$\omega(782)$

$I^G(J^{PC}) = 0^-(1^{--})$

$\omega(782)$ MASS

VALUE (MeV)	EVTS		DOCUMENT ID		TECN	COMMENT
782.65±0.12 OUR AVERAGE			Error includes scale factor of 1.9. See the ideogram below.			
783.20±0.13±0.16	18680		AKHMETSHIN	05	CMD2	0.60–1.38 $e^+e^- \to \pi^0\gamma$
782.68±0.09±0.04	11200	1	AKHMETSHIN	04	CMD2	$e^+e^- \to \pi^+\pi^-\pi^0$
782.79±0.08±0.09	1.2M	2	ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
782.7 ±0.1 ±1.5	19500		WURZINGER	95	SPEC	1.33 $pd \to {}^3\text{He}\,\omega$
781.96±0.17±0.80	11k	3	AMSLER	94C	CBAR	0.0 $\overline{p}p \to \omega\eta\pi^0$
782.08±0.36±0.82	3463	4	AMSLER	94C	CBAR	0.0 $\overline{p}p \to \omega\eta\pi^0$
781.96±0.13±0.17	15k		AMSLER	93B	CBAR	0.0 $\overline{p}p \to \omega\pi^0\pi^0$
782.4 ±0.2	270k		WEIDENAUER	93	ASTE	$\overline{p}p \to 2\pi^+2\pi^-\pi^0$
782.2 ±0.4	1488		KURDADZE	83B	OLYA	$e^+e^- \to \pi^+\pi^-\pi^0$
782.4 ±0.5	7000	5	KEYNE	76	CNTR	$\pi^- p \to \omega n$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
781.91±0.24		6	LEES	12G	BABR	$e^+e^- \to \pi^+\pi^-\gamma$
781.78±0.10		7	BARKOV	87	CMD	$e^+e^- \to \pi^+\pi^-\pi^0$
783.3 ±0.4	433		CORDIER	80	DM1	$e^+e^- \to \pi^+\pi^-\pi^0$
782.5 ±0.8	33260		ROOS	80	RVUE	0.0–3.6 $\overline{p}p$
782.6 ±0.8	3000		BENKHEIRI	79	OMEG	9–12 $\pi^\pm p$
781.8 ±0.6	1430		COOPER	78B	HBC	0.7–0.8 $\overline{p}p \to 5\pi$
782.7 ±0.9	535		VANAPEL...	78	HBC	7.2 $\overline{p}p \to \overline{p}p\omega$
783.5 ±0.8	2100		GESSAROLI	77	HBC	11 $\pi^- p \to \omega n$
782.5 ±0.8	418		AGUILAR-...	72B	HBC	3.9,4.6 $K^- p$
783.4 ±1.0	248		BIZZARRI	71	HBC	0.0 $p\overline{p} \to K^+K^-\omega$
781.0 ±0.6	510		BIZZARRI	71	HBC	0.0 $p\overline{p} \to K_1 K_1 \omega$
783.7 ±1.0	3583	8	COYNE	71	HBC	3.7 $\pi^+ p \to p\pi^+\pi^+\pi^-\pi^0$
784.1 ±1.2	750		ABRAMOVI...	70	HBC	3.9 $\pi^- p$
783.2 ±1.6		9	BIGGS	70B	CNTR	<4.1 $\gamma\text{C} \to \pi^+\pi^-\text{C}$
782.4 ±0.5	2400		BIZZARRI	69	HBC	0.0 $\overline{p}p$

[1] Update of AKHMETSHIN 00C.

[2] From the combined fit of ANTONELLI 92, ACHASOV 01E, ACHASOV 02E, and ACHASOV 03D data on the $\pi^+\pi^-\pi^0$ and ANTONELLI 92 on the $\omega\pi^+\pi^-$ final states. Supersedes ACHASOV 99E and ACHASOV 02E.

[3] From the $\eta \to \gamma\gamma$ decay.

[4] From the $\eta \to 3\pi^0$ decay.

