$\rho(770)$

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

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$\rho(770)$ MASS

We no longer list *S*-wave Breit-Wigner fits, or data with high combinatorial background.

NEUTRAL ONLY, e^+e^-

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
775.8 ±0.5 OUR AVERAGE						
775.65±0.64±0.50	114k	[1,2] AKHMETSHIN	04	CMD2		$e^+e^- \rightarrow \pi^+\pi^-$
775.9 ±0.5 ±0.5	1.98M	[3] ALOISIO	03	KLOE		1.02 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
775.8 ±0.9 ±2.0	500k	[3] ACHASOV	02	SND		1.02 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
775.9 ±1.1		[4] BARKOV	85	OLYA	0	$e^+e^- \rightarrow \pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
775.8 ±0.5 ±0.3	1.98M	[5] ALOISIO	03	KLOE		1.02 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
775.9 ±0.6 ±0.5	1.98M	[6] ALOISIO	03	KLOE		1.02 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
775.0 ±0.6 ±1.1	500k	[7] ACHASOV	02	SND		1.02 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
775.1 ±0.7 ±5.3		[8] BENAYOUN	98	RVUE		$e^+e^- \rightarrow \pi^+\pi^-$, $\mu^+\mu^-$
770.5 ±1.9 ±5.1		[9] GARDNER	98	RVUE		0.28–0.92 $e^+e^- \rightarrow \pi^+\pi^-$
764.1 ±0.7		[10] O'CONNELL	97	RVUE		$e^+e^- \rightarrow \pi^+\pi^-$
757.5 ±1.5		[11] BERNICHA	94	RVUE		$e^+e^- \rightarrow \pi^+\pi^-$
768 ±1		[12] GESHKEN...	89	RVUE		$e^+e^- \rightarrow \pi^+\pi^-$

CHARGED ONLY, τ DECAYS and e^+e^-

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
The data in this block is included in the average printed for a previous datablock.						
775.5±0.5 OUR AVERAGE						
775.5±0.5±0.4	1.98M	[3] ALOISIO	03	KLOE		1.02 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
775.1±1.1±0.5	87k	[13,14] ANDERSON	00A	CLE2		$\tau^- \rightarrow \pi^-\pi^0\nu_\tau$
776.4±0.9±1.5		[14] BARATE	97M	ALEP		$\tau^- \rightarrow \pi^-\pi^0\nu_\tau$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
774.8±0.6±0.4	1.98M	[6] ALOISIO	03	KLOE	−	1.02 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
776.3±0.6±0.7	1.98M	[6] ALOISIO	03	KLOE	+	1.02 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
$773.9\pm2.0^{+0.3}_{-1.0}$		[15] SANZ-CILLERO	03	RVUE		$\tau^- \rightarrow \pi^-\pi^0\nu_\tau$
774.5±0.7±1.5	500k	[3] ACHASOV	02	SND	±	1.02 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
775.1±0.5		[16] PICH	01	RVUE		$\tau^- \rightarrow \pi^-\pi^0\nu_\tau$

MIXED CHARGES, OTHER REACTIONS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
763.0±0.3±1.2	600k	[17] ABELE	99E	CBAR	0±	0.0 $\overline{p}p \to \pi^+\pi^-\pi^0$

CHARGED ONLY, HADROPRODUCED

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
766.5±1.1 OUR AVERAGE						
763.7±3.2		ABELE	97	CBAR		$\overline{p}n \to \pi^-\pi^0\pi^0$
768 ±9		AGUILAR-...	91	EHS		400 pp
767 ±3	2935	[18] CAPRARO	87	SPEC	−	200 π^- Cu $\to \pi^-\pi^0$ Cu
761 ±5	967	[18] CAPRARO	87	SPEC	−	200 π^- Pb $\to \pi^-\pi^0$ Pb
771 ±4		HUSTON	86	SPEC	+	202 π^+ A $\to \pi^+\pi^0$ A
766 ±7	6500	[19] BYERLY	73	OSPK	−	5 $\pi^- p$
766.8±1.5	9650	[20] PISUT	68	RVUE	−	1.7–3.2 $\pi^- p$, t <10
767 ±6	900	[18] EISNER	67	HBC	−	4.2 $\pi^- p$, t <10

NEUTRAL ONLY, PHOTOPRODUCED

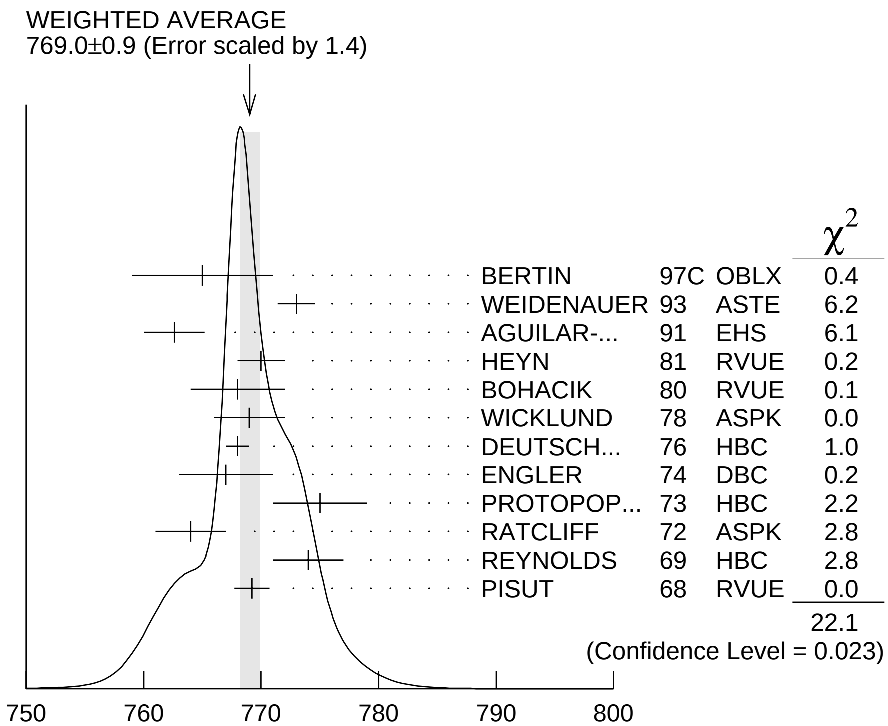
VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
768.5± 1.1 OUR AVERAGE						
770 ± 2 ±1	79k	[21] BREITWEG	98B	ZEUS	0	50–100 γp
767.6± 2.7		BARTALUCCI	78	CNTR	0	$\gamma p \to e^+e^- p$
775 ± 5		GLADDING	73	CNTR	0	2.9–4.7 γp
767 ± 4	1930	BALLAM	72	HBC	0	2.8 γp
770 ± 4	2430	BALLAM	72	HBC	0	4.7 γp
765 ±10		ALVENSLEB...	70	CNTR	0	γA, t <0.01
767.7± 1.9	140k	BIGGS	70	CNTR	0	<4.1 γC $\to \pi^+\pi^-$ C
765 ± 5	4000	ASBURY	67B	CNTR	0	$\gamma +$ Pb
• • • We do not use the following data for averages, fits, limits, etc. • • •						
771 ± 2	79k	[22] BREITWEG	98B	ZEUS	0	50–100 γp

