic form factor of DUBNICKA 10 to analyze the data of LEES 12G and ABLIKIM 16C.

[2] Applies the Unitary & Analytic Model of the pion electromagnetic form factor of DUBNICKA 10 to analyze the data of ACHASOV 06, AKHMETSHIN 07, AUBERT 09AS, and AMBROSINO 11A.

[3] Applies the Unitary & Analytic Model of the pion electromagnetic form factor of DUBNICKA 10 to analyze the data of FUJIKAWA 08.

[4] From a Dalitz plot analysis in an isobar model with $\rho(1450)$ and $\rho(1700)$ masses and widths floating.

[5] Using the KUHN 90 parametrization of the pion form factor, neglecting ρ–ω interference.

[6] 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.

[7] $|F_\pi(0)|^2$ fixed to 1.

[8] From the GOUNARIS 68 parametrization of the pion form factor.

[9] T-matrix pole.

[10] From phase shift analysis of HYAMS 73 data.

[11] Simple relativistic Breit-Wigner fit with constant width.

[12] An additional 40 MeV uncertainty in both the mass and width is present due to the choice of the background shape.

[13] 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	[1] ACHASOV	13	SND	1.05–2.00 $e^+ e^- \rightarrow \pi^0 \pi^0 \gamma$
1550 to 1620		[2] ACHASOV	00I	SND	$e^+ e^- \rightarrow \pi^0 \pi^0 \gamma$
1580 to 1710		[3] ACHASOV	00I	SND	$e^+ e^- \rightarrow \pi^0 \pi^0 \gamma$
1710 ± 90		ACHASOV	97	RVUE	$e^+ e^- \rightarrow \omega \pi^0$

[1] 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.

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

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

$K\overline{K}$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1541 $\pm$12 $\pm$33	190k	[1] AAIJ	16N	LHCB		$D^0 \to K^0_S K^\pm \pi^\mp$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1740.8$\pm$22.2	27k	[2] ABELE	99D	CBAR	$\pm$	0.0 $\overline{p}p \to K^+ K^- \pi^0$
1582 $\pm$36	1600	CLELAND	82B	SPEC	$\pm$	50 $\pi p \to K^0_S K^\pm p$

[1] Using the GOUNARIS 68 parameterization with a fixed width. Value is average using different $K\pi$ S-wave parametrizations in fit.
[2] 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$\pm$ 20		[1] CORDIER	82	DM1	$e^+e^- \to 2(\pi^+\pi^-)$
1520$\pm$ 30		[2] ASTON	81E	OMEG	20–70 $\gamma p \to p4\pi$
1654$\pm$ 25		[3] DIBIANCA	81	DBC	$\pi^+ d \to pp2(\pi^+\pi^-)$
1666$\pm$ 39		[1] BACCI	80	FRAG	$e^+e^- \to 2(\pi^+\pi^-)$
1780	34	KILLIAN	80	SPEC	11 $e^- p \to 2(\pi^+\pi^-)$
1500		[4] ATIYA	79B	SPEC	50 γC $\to$ C$4\pi^\pm$
1570$\pm$ 60	65	[5] ALEXANDER	75	HBC	7.5 $\gamma p \to p4\pi$
1550$\pm$ 60		[2] CONVERSI	74	OSPK	$e^+e^- \to 2(\pi^+\pi^-)$
1550$\pm$ 50	160	SCHACHT	74	STRC	5.5–9 $\gamma p \to p4\pi$
1450$\pm$100	340	SCHACHT	74	STRC	9–18 $\gamma p \to p4\pi$
1430$\pm$ 50	400	BINGHAM	72B	HBC	9.3 $\gamma p \to p4\pi$