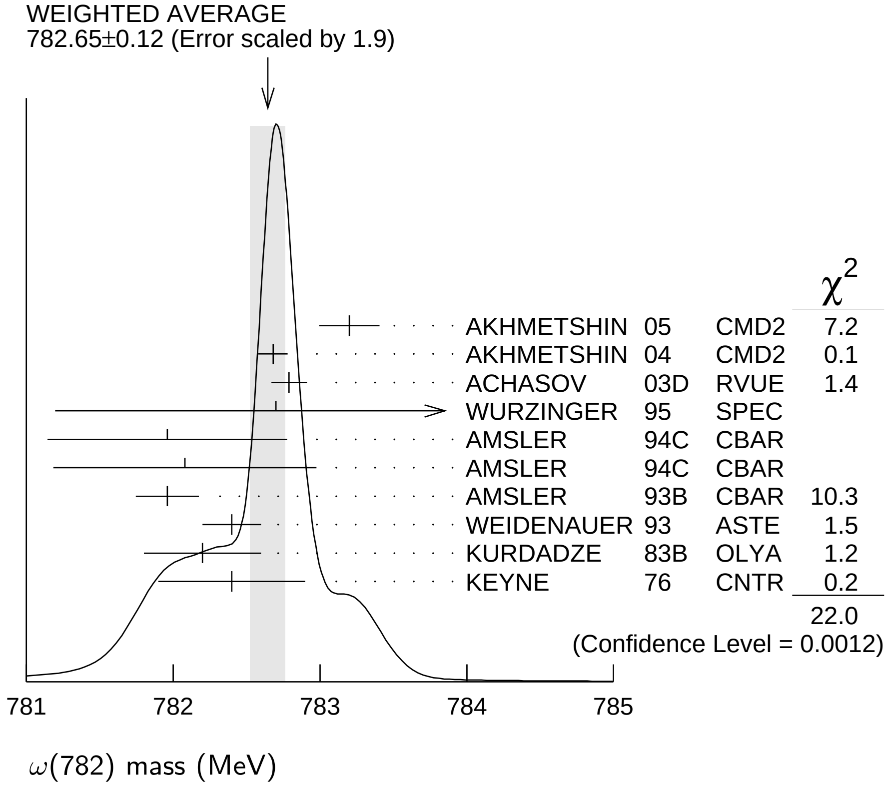
[5] Observed by threshold-crossing technique. Mass resolution = 4.8 MeV FWHM.

[6] From the $\rho-\omega$ interference in the $\pi^+\pi^-$ mass spectrum using the Breit-Wigner for the ω and leaving its mass and width as free parameters of the fit.

[7] Systematic uncertainties underestimated.

[8] From best-resolution sample of COYNE 71.

[9] From ω-ρ interference in the $\pi^+\pi^-$ mass spectrum assuming ω width 12.6 MeV.



$\omega(782)$ WIDTH

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
8.49±0.08 OUR AVERAGE					
8.68±0.23±0.10	11200	[1] AKHMETSHIN	04	CMD2	$e^+e^- \rightarrow \pi^+\pi^-\pi^0$
8.68±0.04±0.15	1.2M	[2] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
8.2 ±0.3	19500	WURZINGER	95	SPEC	1.33 $pd \rightarrow {}^3\text{He}\omega$
8.4 ±0.1		[3] AULCHENKO	87	ND	$e^+e^- \rightarrow \pi^+\pi^-\pi^0$
8.30±0.40		BARKOV	87	CMD	$e^+e^- \rightarrow \pi^+\pi^-\pi^0$
9.8 ±0.9	1488	KURDADZE	83B	OLYA	$e^+e^- \rightarrow \pi^+\pi^-\pi^0$
9.0 ±0.8	433	CORDIER	80	DM1	$e^+e^- \rightarrow \pi^+\pi^-\pi^0$
9.1 ±0.8	451	BENAKSAS	72B	OSPK	$e^+e^- \rightarrow \pi^+\pi^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
8.13±0.45		[4] LEES	12G	BABR	$e^+e^- \rightarrow \pi^+\pi^-\gamma$
12 ±2	1430	COOPER	78B	HBC	0.7–0.8 $\overline{p}p \rightarrow 5\pi$
9.4 ±2.5	2100	GESSAROLI	77	HBC	11 $\pi^- p \rightarrow \omega n$
10.22±0.43	20000	[5] KEYNE	76	CNTR	$\pi^- p \rightarrow \omega n$
13.3 ±2	418	AGUILAR-...	72B	HBC	3.9,4.6 $K^- p$
10.5 ±1.5		BORENSTEIN	72	HBC	2.18 $K^- p$
7.70±0.9 ±1.15	940	BROWN	72	MMS	2.5 $\pi^- p \rightarrow n\text{MM}$
10.3 ±1.4	510	BIZZARRI	71	HBC	0.0 $p\overline{p} \rightarrow K_1 K_1 \omega$
12.8 ±3.0	248	BIZZARRI	71	HBC	0.0 $p\overline{p} \rightarrow K^+K^-\omega$
9.5 ±1.0	3583	COYNE	71	HBC	3.7 $\pi^+ p \rightarrow p\pi^+\pi^+\pi^-\pi^0$