NEUTRAL ONLY, OTHER REACTIONS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
769.0±0.9 OUR AVERAGE	Error includes scale factor of 1.4. See the ideogram below.					
765 ±6		BERTIN	97C	OBLX		0.0 $\overline{p}p \to \pi^+\pi^-\pi^0$
773 ±1.6		WEIDENAUER	93	ASTE		$\overline{p}p \to \pi^+\pi^-\omega$
762.6±2.6		AGUILAR-...	91	EHS		400 pp
770 ±2		[23] HEYN	81	RVUE		Pion form factor
768 ±4		[24,25] BOHACIK	80	RVUE	0	
769 ±3		[19] WICKLUND	78	ASPK	0	3,4,6 $\pi^\pm N$
768 ±1	76000	DEUTSCH...	76	HBC	0	16 $\pi^+ p$
767 ±4	4100	ENGLER	74	DBC	0	6 $\pi^+ n \to \pi^+\pi^- p$
775 ±4	32000	[24] PROTOPOP...	73	HBC	0	7.1 $\pi^+ p$, t <0.4
764 ±3	6800	RATCLIFF	72	ASPK	0	15 $\pi^- p$, t <0.3
774 ±3	1700	REYNOLDS	69	HBC	0	2.26 $\pi^- p$
769.2±1.5	13300	[26] PISUT	68	RVUE	0	1.7–3.2 $\pi^- p$, t <10

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

773.5±2.5		[27] COLANGELO	01	RVUE		$\pi\pi \rightarrow \pi\pi$
762.3±0.5±1.2	600k	[28] ABELE	99E	CBAR	0	0.0 $\overline{p}p \rightarrow \pi^+\pi^-\pi^0$
777 ±2	4943	[29] ADAMS	97	E665		470 $\mu p \rightarrow \mu X B$
770 ±2		[30] BOGOLYUB...	97	MIRA		32 $\overline{p}p \rightarrow \pi^+\pi^- X$
768 ±8		[30] BOGOLYUB...	97	MIRA		32 $pp \rightarrow \pi^+\pi^- X$
761.1±2.9		DUBNICKA	89	RVUE		π form factor
777.4±2.0		[31] CHABAUD	83	ASPK	0	17 $\pi^- p$ polarized
769.5±0.7		[24,25] LANG	79	RVUE	0	
770 ±9		[25] ESTABROOKS	74	RVUE	0	17 $\pi^- p \rightarrow \pi^+\pi^- n$
773.5±1.7	11200	[18] JACOBS	72	HBC	0	2.8 $\pi^- p$
775 ±3	2250	HYAMS	68	OSPK	0	11.2 $\pi^- p$



$\rho(770)^0$ mass (MeV)

[1] Using the GOUNARIS 68 parametrization with the complex phase of the ρ-ω interference.
[2] Update of AKHMETSHIN 02.
[3] Assuming $m_{\rho^+} = m_{\rho^-}$, $\Gamma_{\rho^+} = \Gamma_{\rho^-}$.
[4] From the GOUNARIS 68 parametrization of the pion form factor.
[5] Assuming $m_{\rho^+} = m_{\rho^-} = m_{\rho^0}$, $\Gamma_{\rho^+} = \Gamma_{\rho^-} = \Gamma_{\rho^0}$.
[6] Without limitations on masses and widths.
[7] Assuming $m_{\rho^0} = m_{\rho^\pm}$, $g_{\rho^0\pi\pi} = g_{\rho^\pm\pi\pi}$.
[8] Using the data of BARKOV 85 in the hidden local symmetry model.
[9] From the fit to $e^+e^- \rightarrow \pi^+\pi^-$ data from the compilations of HEYN 81 and BARKOV 85, including the GOUNARIS 68 parametrization of the pion form factor.
[10] A fit of BARKOV 85 data assuming the direct $\omega\pi\pi$ coupling.
[11] Applying the S-matrix formalism to the BARKOV 85 data.
[12] Includes BARKOV 85 data. Model-dependent width definition.

[13] $\rho(1700)$ mass and width fixed at 1700 MeV and 235 MeV respectively.
[14] From the GOUNARIS 68 parametrization of the pion form factor. The second error is a model error taking into account different parametrizations of the pion form factor.
[15] Using the data of BARATE 97M and the effective chiral Lagrangian.
[16] From a fit of the model-independent parameterization of the pion form factor to the data of BARATE 97M.
[17] Assuming the equality of ρ^+ and ρ^- masses and widths.
[18] Mass errors enlarged by us to $\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.
[19] Phase shift analysis. Systematic errors added corresponding to spread of different fits.
[20] From fit of 3-parameter relativistic P-wave Breit-Wigner to total mass distribution. Includes BATON 68, MILLER 67B, ALFF-STEINBERGER 66, HAGOPIAN 66, HAGOPIAN 66B, JACOBS 66B, JAMES 66, WEST 66, BLIEDEN 65 and CARMONY 64.
[21] From the parametrization according to SOEDING 66.
[22] From the parametrization according to ROSS 66.
[23] HEYN 81 includes all spacelike and timelike F_π values until 1978.
[24] From pole extrapolation.
[25] From phase shift analysis of GRAYER 74 data.
[26] Includes MALAMUD 69, ARMENISE 68, BACON 67, HUWE 67, MILLER 67B, ALFF-STEINBERGER 66, HAGOPIAN 66, HAGOPIAN 66B, JACOBS 66B, JAMES 66, WEST 66, GOLDHABER 64, ABOLINS 63.
[27] Breit-Wigner mass from a phase-shift analysis of HYAMS 73 and PROTOPOPESCU 73 data.
[28] Using relativistic Breit-Wigner and taking into account ρ-ω interference.
[29] Systematic errors not evaluated.
[30] Systematic effects not studied.
[31] From fit of 3-parameter relativistic Breit-Wigner to helicity-zero part of P-wave intensity. CHABAUD 83 includes data of GRAYER 74.

$m_{\rho(770)^0} - m_{\rho(770)^\pm}$

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
0.7±0.7 OUR AVERAGE						
0.4±0.7±0.6	1.98M	[32] ALOISIO	03	KLOE		1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
1.3±1.1±2.0	500k	[32] ACHASOV	02	SND		1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
1.6±0.6±1.7	600k	ABELE	99E	CBAR	0±	0.0 $\overline{p}p \to \pi^+\pi^-\pi^0$
−4 ±4	3000	[33] REYNOLDS	69	HBC	−0	2.26 $\pi^- p$
−5 ±5	3600	[33] FOSTER	68	HBC	±0	0.0 $\overline{p}p$
2.4±2.1	22950	[34] PISUT	68	RVUE		$\pi N \to \rho N$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
0.0±1.0		[35] BARATE	97M	ALEP		$\tau^- \to \pi^-\pi^0\nu_\tau$

[32] Assuming $m_{\rho^+} = m_{\rho^-}$, $\Gamma_{\rho^+} = \Gamma_{\rho^-}$.
[33] From quoted masses of charged and neutral modes.
[34] Includes MALAMUD 69, ARMENISE 68, BATON 68, BACON 67, HUWE 67, MILLER 67B, ALFF-STEINBERGER 66, HAGOPIAN 66, HAGOPIAN 66B, JACOBS 66B, JAMES 66, WEST 66, BLIEDEN 65, CARMONY 64, GOLDHABER 64, ABOLINS 63.
[35] Using the compilation of e^+e^- data from BARKOV 85.

$m_{\rho(770)^+} - m_{\rho(770)^-}$

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.5±0.8±0.7	1.98M	[36] ALOISIO	03	KLOE	1.02 $e^+e^- \to \pi^+\pi^-\pi^0$

[36] Without limitations on masses and widths.