[1] Simple relativistic Breit-Wigner fit with model dependent width.
[2] Simple relativistic Breit-Wigner fit with constant width.
[3] One peak fit result.
[4] Parameters roughly estimated, not from a fit.
[5] 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$\pm$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$\pm$34	[1] FRABETTI	04	E687	$\gamma p \to 3\pi^+ 3\pi^- p$
1783$\pm$15	CLEGG	90	RVUE	$e^+e^- \to 3(\pi^+\pi^-)2(\pi^+\pi^-\pi^0)$

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

$m_{\rho(1700)^0} - m_{\rho(1700)^\pm}$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
-48.30 ± 83.81	[1] BARTOS	17A	RVUE	$e^+e^- \to \pi^+\pi^-$, $\tau^- \to \pi^-\pi^0\nu_\tau$

[1] Applies the Unitary & Analytic Model of the pion electromagnetic form factor of DUBNICKA 10 to analyze the data of ACHASOV 06, AKHMETSHIN 07, AUBERT 09AS, AMBROSINO 11A, and FUJIKAWA 08.

$\rho(1700)$ WIDTH

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

VALUE (MeV)	DOCUMENT ID
250±100 OUR ESTIMATE	

$\eta\rho^0$ 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. • • •					
132±40	7.4k	[1] ACHASOV	18	SND	1.22–2.00 $e^+e^- \to \eta\pi^+\pi^-$
150±30		ANTONELLI	88	DM2	$e^+e^- \to \eta\pi^+\pi^-$
282±44		[2] FUKUI	88	SPEC	8.95 $\pi^- p \to \eta\pi^+\pi^- n$

[1] From the combined fit of AULCHENKO 15 and ACHASOV 18 in the model with the interfering $\rho(1450)$, $\rho(1700)$ and $\rho(2150)$ with the parameters of the $\rho(1450)$ and $\rho(1700)$ floating and the mass and width of the $\rho(2150)$ fixed at 2155 MeV and 320 MeV, respectively. The phases of the resonances are π, 0 and π, respectively.

[2] 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. • • •						
268.98± 11.40			[1] BARTOS	17	RVUE	$e^+e^- \to \pi^+\pi^-$
489.58± 16.95			[2] BARTOS	17A	RVUE	$e^+e^- \to \pi^+\pi^-$
414.71±119.48			[3] BARTOS	17A	RVUE	$\tau^- \to \pi^-\pi^0\nu_\tau$
109 ± 19		20K	[4] LEES	17C	BABR	$J/\psi \to \pi^+\pi^-\pi^0$
310 ± 30	$^{+25}_{-35}$	63.5k	[5] ABRAMOWICZ	12	ZEUS	$e p \to e\pi^+\pi^- p$
316 ± 26			[6] LEES	12G	BABR	$e^+e^- \to \pi^+\pi^-\gamma$
164 ± 21	$^{+89}_{-26}$	5.4M	[7,8] FUJIKAWA	08	BELL	$\tau^- \to \pi^-\pi^0\nu_\tau$
275 ± 45			[9] ABELE	97	CBAR	$\overline{p} n \to \pi^-\pi^0\pi^0$
310 ± 40			[9] BERTIN	97C	OBLX	0.0 $\overline{p} p \to \pi^+\pi^-\pi^0$
400 ±100			CLEGG	94	RVUE	$e^+e^- \to \pi^+\pi^-$
224 ± 22			BISELLO	89	DM2	$e^+e^- \to \pi^+\pi^-$
242.5 ±163.0			DUBNICKA	89	RVUE	$e^+e^- \to \pi^+\pi^-$
620 ± 60			GESHKEN...	89	RVUE	
<315			[10] ERKAL	85	RVUE	20–70 $\gamma p \to \gamma\pi$
280 $^{+30}_{-80}$			ABE	84B	HYBR	20 $\gamma p \to \pi^+\pi^- p$
230 ± 80			[11] ASTON	80	OMEG	20–70 $\gamma p \to p 2\pi$