[1] Update of AKHMETSHIN 00C.
[2] From the combined fit of ANTONELLI 92, ACHASOV 01E, ACHASOV 02E, and ACHASOV 03D data on the $\pi^+\pi^-\pi^0$ and ANTONELLI 92 on the $\omega\pi^+\pi^-$ final states. Supersedes ACHASOV 99E and ACHASOV 02E.
[3] Relativistic Breit-Wigner includes radiative corrections.
[4] From the $\rho-\omega$ interference in the $\pi^+\pi^-$ mass spectrum using the Breit-Wigner for the ω and leaving its mass and width as free parameters of the fit.
[5] Observed by threshold-crossing technique. Mass resolution = 4.8 MeV FWHM.

$\omega(782)$ DECAY MODES

	Mode		Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	$\pi^+\pi^-\pi^0$		(89.2 ± 0.7) %	
Γ_2	$\pi^0\gamma$		(8.28 ± 0.28) %	S=2.1
Γ_3	$\pi^+\pi^-$		$(1.53^{+0.11}_{-0.13})$ %	S=1.2
Γ_4	neutrals (excluding $\pi^0\gamma$)		$(8 \; ^{+8}_{-5}) \times 10^{-3}$	S=1.1
Γ_5	$\eta\gamma$		$(4.6 \pm 0.4) \times 10^{-4}$	S=1.1
Γ_6	$\pi^0 e^+ e^-$		$(7.7 \pm 0.6) \times 10^{-4}$	
Γ_7	$\pi^0 \mu^+ \mu^-$		$(1.3 \pm 0.4) \times 10^{-4}$	S=2.1
Γ_8	$\eta e^+ e^-$			
Γ_9	$e^+ e^-$		$(7.28 \pm 0.14) \times 10^{-5}$	S=1.3
Γ_{10}	$\pi^+\pi^-\pi^0\pi^0$		$< 2 \times 10^{-4}$	CL=90%
Γ_{11}	$\pi^+\pi^-\gamma$		$< 3.6 \times 10^{-3}$	CL=95%
Γ_{12}	$\pi^+\pi^-\pi^+\pi^-$		$< 1 \times 10^{-3}$	CL=90%
Γ_{13}	$\pi^0\pi^0\gamma$		$(6.6 \pm 1.1) \times 10^{-5}$	
Γ_{14}	$\eta\pi^0\gamma$		$< 3.3 \times 10^{-5}$	CL=90%
Γ_{15}	$\mu^+\mu^-$		$(9.0 \pm 3.1) \times 10^{-5}$	
Γ_{16}	3γ		$< 1.9 \times 10^{-4}$	CL=95%
	Charge conjugation (*C*) violating modes			
Γ_{17}	$\eta\pi^0$	*C*	$< 2.1 \times 10^{-4}$	CL=90%
Γ_{18}	$2\pi^0$	*C*	$< 2.1 \times 10^{-4}$	CL=90%
Γ_{19}	$3\pi^0$	*C*	$< 2.3 \times 10^{-4}$	CL=90%