ρ(770) RANGE PARAMETER

The range parameter R enters an energy-dependent correction to the width, of the form $(1 + q_r^2\ R^2)\ /\ (1 + q^2\ R^2)$, where q is the momentum of one of the pions in the $\pi\pi$ rest system. At resonance, $q = q_r$.

VALUE (GeV^{-1})	DOCUMENT ID		TECN	CHG	COMMENT
$5.3^{+0.9}_{-0.7}$	CHABAUD	83	ASPK	0	17 $\pi^- p$ polarized

ρ(770) WIDTH

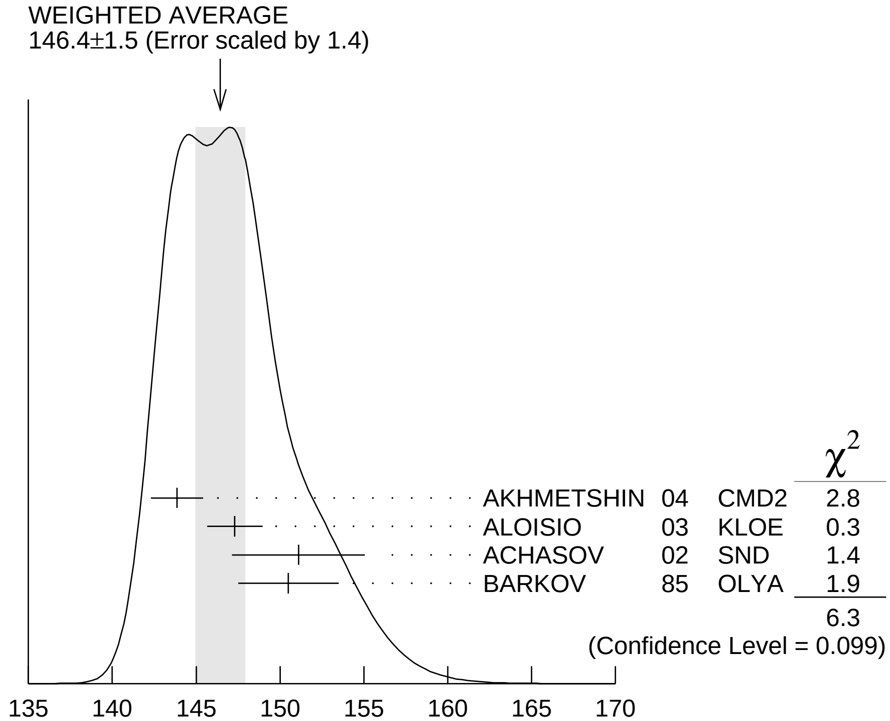
We no longer list S-wave Breit-Wigner fits, or data with high combinatorial background.

NEUTRAL ONLY, e^+e^-

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
146.4 ±1.5 OUR AVERAGE	Error includes scale factor of 1.4. See the ideogram below.					
143.85±1.33±0.80	114k	[39,40] AKHMETSHIN	04	CMD2		$e^+e^- \to \pi^+\pi^-$
147.3 ±1.5 ±0.7	1.98M	[37] ALOISIO	03	KLOE		1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
151.1 ±2.6 ±3.0	500k	[37] ACHASOV	02	SND	0	1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
150.5 ±3.0		[41] BARKOV	85	OLYA	0	$e^+e^- \to \pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
143.9 ±1.3 ±1.1	1.98M	[42] ALOISIO	03	KLOE		1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
147.4 ±1.5 ±0.7	1.98M	[43] ALOISIO	03	KLOE		1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
149.8 ±2.2 ±2.0	500k	[38] ACHASOV	02	SND		1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
147.9 ±1.5 ±7.5		[44] BENAYOUN	98	RVUE		$e^+e^- \to \pi^+\pi^-, \mu^+\mu^-$
153.5 ±1.3 ±4.6		[45] GARDNER	98	RVUE		0.28–0.92 $e^+e^- \to \pi^+\pi^-$
145.0 ±1.7		[46] O'CONNELL	97	RVUE		$e^+e^- \to \pi^+\pi^-$
142.5 ±3.5		[47] BERNICHA	94	RVUE		$e^+e^- \to \pi^+\pi^-$
138 ±1		[48] GESHKEN...	89	RVUE		$e^+e^- \to \pi^+\pi^-$

[37] Assuming $m_{\rho^+} = m_{\rho^-}$, $\Gamma_{\rho^+} = \Gamma_{\rho^-}$.

[38] Assuming $m_{\rho^0} = m_{\rho^\pm}$, $g_{\rho^0 \pi\pi} = g_{\rho^\pm \pi\pi}$.



Neutral only, e^+e^-

CHARGED ONLY, τ DECAYS and e^+e^-

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
The data in this block is included in the average printed for a previous datablock.						
150.3±1.6 OUR FIT						
150.3±1.6 OUR AVERAGE						
149.9±2.3±2.0	500k	[37] ACHASOV	02	SND	±	1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
150.4±1.4±1.4	87k	[49,50] ANDERSON	00A	CLE2		$\tau^- \to \pi^-\pi^0\nu_\tau$
150.5±1.6±6.3		[50] BARATE	97M	ALEP		$\tau^- \to \pi^-\pi^0\nu_\tau$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
143.7±1.3±1.2	1.98M	[37] ALOISIO	03	KLOE	±	1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
142.9±1.3±1.4	1.98M	[43] ALOISIO	03	KLOE	−	1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
144.7±1.4±1.2	1.98M	[43] ALOISIO	03	KLOE	+	1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
$150.2 \pm 2.0^{+0.7}_{-1.6}$		[51] SANZ-CILLERO	03	RVUE		$\tau^- \to \pi^-\pi^0\nu_\tau$
150.9±2.2±2.0	500k	[38] ACHASOV	02	SND		1.02 $e^+e^- \to \pi^+\pi^-\pi^0$

MIXED CHARGES, OTHER REACTIONS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
149.5±1.3	600k	[52] ABELE	99E	CBAR	0±	0.0 $\overline{p}p \to \pi^+\pi^-\pi^0$

CHARGED ONLY, HADROPRODUCED

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
150.2± 2.4 OUR FIT						
150.2± 2.4 OUR AVERAGE						
152.8± 4.3		ABELE	97	CBAR		$\overline{p}n \to \pi^- \pi^0 \pi^0$
155 ±11	2935	[53] CAPRARO	87	SPEC	−	200 π^- Cu → $\pi^- \pi^0$ Cu
154 ±20	967	[53] CAPRARO	87	SPEC	−	200 π^- Pb → $\pi^- \pi^0$ Pb
150 ± 5		HUSTON	86	SPEC	+	202 π^+ A → $\pi^+ \pi^0$ A
146 ±12	6500	[54] BYERLY	73	OSPK	−	5 $\pi^- p$
148.2± 4.1	9650	[55] PISUT	68	RVUE	−	1.7–3.2 $\pi^- p$, t <10
146 ±13	900	EISNER	67	HBC	−	4.2 $\pi^- p$, t <10

NEUTRAL ONLY, PHOTOPRODUCED

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
150.7± 2.9 OUR AVERAGE						
146 ± 3 ±13	79k	[56] BREITWEG	98B	ZEUS	0	50–100 γp
150.9± 3.0		BARTALUCCI	78	CNTR	0	$\gamma p \to e^+ e^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
138 ± 3	79k	[57] BREITWEG	98B	ZEUS	0	50–100 γp
147 ±11		GLADDING	73	CNTR	0	2.9–4.7 γp
155 ±12	2430	BALLAM	72	HBC	0	4.7 γp
145 ±13	1930	BALLAM	72	HBC	0	2.8 γp
140 ± 5		ALVENSLEB...	70	CNTR	0	γA, t <0.01
146.1± 2.9	140k	BIGGS	70	CNTR	0	<4.1 γC → $\pi^+ \pi^-$ C
160 ±10		LANZEROTTI	68	CNTR	0	γp
130 ± 5	4000	ASBURY	67B	CNTR	0	$\gamma +$ Pb