283	± 14	[12] ATIYA	79B	SPEC	50 $\gamma C \rightarrow C 2\pi$
175	$^{+98}_{-53}$	BECKER	79	ASPK	17 $\pi^- p$ polarized
232	± 34	[10] LANG	79	RVUE	
340		[10] MARTIN	78C	RVUE	17 $\pi^- p \rightarrow \pi^+ \pi^- n$
300	±100	[10] FROGGATT	77	RVUE	17 $\pi^- p \rightarrow \pi^+ \pi^- n$
180	± 50	[13] HYAMS	73	ASPK	17 $\pi^- p \rightarrow \pi^+ \pi^- n$

[1] Applies the Unitary & Analytic Model of the pion electromagnetic form factor of DUBNICKA 10 to analyze the data of LEES 12G and ABLIKIM 16C.
[2] Applies the Unitary & Analytic Model of the pion electromagnetic form factor of DUBNICKA 10 to analyze the data of ACHASOV 06, AKHMETSHIN 07, AUBERT 09AS, and AMBROSINO 11A.
[3] Applies the Unitary & Analytic Model of the pion electromagnetic form factor of DUBNICKA 10 to analyze the data of FUJIKAWA 08.
[4] From a Dalitz plot analysis in an isobar model with $\rho(1450)$ and $\rho(1700)$ masses and widths floating.
[5] Using the KUHN 90 parametrization of the pion form factor, neglecting $\rho-\omega$ interference.
[6] 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.
[7] $|F_\pi(0)|^2$ fixed to 1.
[8] From the GOUNARIS 68 parametrization of the pion form factor.
[9] T-matrix pole.
[10] From phase shift analysis of HYAMS 73 data.
[11] Simple relativistic Breit-Wigner fit with constant width.
[12] An additional 40 MeV uncertainty in both the mass and width is present due to the choice of the background shape.
[13] 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	[1] ABELE	99D	CBAR	±	0.0 $\overline{p} p \rightarrow K^+ K^- \pi^0$
265 ±120	1600	CLELAND	82B	SPEC	±	50 $\pi p \rightarrow K^0_S K^\pm p$

[1] 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		[1] CORDIER	82	DM1	$e^+ e^- \rightarrow 2(\pi^+ \pi^-)$
400± 50		[2] ASTON	81E	OMEG	20–70 $\gamma p \rightarrow p 4\pi$
400±146		[3] DIBIANCA	81	DBC	$\pi^+ d \rightarrow p p 2(\pi^+ \pi^-)$
700±160		[1] BACCI	80	FRAG	$e^+ e^- \rightarrow 2(\pi^+ \pi^-)$
100	34	KILLIAN	80	SPEC	11 $e^- p \rightarrow 2(\pi^+ \pi^-)$
600		[4] ATIYA	79B	SPEC	50 $\gamma C \rightarrow C 4\pi^\pm$
340±160	65	[5] ALEXANDER	75	HBC	7.5 $\gamma p \rightarrow p 4\pi$
360±100		[2] CONVERSI	74	OSPK	$e^+ e^- \rightarrow 2(\pi^+ \pi^-)$
400±120	160	[6] SCHACHT	74	STRC	5.5–9 $\gamma p \rightarrow p 4\pi$
850±200	340	[6] SCHACHT	74	STRC	9–18 $\gamma p \rightarrow p 4\pi$
650±100	400	BINGHAM	72B	HBC	9.3 $\gamma p \rightarrow p 4\pi$

[1] Simple relativistic Breit-Wigner fit with model-dependent width.
[2] Simple relativistic Breit-Wigner fit with constant width.
[3] One peak fit result.
[4] Parameters roughly estimated, not from a fit.
[5] Skew mass distribution compensated by Ross-Stodolsky factor.
[6] 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	[1] ACHASOV	00I	SND	$e^+e^- \to \pi^0\pi^0\gamma$
490 to 1040	[2] ACHASOV	00I	SND	$e^+e^- \to \pi^0\pi^0\gamma$