NEUTRAL ONLY, OTHER REACTIONS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
150.9± 1.7 OUR AVERAGE Error includes scale factor of 1.1.						
122 ±20		BERTIN	97C	OBLX		0.0 $\overline{p}p \to \pi^+ \pi^- \pi^0$
145.7± 5.3		WEIDENAUER	93	ASTE		$\overline{p}p \to \pi^+ \pi^- \omega$
144.9± 3.7		DUBNICKA	89	RVUE		π form factor
148 ± 6		[58,59] BOHACIK	80	RVUE	0	
152 ± 9		[54] WICKLUND	78	ASPK	0	3,4,6 $\pi^\pm pN$
154 ± 2	76000	DEUTSCH...	76	HBC	0	16 $\pi^+ p$
157 ± 8	6800	RATCLIFF	72	ASPK	0	15 $\pi^- p$, t <0.3
143 ± 8	1700	REYNOLDS	69	HBC	0	2.26 $\pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
147.0± 2.5	600k	[60] ABELE	99E	CBAR	0	0.0 $\overline{p}p \to \pi^+ \pi^- \pi^0$
146 ± 3	4943	[61] ADAMS	97	E665		470 $\mu p \to \mu X B$
$160.0^{+4.1}_{-4.0}$		[62] CHABAUD	83	ASPK	0	17 $\pi^- p$ polarized
155 ± 1		[63] HEYN	81	RVUE	0	π form factor
148.0± 1.3		[58,59] LANG	79	RVUE	0	
146 ±14	4100	ENGLER	74	DBC	0	6 $\pi^+ n \to \pi^+ \pi^- p$
143 ±13		[59] ESTABROOKS	74	RVUE	0	17 $\pi^- p \to \pi^+ \pi^- n$
160 ±10	32000	[58] PROTOPOP...	73	HBC	0	7.1 $\pi^+ p$, t <0.4
145 ±12	2250	[53] HYAMS	68	OSPK	0	11.2 $\pi^- p$
163 ±15	13300	[64] PISUT	68	RVUE	0	1.7–3.2 $\pi^- p$, t <10

[39] Using the GOUNARIS 68 parametrization with the complex phase of the ρ-ω interference.
[40] From a fit in the energy range 0.61 to 0.96 GeV. Update of AKHMETSHIN 02.
[41] From the GOUNARIS 68 parametrization of the pion form factor.
[42] Assuming $m_{\rho^+} = m_{\rho^-} = m_{\rho^0}$, $\Gamma_{\rho^+} = \Gamma_{\rho^-} = \Gamma_{\rho^0}$.
[43] Without limitations on masses and widths.
[44] Using the data of BARKOV 85 in the hidden local symmetry model.
[45] From the fit to $e^+e^- \rightarrow \pi^+\pi^-$ data from the compilations of HEYN 81 and BARKOV 85, including the GOUNARIS 68 parametrization of the pion form factor.
[46] A fit of BARKOV 85 data assuming the direct $\omega\pi\pi$ coupling.
[47] Applying the S-matrix formalism to the BARKOV 85 data.
[48] Includes BARKOV 85 data. Model-dependent width definition.
[49] ρ(1700) mass and width fixed at 1700 MeV and 235 MeV respectively.
[50] From the GOUNARIS 68 parametrization of the pion form factor. The second error is a model error taking into account different parametrizations of the pion form factor.
[51] Using the data of BARATE 97M and the effective chiral Lagrangian.
[52] Assuming the equality of ρ^+ and ρ^- masses and widths.
[53] Width errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.
[54] Phase shift analysis. Systematic errors added corresponding to spread of different fits.
[55] From fit of 3-parameter relativistic P-wave Breit-Wigner to total mass distribution. Includes BATON 68, MILLER 67B, ALFF-STEINBERGER 66, HAGOPIAN 66, HAGOPIAN 66B, JACOBS 66B, JAMES 66, WEST 66, BLIEDEN 65 and CARMONY 64.
[56] From the parametrization according to SOEDING 66.
[57] From the parametrization according to ROSS 66.
[58] From pole extrapolation.
[59] From phase shift analysis of GRAYER 74 data.
[60] Using relativistic Breit-Wigner and taking into account ρ-ω interference.
[61] Systematic errors not evaluated.
[62] From fit of 3-parameter relativistic Breit-Wigner to helicity-zero part of P-wave intensity. CHABAUD 83 includes data of GRAYER 74.
[63] HEYN 81 includes all spacelike and timelike F_π values until 1978.
[64] Includes MALAMUD 69, ARMENISE 68, BACON 67, HUWE 67, MILLER 67B, ALFF-STEINBERGER 66, HAGOPIAN 66, HAGOPIAN 66B, JACOBS 66B, JAMES 66, WEST 66, GOLDHABER 64, ABOLINS 63.

$\Gamma_{\rho(770)^0} - \Gamma_{\rho(770)^\pm}$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
3.6±1.8±1.7	1.98M	[37] ALOISIO	03	KLOE	1.02 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
-0.1 ± 1.9		[65] BARATE	97M	ALEP	$\tau^- \rightarrow \pi^-\pi^0\nu_\tau$

$\Gamma_{\rho(770)^+} - \Gamma_{\rho(770)^-}$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.8±2.0±0.5	1.98M	[43] ALOISIO	03	KLOE	1.02 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$

[65] Using the compilation of e^+e^- data from BARKOV 85.

$\rho(770)$ DECAY MODES

	Mode		Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	$\pi\pi$		$\sim$ 100 %	
	$\rho(770)^{\pm}$ decays			
Γ_2	$\pi^{\pm}\pi^0$		$\sim$ 100 %	
Γ_3	$\pi^{\pm}\gamma$		$(4.5 \pm 0.5) \times 10^{-4}$	S=2.2
Γ_4	$\pi^{\pm}\eta$		$< 6 \times 10^{-3}$	CL=84%
Γ_5	$\pi^{\pm}\pi^+\pi^-\pi^0$		$< 2.0 \times 10^{-3}$	CL=84%
	$\rho(770)^0$ decays			
Γ_6	$\pi^+\pi^-$		$\sim$ 100 %	
Γ_7	$\pi^+\pi^-\gamma$		$(9.9 \pm 1.6) \times 10^{-3}$	
Γ_8	$\pi^0\gamma$		$(6.1 \pm 0.8) \times 10^{-4}$	
Γ_9	$\eta\gamma$		$(2.96 \pm 0.31) \times 10^{-4}$	S=1.2
Γ_{10}	$\pi^0\pi^0\gamma$		$(4.5 \pm 0.8) \times 10^{-5}$	
Γ_{11}	$\mu^+\mu^-$	[a]	$(4.55 \pm 0.28) \times 10^{-5}$	
Γ_{12}	e^+e^-	[a]	$(4.67 \pm 0.09) \times 10^{-5}$	
Γ_{13}	$\pi^+\pi^-\pi^0$		$(1.01^{+0.54}_{-0.36} \pm 0.34) \times 10^{-4}$	
Γ_{14}	$\pi^+\pi^-\pi^+\pi^-$		$(1.8 \pm 0.9) \times 10^{-5}$	
Γ_{15}	$\pi^+\pi^-\pi^0\pi^0$		$< 4 \times 10^{-5}$	CL=90%
Γ_{16}	$\pi^0 e^+e^-$			
Γ_{17}	ηe^+e^-			

[a] The $\omega\rho$ interference is then due to $\omega\rho$ mixing only, and is expected to be small. If $e\mu$ universality holds, $\Gamma(\rho^0 \to \mu^+\mu^-) = \Gamma(\rho^0 \to e^+e^-) \times 0.99785$.

CONSTRAINED FIT INFORMATION

An overall fit to the total width and a partial width uses 10 measurements and one constraint to determine 3 parameters. The overall fit has a $\chi^2 = 10.7$ for 8 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle\delta p_i \delta p_j\right\rangle/(\delta p_i\cdot\delta p_j)$, in percent, from the fit to parameters p_i, including the branching fractions, $x_i \equiv \Gamma_i/\Gamma_{\rm total}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_3	−100	
Γ	15	−15
	x_2	x_3

	Mode	Rate (MeV)	Scale factor
Γ_2	$\pi^\pm\pi^0$	150.2 ±2.4	
Γ_3	$\pi^\pm\gamma$	0.068±0.007	2.3

CONSTRAINED FIT INFORMATION

An overall fit to the total width, a partial width, and 7 branching ratios uses 18 measurements and one constraint to determine 9 parameters. The overall fit has a $\chi^2 = 6.3$ for 10 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle\delta p_i \delta p_j\right\rangle/(\delta p_i \cdot \delta p_j)$, in percent, from the fit to parameters p_i, including the branching fractions, $x_i \equiv \Gamma_i/\Gamma_{total}$. The fit constrains the x_i whose labels appear in this array to sum to one.

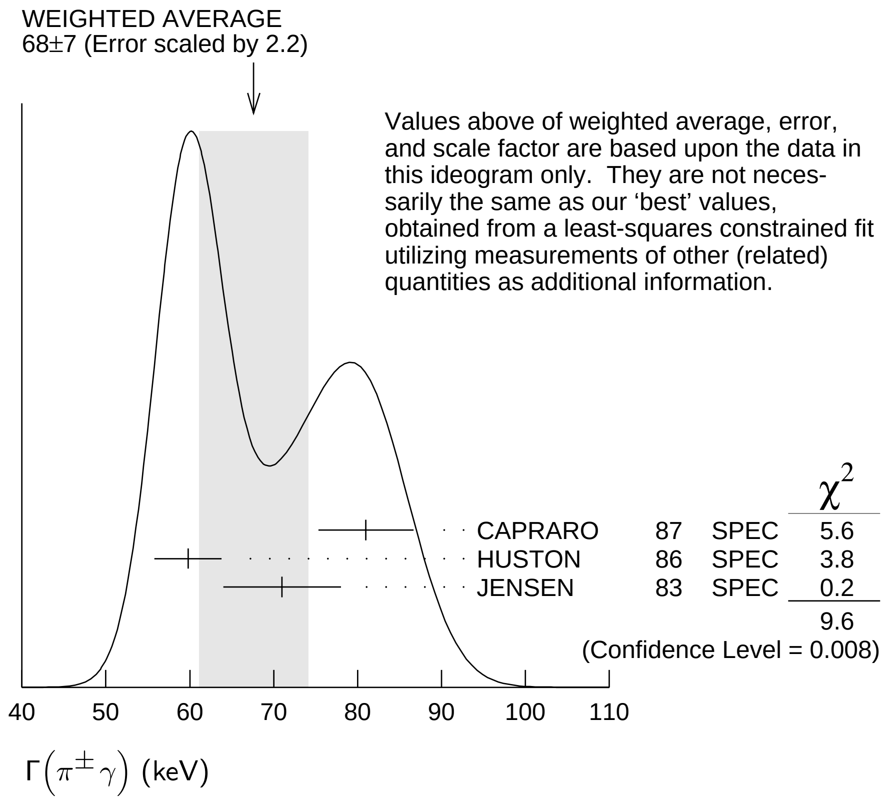
x_7	−100							
x_8	−5	0						
x_9	−2	0	3					
x_{10}	−1	0	0	0				
x_{11}	2	−3	0	0	0			
x_{12}	1	0	−14	−18	0	0		
x_{14}	−1	0	0	0	0	0	0	
Γ	−1	0	8	10	0	0	−55	0
	x_6	x_7	x_8	x_9	x_{10}	x_{11}	x_{12}	x_{14}

	Mode		Rate (MeV)	Scale factor
Γ_6	$\pi^+\pi^-$		148.7 ±1.6	
Γ_7	$\pi^+\pi^-\gamma$		1.49 ±0.24	
Γ_8	$\pi^0\gamma$		0.091 ±0.013	
Γ_9	$\eta\gamma$		0.045 ±0.005	1.2
Γ_{10}	$\pi^0\pi^0\gamma$		0.0067 ±0.0013	
Γ_{11}	$\mu^+\mu^-$	[a]	0.0068 ±0.0004	
Γ_{12}	e^+e^-	[a]	0.00702±0.00011	
Γ_{14}	$\pi^+\pi^-\pi^+\pi^-$		0.0027 ±0.0014	

ρ(770) PARTIAL WIDTHS

$\Gamma(\pi^\pm\gamma)$ Γ_3

VALUE (keV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
68 ±7 OUR FIT Error includes scale factor of 2.3.					
68 ±7 OUR AVERAGE Error includes scale factor of 2.2. See the ideogram below.					
81 ±4 ±4	CAPRARO	87	SPEC	−	200 π^- A → $\pi^-\pi^0$ A
59.8±4.0	HUSTON	86	SPEC	+	202 π^+ A → $\pi^+\pi^0$ A
71 ±7	JENSEN	83	SPEC	−	156–260 π^- A → $\pi^-\pi^0$ A



$\Gamma(e^+e^-)$ Γ_{12}

VALUE (keV)	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
7.02±0.11 OUR FIT				
7.02±0.11 OUR AVERAGE				
7.06±0.11±0.05	114k	[66,67] AKHMETSHIN 04	CMD2	$e^+e^- \to \pi^+\pi^-$
6.77±0.10±0.30		BARKOV 85	OLYA	$e^+e^- \to \pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
6.3 ±0.1		[68] BENAYOUN 98	RVUE	$e^+e^- \to \pi^+\pi^-$, $\mu^+\mu^-$

$\Gamma(\pi^0\gamma)$ Γ_8

VALUE (keV)	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
77±17±11	36500	[69] ACHASOV 03	SND	0.60–0.97 $e^+e^- \to \pi^0\gamma$
121±31		DOLINSKY 89	ND	$e^+e^- \to \pi^0\gamma$

$\Gamma(\eta\gamma)$ Γ_9

VALUE (keV)	*DOCUMENT ID*	*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •			
62±17	[70] DOLINSKY 89	ND	$e^+e^- \to \eta\gamma$

$\Gamma(\pi^+\pi^-\pi^+\pi^-)$ — Γ_{14}

VALUE (keV)	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$2.8\pm1.4\pm0.5$	153	AKHMETSHIN 00	CMD2	0.6–0.97 $e^+e^- \to \pi^+\pi^-\pi^+\pi^-$

[66] Using the GOUNARIS 68 parametrization with the complex phase of the ρ-ω interference.
[67] From a fit in the energy range 0.61 to 0.96 GeV. Update of AKHMETSHIN 02.
[68] Using the data of BARKOV 85 in the hidden local symmetry model.
[69] Using Γ_{total}= 147.9 ± 1.3 MeV and B($\rho \to \pi^0\gamma$) from ACHASOV 03.
[70] Solution corresponding to constructive ω-ρ interference.