[1] 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.
[2] 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	[1] FRABETTI	04	E687	$\gamma p \to 3\pi^+ 3\pi^- p$
285± 20	CLEGG	90	RVUE	$e^+e^- \to 3(\pi^+\pi^-)2(\pi^+\pi^-\pi^0)$

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

$\Gamma_{\rho(1700)^0} - \Gamma_{\rho(1700)^\pm}$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
74.87±120.67	[1] BARTOS	17A	RVUE	$e^+e^- \to \pi^+\pi^-, \tau^- \to \pi^-\pi^0\nu_\tau$

[1] Applies the Unitary & Analytic Model of the pion electromagnetic form factor of DUBNICKA 10 to analyze the data of ACHASOV 06, AKHMETSHIN 07, AUBERT 09AS, AMBROSINO 11A, and FUJIKAWA 08.

$\rho(1700)$ 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.

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

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

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

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.13	[1] DIEKMAN	88	RVUE	$e^+e^- \to \pi^+\pi^-$
$0.029^{+0.016}_{-0.012}$	KURDADZE	83	OLYA	0.64–1.4 $e^+e^- \to \pi^+\pi^-$

[1] Using total width = 220 MeV.

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

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.305 ± 0.071	[1] BIZOT	80	DM1	e^+e^-

[1] Model dependent.

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

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

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

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.035 ± 0.029	[1] BIZOT	80	DM1	e^+e^-

[1] Model dependent.

$\Gamma(\rho\pi\pi) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ — $\Gamma_{3}\Gamma_{17}/\Gamma$

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3.510 ± 0.090	[1] BIZOT	80	DM1	e^+e^-

[1] 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. • • •					
0.09 ± 0.05	10.2k	[1] ACHASOV	16D	SND	1.05–2.00 $e^+e^- \rightarrow \pi^0\pi^0\gamma$
1.7 ± 0.4	7815	[2] ACHASOV	13	SND	1.05–2.00 $e^+e^- \rightarrow \pi^0\pi^0\gamma$

[1] From a phenomenological model based on vector meson dominance with interfering $\rho(700)$, $\rho(1450)$, and $\rho(1700)$. The $\rho(1700)$ mass and width are fixed at 1720 MeV and 250 MeV, respectively. Systematic uncertainty not estimated. Supersedes ACHASOV 13.

[2] 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.

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

VALUE (units 10^{-8})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$8.3^{+3.8}_{-3.1}$	7.4k	[1] ACHASOV	18	SND	1.22–2.00 $e^+e^- \rightarrow \eta\pi^+\pi^-$

[1] From the combined fit of AULCHENKO 15 and ACHASOV 18 in the model with the interfering $\rho(1450)$, $\rho(1700)$ and $\rho(2150)$ with the parameters of the $\rho(1450)$ and $\rho(1700)$ floating and the mass and width of the $\rho(2150)$ fixed at 2155 MeV and 320 MeV, respectively. The phases of the resonances are π, 0 and π, respectively.

$\rho(1700)$ 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	[1] ABELE	01B	CBAR	$0.0\ \overline{p}n \rightarrow 5\pi$

[1] $\omega\pi$ 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	$e^+e^- \rightarrow 2(\pi^+\pi^-)$
$0.7\ \pm0.1$	500	SCHACHT	74	STRC	5.5–18 $\gamma p \rightarrow p4\pi$
0.80		[1] BINGHAM	72B	HBC	9.3 $\gamma p \rightarrow p4\pi$

[1] 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 $\gamma p \rightarrow p4\pi$

$\Gamma(a_1(1260)\pi)/\Gamma(4\pi)$ — 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	[1] ABELE	01B	CBAR	$0.0\ \overline{p}n \rightarrow 5\pi$

[1] $\omega\pi$ 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	[1] ABELE	01B	CBAR	$0.0\ \overline{p}n \rightarrow 5\pi$

[1] $\omega\pi$ 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	[1] ABELE	01B	CBAR	$0.0\ \overline{p}n \rightarrow 5\pi$

[1] $\omega\pi$ 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	[1] ABELE	01B	CBAR	$0.0\ \overline{p}n \rightarrow 5\pi$

[1] $\omega\pi$ 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	[1] MARTIN	78C	RVUE	17 $\pi^- p \to \pi^+\pi^- n$
<0.20	[2] COSTA...	77B	RVUE	$e^+e^- \to 2\pi, 4\pi$
0.30 ±0.05	[1] FROGGATT	77	RVUE	17 $\pi^- p \to \pi^+\pi^- n$
<0.15	[3] EISENBERG	73	HBC	5 $\pi^+ p \to \Delta^{++} 2\pi$
0.25 ±0.05	[4] HYAMS	73	ASPK	17 $\pi^- p \to \pi^+\pi^- n$

[1] From phase shift analysis of HYAMS 73 data.
[2] Estimate using unitarity, time reversal invariance, Breit-Wigner.
[3] Estimated using one-pion-exchange model.
[4] 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 $\gamma p \to p 2\pi$
<0.14	[1] DAVIER	73	STRC	6–18 $\gamma p \to p 4\pi$
<0.2	[2] BINGHAM	72B	HBC	9.3 $\gamma p \to p 2\pi$

[1] Upper limit is estimate.
[2] 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	[1,2] ABELE	01B	CBAR	0.0 $\overline{p} n \to 5\pi$

[1] Using ABELE 97.
[2] $\omega\pi$ not included.

$\Gamma(K\overline{K}^*(892)+c.c.)/\Gamma_{total}$ — 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	$\tau^- \to K^-\pi^- K^+ \nu_\tau$

$\Gamma(K\overline{K}^*(892)+c.c.)/\Gamma(2(\pi^+\pi^-))$ — 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	[1] DELCOURT	81B	DM1	$e^+e^- \to \overline{K} K \pi$

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

$\Gamma(\eta\rho)/\Gamma_{total}$ — 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	$e^+e^- \to \eta\pi^+\pi^-$
<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	[1] BALLAM	74	HBC	9.3 γp

[1] Upper limit. Background not subtracted.

$\Gamma(a_2(1320)\pi)/\Gamma_{total}$ — 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		[1] DELCOURT	81B	DM1		$e^+e^- \rightarrow \overline{K}K$
<0.04	95	BINGHAM	72B	HBC	0	9.3 γp

[1] 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

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
not seen		MATVIENKO	15	BELL	$\overline{B}^0 \rightarrow D^{*+}\omega\pi^-$
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	18	PR D97 012008	M.N. Achasov *et al.*	(SND Collab.)
BARTOS	17	PR D96 113004	E. Bartos *et al.*	
BARTOS	17A	IJMP A32 1750154	E. Bartos *et al.*	
LEES	17C	PR D95 072007	J.P. Lees *et al.*	(BABAR Collab)
AAIJ	16N	PR D93 052018	R. Aaij *et al.*	(LHCb Collab.)
ABLIKIM	16C	PL B753 629	M. Ablikim *et al.*	(BES III Collab.)
ACHASOV	16D	PR D94 112001	M.N. Achasov *et al.*	(SND Collab.)
AULCHENKO	15	PR D91 052013	V.M. Aulchenko *et al.*	(SND Collab.)
MATVIENKO	15	PR D92 012013	D. Matvienko *et al.*	(BELLE Collab.)
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.)
AMBROSINO	11A	PL B700 102	F. Ambrosino *et al.*	(KLOE Collab.)
DUBNICKA	10	APS 60 1	S. Dubnicka, A.Z. Dubnickova	
AUBERT	09AS	PRL 103 231801	B. Aubert *et al.*	(BABAR Collab.)
FUJIKAWA	08	PR D78 072006	M. Fujikawa *et al.*	(BELLE Collab.)
AKHMETSHIN	07	PL B648 28	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
ACHASOV	06	JETP 103 380	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
		Translated from ZETF 130 437.		
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	