$\rho(770)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma^2(\text{total})$

$\Gamma(e^+e^-) \times \Gamma(\eta\gamma)/\Gamma^2_{total}$ — $\Gamma_{12}\Gamma_9/\Gamma^2$

VALUE (units 10^{-8})	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
1.38±0.14 OUR FIT Error includes scale factor of 1.2.				
1.36±0.12 OUR AVERAGE				
$1.50\pm0.65\pm0.09$	17400	[73] AKHMETSHIN 05	CMD2	0.60-1.38 $e^+e^- \to \eta\gamma$
$1.61\pm0.20\pm0.11$	23k	[74,75] AKHMETSHIN 01B	CMD2	$e^+e^- \to \eta\gamma$
$1.21\pm0.14\pm0.04$	312	[76] ACHASOV 00D	SND	$e^+e^- \to \eta\gamma$
1.85 ± 0.49		[77] DOLINSKY 89	ND	$e^+e^- \to \eta\gamma$

$\Gamma(e^+e^-) \times \Gamma(\pi^0\gamma)/\Gamma^2_{total}$ — $\Gamma_{12}\Gamma_8/\Gamma^2$

VALUE (units 10^{-8})	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
2.8 ±0.4 OUR FIT				
2.8 ±0.4 OUR AVERAGE				
$2.90^{+0.60}_{-0.55}\pm0.18$	18680	AKHMETSHIN 05	CMD2	0.60-1.38 $e^+e^- \to \pi^0\gamma$
$2.37\pm0.53\pm0.33$	36500	[71] ACHASOV 03	SND	0.60–0.97 $e^+e^- \to \pi^0\gamma$
$3.61\pm0.74\pm0.49$	10625	[77] DOLINSKY 89	ND	$e^+e^- \to \pi^0\gamma$

[71] Using $\sigma_{\phi \to \pi^0\gamma}$ from ACHASOV 00 and m_ρ= 775.97 MeV in the model with the energy-independent phase of ρ-ω interference equal to $(-10.2 \pm 7.0)^\circ$.

$\Gamma(e^+e^-) \times \Gamma(\pi^+\pi^-\pi^0)/\Gamma^2_{total}$ — $\Gamma_{12}\Gamma_{13}/\Gamma^2$

VALUE (units 10^{-9})	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$4.58^{+2.46}_{-1.64}\pm1.56$	1.2M	[72] ACHASOV 03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$

[72] Statistical significance in less than 3 σ.
[73] From the $\eta \to 2\gamma$ decay and using B($\eta \to \gamma\gamma$)= 39.43 ± 0.26%.
[74] From the $\eta \to 3\pi^0$ decay and using B($\eta \to 3\pi^0$)= (32.24 ± 0.29) × 10^{-2}.
[75] The combined fit from 600 to 1380 MeV taking into account $\rho(770)$, $\omega(782)$, $\phi(1020)$, and $\rho(1450)$ (mass and width fixed at 1450 MeV and 310 MeV respectively).
[76] From the $\eta \to 3\pi^0$ decay and using B($\eta \to 3\pi^0$)= (32.2 ± 0.4) × 10^{-2}.
[77] Recalculated by us from the cross section in the peak.

$\rho(770)$ BRANCHING RATIOS

$\Gamma(\pi^{\pm}\eta)/\Gamma(\pi\pi)$ — Γ_4/Γ_1

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	CHG	COMMENT
<60	84	FERBEL	66	HBC	$\pm$	$\pi^{\pm} p$ above 2.5

$\Gamma(\pi^{\pm}\pi^{+}\pi^{-}\pi^{0})/\Gamma(\pi\pi)$ — Γ_5/Γ_1

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	CHG	COMMENT
<20	84	FERBEL	66	HBC	$\pm$	$\pi^{\pm} p$ above 2.5
• • • We do not use the following data for averages, fits, limits, etc. • • •						
35±40		JAMES	66	HBC	+	2.1 $\pi^{+} p$

$\Gamma(\mu^{+}\mu^{-})/\Gamma(\pi^{+}\pi^{-})$ — Γ_{11}/Γ_6

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
4.60±0.28 OUR FIT				
4.6 ±0.2 ±0.2	ANTIPOV	89	SIGM	π^{-} Cu $\rightarrow \mu^{+}\mu^{-}\pi^{-}$ Cu
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$8.2\ ^{+1.6}_{-3.6}$	[78] ROTHWELL	69	CNTR	Photoproduction
5.6 ±1.5	[79] WEHMANN	69	OSPK	12 π^{-} C, Fe
$9.7\ ^{+3.1}_{-3.3}$	[80] HYAMS	67	OSPK	11 π^{-} Li, H

$\Gamma(e^{+}e^{-})/\Gamma(\pi\pi)$ — Γ_{12}/Γ_1

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.40±0.05	[81] BENAKSAS	72	OSPK	$e^{+}e^{-} \rightarrow \pi^{+}\pi^{-}$

$\Gamma(\eta\gamma)/\Gamma_{total}$ — Γ_9/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
2.96±0.31 OUR FIT Error includes scale factor of 1.2.						
3.6 ±0.9		[82] ANDREWS	77	CNTR	0	6.7–10 γCu
• • • We do not use the following data for averages, fits, limits, etc. • • •						
3.21±1.39±0.20	17400	[83,84] AKHMETSHIN	05	CMD2		0.60-1.38 $e^{+}e^{-} \rightarrow \eta\gamma$
3.39±0.42±0.23		[82,85,86] AKHMETSHIN	01B	CMD2		$e^{+}e^{-} \rightarrow \eta\gamma$
2.69±0.32±0.16	312	[87] ACHASOV	00D	SND		$e^{+}e^{-} \rightarrow \eta\gamma$
$1.9\ ^{+0.6}_{-0.8}$		[88] BENAYOUN	96	RVUE		0.54-1.04 $e^{+}e^{-} \rightarrow \eta\gamma$
4.0 ±1.1		[82,84] DOLINSKY	89	ND		$e^{+}e^{-} \rightarrow \eta\gamma$

$\Gamma(\pi^{+}\pi^{-}\pi^{+}\pi^{-})/\Gamma_{total}$ — Γ_{14}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.8±0.9 OUR FIT						
1.8±0.9±0.3		153	AKHMETSHIN	00	CMD2	0.6–0.97 $e^{+}e^{-} \rightarrow \pi^{+}\pi^{-}\pi^{+}\pi^{-}$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<20	90		KURDADZE	88	OLYA	$e^{+}e^{-} \rightarrow \pi^{+}\pi^{-}\pi^{+}\pi^{-}$

$\Gamma(\pi^+\pi^-\pi^+\pi^-)/\Gamma(\pi\pi)$ — Γ_{14}/Γ_1

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<15	90	ERBE	69	HBC	0	2.5–5.8 γp
<20		CHUNG	68	HBC	0	3.2,4.2 $\pi^- p$
<20	90	HUSON	68	HLBC	0	16.0 $\pi^- p$
<80		JAMES	66	HBC	0	2.1 $\pi^+ p$

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{13}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$1.01^{+0.54}_{-0.36}\pm0.34$		1.2M	[89] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
<1.2	90		VASSERMAN	88B	ND	$e^+e^- \to \pi^+\pi^-\pi^0$

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma(\pi\pi)$ — Γ_{13}/Γ_1

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
~ 0.01		BRAMON	86	RVUE	0	$J/\psi \to \omega\pi^0$
<0.01	84	[90] ABRAMS	71	HBC	0	3.7 $\pi^+ p$

$\Gamma(\pi^+\pi^-\pi^0\pi^0)/\Gamma_{total}$ — Γ_{15}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	CHG	COMMENT
<0.4	90	AULCHENKO	87C	ND	0	$e^+e^- \to \pi^+\pi^-\pi^0\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<2	90	KURDADZE	86	OLYA	0	$e^+e^- \to \pi^+\pi^-\pi^0\pi^0$

$\Gamma(\pi^+\pi^-\gamma)/\Gamma_{total}$ — Γ_7/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.0099±0.0016 OUR FIT					
0.0099±0.0016		[91] DOLINSKY	91	ND	$e^+e^- \to \pi^+\pi^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0111±0.0014		[92] VASSERMAN	88	ND	$e^+e^- \to \pi^+\pi^-\gamma$
<0.005	90	[93] VASSERMAN	88	ND	$e^+e^- \to \pi^+\pi^-\gamma$

$\Gamma(\pi^0\gamma)/\Gamma_{total}$ — Γ_8/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$6.21^{+1.28}_{-1.18}\pm0.39$	18680	[94,95] AKHMETSHIN	05	CMD2	0.60–1.38 $e^+e^- \to \pi^0\gamma$
5.22±1.17±0.75	36500	[95,96] ACHASOV	03	SND	0.60–0.97 $e^+e^- \to \pi^0\gamma$
6.8 ±1.7		[97] BENAYOUN	96	RVUE	0.54–1.04 $e^+e^- \to \pi^0\gamma$
7.9 ±2.0		[95] DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$

$\Gamma(\pi^0 e^+ e^-)/\Gamma_{total}$ — Γ_{16}/Γ

VALUE (units 10^{-5})	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
<1.6	AKHMETSHIN 05A	CMD2	0.72-0.84 $e^+ e^-$

$\Gamma(\eta e^+ e^-)/\Gamma_{total}$ — Γ_{17}/Γ

VALUE (units 10^{-5})	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
<0.7	AKHMETSHIN 05A	CMD2	0.72-0.84 $e^+ e^-$

$\Gamma(\pi^0 \pi^0 \gamma)/\Gamma_{total}$ — Γ_{10}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
4.5±0.8 OUR FIT				
$4.5^{+0.9}_{-0.8}$ OUR AVERAGE				
$5.2^{+1.5}_{-1.3}\pm0.6$	190	[98] AKHMETSHIN 04B	CMD2	0.6–0.97 $e^+ e^- \rightarrow \pi^0 \pi^0 \gamma$
$4.1^{+1.0}_{-0.9}\pm0.3$	295	[99] ACHASOV 02F	SND	0.36–0.97 $e^+ e^- \rightarrow \pi^0 \pi^0 \gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$4.8^{+3.4}_{-1.8}\pm0.5$	63	[100] ACHASOV 00G	SND	$e^+ e^- \rightarrow \pi^0 \pi^0 \gamma$

[78] Possibly large ρ-ω interference leads us to increase the minus error.
[79] Result contains 11 ± 11% correction using SU(3) for central value. The error on the correction takes account of possible ρ-ω interference and the upper limit agrees with the upper limit of $\omega \rightarrow \mu^+ \mu^-$ from this experiment.
[80] HYAMS 67's mass resolution is 20 MeV. The ω region was excluded.
[81] The ρ' contribution is not taken into account.
[82] Solution corresponding to constructive ω-ρ interference.
[83] Using B($\rho \rightarrow e^+ e^-$) = $(4.67 \pm 0.09) \times 10^{-5}$ and B($\eta \rightarrow \gamma\gamma$) = 39.43 ± 0.26%.
[84] Not independent of the corresponding $\Gamma(e^+ e^-) \times \Gamma(\eta\gamma)/\Gamma^2_{total}$.
[85] The combined fit from 600 to 1380 MeV taking into account $\rho(770)$, $\omega(782)$, $\phi(1020)$, and $\rho(1450)$ (mass and width fixed at 1450 MeV and 310 MeV respectively).
[86] Using B($\rho \rightarrow e^+ e^-$) = $(4.75 \pm 0.10) \times 10^{-5}$ from AKHMETSHIN 02 and B($\eta \rightarrow 3\pi^0$) = $(32.24 \pm 0.29) \times 10^{-2}$.
[87] Using B($\rho \rightarrow e^+ e^-$) = $(4.49 \pm 0.22) \times 10^{-5}$ and B($\eta \rightarrow 3\pi^0$) = $(32.2 \pm 0.4) \times 10^{-2}$.
[88] Reanalysis of DRUZHININ 84, DOLINSKY 89, and DOLINSKY 91 taking into account a triangle anomaly contribution. Constructive ρ-ω interference solution.
[89] Statistical significance is less than 3σ.
[90] Model dependent, assumes I = 1, 2, or 3 for the 3π system.
[91] Bremsstrahlung from a decay pion and for photon energy above 50 MeV.
[92] Superseded by DOLINSKY 91.
[93] Structure radiation due to quark rearrangement in the decay.
[94] Using B($\rho \rightarrow e^+ e^-$) = $(4.67 \pm 0.09) \times 10^{-5}$.
[95] Not independent of the corresponding $\Gamma(e^+ e^-) \times \Gamma(\pi^0\gamma)/\Gamma^2_{total}$.
[96] Using B($\rho \rightarrow e^+ e^-$) = $(4.54 \pm 0.10) \times 10^{-5}$.
[97] Reanalysis of DRUZHININ 84, DOLINSKY 89, and DOLINSKY 91 taking into account a triangle anomaly contribution.

[98] This branching ratio includes the conventional VMD mechanism $\rho \rightarrow \omega \pi^0$, $\omega \rightarrow \pi^0 \gamma$, and the new decay mode $\rho \rightarrow f_0(600)\gamma$, $f_0(600) \rightarrow \pi^0 \pi^0$ with a branching ratio $(2.0^{+1.1}_{-0.9} \pm 0.3) \times 10^{-5}$ differing from zero by 2.0 standard deviations.

[99] This branching ratio includes the conventional VMD mechanism $\rho \rightarrow \omega \pi^0$, $\omega \rightarrow \pi^0 \gamma$ and the new decay mode $\rho \rightarrow f_0(600)\gamma$, $f_0(600) \rightarrow \pi^0 \pi^0$ with a branching ratio $(1.9^{+0.9}_{-0.8} \pm 0.4) \times 10^{-5}$ differing from zero by 2.4 standard deviations. Supersedes ACHASOV 00G.

[100] Superseded by ACHASOV 02F.

ρ(770) REFERENCES

AKHMETSHIN	05	PL B605 26	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
AKHMETSHIN	05A	PL B613 29	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
AKHMETSHIN	04	PL B578 285	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
AKHMETSHIN	04B	PL B580 119	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
ACHASOV	03	PL B559 171	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
ACHASOV	03D	PR D68 052006	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
ALOISIO	03	PL B561 55	A. Aloisio *et al.*	(KLOE Collab.)
SANZ-CILLERO	03	EPJ C27 587	J.J. Sanz-Cillero, A. Pich	
ACHASOV	02	PR D65 032002	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
ACHASOV	02F	PL B537 201	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
AKHMETSHIN	02	PL B527 161	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
AKHMETSHIN	01B	PL B509 217	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
COLANGELO	01	NP B603 125	G. Colangelo, J. Gasser, H. Leytwyler	
PICH	01	PR D63 093005	A. Pich, J. Portoles	
ACHASOV	00	EPJ C12 25	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
ACHASOV	00D	JETPL 72 282	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
		Translated from ZETFP 72 411.		
ACHASOV	00G	JETPL 71 355	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
		Translated from ZETFP 71 519.		
AKHMETSHIN	00	PL B475 190	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
ANDERSON	00A	PR D61 112002	S. Anderson *et al.*	(CLEO Collab.)
ABELE	99E	PL B469 270	A. Abele *et al.*	(Crystal Barrel Collab.)
BENAYOUN	98	EPJ C2 269	M. Benayoun *et al.*	(IPNP, NOVO, ADLD+)
BREITWEG	98B	EPJ C2 247	J. Breitweg *et al.*	(ZEUS Collab.)
GARDNER	98	PR D57 2716	S. Gardner, H.B. O'Connell	
Also	00A	PR D62 019903 (errata)	S. Gardner, H.B. O'Connell	
ABELE	97	PL B391 191	A. Abele *et al.*	(Crystal Barrel Collab.)
ADAMS	97	ZPHY C74 237	M.R. Adams *et al.*	(E665 Collab.)
BARATE	97M	ZPHY C76 15	R. Barate *et al.*	(ALEPH Collab.)
BERTIN	97C	PL B408 476	A. Bertin *et al.*	(OBELIX Collab.)
BOGOLYUB...	97	PAN 60 46	M.Y. Bogolyubsky *et al.*	(MOSU, SERP)
		Translated from YAF 60 53.		
O'CONNELL	97	NP A623 559	H.B. O'Connell *et al.*	(ADLD)
BENAYOUN	96	ZPHY C72 221	M. Benayoun *et al.*	(IPNP, NOVO)
BERNICHA	94	PR D50 4454	A. Bernicha, G. Lopez Castro, J. Pestieau	(LOUV+)
WEIDENAUER	93	ZPHY C59 387	P. Weidenauer *et al.*	(ASTERIX Collab.)
AGUILAR-...	91	ZPHY C50 405	M. Aguilar-Benitez *et al.*	(LEBC-EHS Collab.)
DOLINSKY	91	PRPL 202 99	S.I. Dolinsky *et al.*	(NOVO)
ANTIPOV	89	ZPHY C42 185	Y.M. Antipov *et al.*	(SERP, JINR, BGNA+)
DOLINSKY	89	ZPHY C42 511	S.I. Dolinsky *et al.*	(NOVO)
DUBNICKA	89	JPG 15 1349	S. Dubnicka *et al.*	(JINR, SLOV)
GESHKEN...	89	ZPHY C45 351	B.V. Geshkenbein	(ITEP)
KURDADZE	88	JETPL 47 512	L.M. Kurdadze *et al.*	(NOVO)
		Translated from ZETFP 47 432.		
VASSERMAN	88	SJNP 47 1035	I.B. Vasserman *et al.*	(NOVO)
		Translated from YAF 47 1635.		
VASSERMAN	88B	SJNP 48 480	I.B. Vasserman *et al.*	(NOVO)
		Translated from YAF 48 753.		
AULCHENKO	87C	IYF 87-90 Preprint	V.M. Aulchenko *et al.*	(NOVO)
CAPRARO	87	NP B288 659	L. Capraro *et al.*	(CLER, FRAS, MILA+)
BRAMON	86	PL B173 97	A. Bramon, J. Casulleras	(BARC)
HUSTON	86	PR 33 3199	J. Huston *et al.*	(ROCH, FNAL, MINN)
KURDADZE	86	JETPL 43 643	L.M. Kurdadze *et al.*	(NOVO)
		Translated from ZETFP 43 497.		

BARKOV	85	NP B256 365	L.M. Barkov *et al.*	(NOVO)
DRUZHININ	84	PL 144B 136	V.P. Druzhinin *et al.*	(NOVO)
CHABAUD	83	NP B223 1	V. Chabaud *et al.*	(CERN, CRAC, MPIM)
JENSEN	83	PR D27 26	T. Jensen *et al.*	(ROCH, FNAL, MINN)
HEYN	81	ZPHY C7 169	M.F. Heyn, C.B. Lang	(GRAZ)
BOHACIK	80	PR D21 1342	J. Bohacik, H. Kuhnelt	(SLOV, WIEN)
LANG	79	PR D19 956	C.B. Lang, A. Mas-Parareda	(GRAZ)
BARTALUCCI	78	NC 44A 587	S. Bartalucci *et al.*	(DESY, FRAS)
WICKLUND	78	PR D17 1197	A.B. Wicklund *et al.*	(ANL)
ANDREWS	77	PRL 38 198	D.E. Andrews *et al.*	(ROCH)
DEUTSCH...	76	NP B103 426	M. Deutschmann *et al.*	(AACH3, BERL, BONN+)
ENGLER	74	PR D10 2070	A. Engler *et al.*	(CMU, CASE)
ESTABROOKS	74	NP B79 301	P.G. Estabrooks, A.D. Martin	(DURH)
GRAYER	74	NP B75 189	G. Grayer *et al.*	(CERN, MPIM)
BYERLY	73	PR D7 637	W.L. Byerly *et al.*	(MICH)
GLADDING	73	PR D8 3721	G.E. Gladding *et al.*	(HARV)
HYAMS	73	NP B64 134	B.D. Hyams *et al.*	(CERN, MPIM)
PROTOPOP...	73	PR D7 1279	S.D. Protopopescu *et al.*	(LBL)
BALLAM	72	PR D5 545	J. Ballam *et al.*	(SLAC, LBL, TUFTS)
BENAKSAS	72	PL 39B 289	D. Benaksas *et al.*	(ORSAY)
JACOBS	72	PR D6 1291	L.D. Jacobs	(SACL)
RATCLIFF	72	PL 38B 345	B.N. Ratcliff *et al.*	(SLAC)
ABRAMS	71	PR D4 653	G.S. Abrams *et al.*	(LBL)
ALVENSLEB...	70	PRL 24 786	H. Alvensleben *et al.*	(DESY)
BIGGS	70	PRL 24 1197	P.J. Biggs *et al.*	(DARE)
ERBE	69	PR 188 2060	R. Erbe *et al.*	(German Bubble Chamber Collab.)
MALAMUD	69	Argonne Conf. 93	E.I. Malamud, P.E. Schlein	(UCLA)
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ROTHWELL	69	PRL 23 1521	P.L. Rothwell *et al.*	(NEAS)
WEHMANN	69	PR 178 2095	A.A. Wehmann *et al.*	(HARV, CASE, SLAC+)
ARMENISE	68	NC 54A 999	N. Armenise *et al.*	(BARI, BGNA, FIRZ+)
BATON	68	PR 176 1574	J.P. Baton, G. Laurens	(SACL)
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HUSON	68	PL 28B 208	R. Huson *et al.*	(ORSAY, MILA, UCLA)
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HUWE	67	PL 24B 252	D.O. Huwe *et al.*	(COLU)
HYAMS	67	PL 24B 634	B.D. Hyams *et al.*	(CERN, MPIM)
MILLER	67B	PR 153 1423	D.H. Miller *et al.*	(PURD)
ALFF-...	66	PR 145 1072	C. Alff-Steinberger *et al.*	(COLU, RUTG)
FERBEL	66	PL 21 111	T. Ferbel	(ROCH)
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JACOBS	66B	UCRL 16877	L.D. Jacobs	(LRL)
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