CONSTRAINED FIT INFORMATION

An overall fit to 15 branching ratios uses 51 measurements and one constraint to determine 10 parameters. The overall fit has a $\chi^2 = 51.8$ for 42 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle\delta x_i \delta x_j\right\rangle/(\delta x_i \cdot \delta x_j)$, in percent, from the fit to 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_2	22								
x_3	−18	−4							
x_4	−92	−56	1						
x_5	7	7	−1	−9					
x_6	−1	0	0	0	0				
x_7	−1	0	0	0	0	0			
x_9	−38	−33	7	44	−21	0	0		
x_{13}	1	4	0	−2	0	0	0	−1	
x_{15}	0	0	0	0	0	0	0	0	0
	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_9	x_{13}

$\omega(782)$ PARTIAL WIDTHS

$\Gamma(\pi^0\gamma)$ — Γ_2

VALUE (keV)	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
788±12±27	36500	[1] ACHASOV	03	SND	0.60–0.97 $e^+e^- \to \pi^0\gamma$
764±51	10625	DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$

[1] Using $\Gamma_\omega = 8.44 \pm 0.09$ MeV and B($\omega \to \pi^0\gamma$) from ACHASOV 03.

$\Gamma(\eta\gamma)$ — Γ_5

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
6.1±2.5	[1] DOLINSKY	89	ND	$e^+e^- \to \eta\gamma$

[1] Using $\Gamma_\omega = 8.4 \pm 0.1$ MeV and B($\omega \to \eta\gamma$) from DOLINSKY 89.

$\Gamma(e^+e^-)$ — Γ_9

VALUE (keV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.60 ±0.02 OUR EVALUATION					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.591±0.015	11200	[1,2] AKHMETSHIN	04	CMD2	$e^+e^- \to \pi^+\pi^-\pi^0$
0.653±0.003±0.021	1.2M	[3] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
0.600±0.031	10625	DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$

[1] Using B($\omega \rightarrow \pi^+ \pi^- \pi^0$) = 0.891 ± 0.007 and Γ_{total} = 8.44 ± 0.09 MeV.
[2] Update of AKHMETSHIN 00C.
[3] Using ACHASOV 03, ACHASOV 03D and B($\omega \rightarrow \pi^+ \pi^-$) = (1.70 ± 0.28)%.

ω(782) $\Gamma(e^+ e^-)\Gamma(i)/\Gamma^2$(total)

$\Gamma(e^+ e^-)/\Gamma_{total} \times \Gamma(\pi^+ \pi^- \pi^0)/\Gamma_{total}$ — $\Gamma_9/\Gamma \times \Gamma_1/\Gamma$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
6.49±0.11 OUR FIT Error includes scale factor of 1.3.					
6.38±0.10 OUR AVERAGE Error includes scale factor of 1.1.					
6.24±0.11±0.08	11.2k	[1] AKHMETSHIN	04	CMD2	$e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
6.70±0.06±0.27		AUBERT,B	04N	BABR	10.6 $e^+ e^- \rightarrow \pi^+ \pi^- \pi^0 \gamma$
6.74±0.04±0.24	1.2M	[2,3] ACHASOV	03D	RVUE	0.44–2.00 $e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
6.37±0.35		[2] DOLINSKY	89	ND	$e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
6.45±0.24		[2] BARKOV	87	CMD	$e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
5.79±0.42	1488	[2] KURDADZE	83B	OLYA	$e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
5.89±0.54	433	[2] CORDIER	80	DM1	$e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
7.54±0.84	451	[2] BENAKSAS	72B	OSPK	$e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
6.20±0.13		[4] BENAYOUN	10	RVUE	0.4–1.05 $e^+ e^-$

[1] Update of AKHMETSHIN 00C.
[2] Recalculated by us from the cross section in the peak.
[3] From the combined fit of ANTONELLI 92, ACHASOV 01E, ACHASOV 02E, and ACHASOV 03D data on the $\pi^+ \pi^- \pi^0$ and ANTONELLI 92 on the $\omega \pi^+ \pi^-$ final states. Supersedes ACHASOV 99E and ACHASOV 02E.
[4] A simultaneous fit of $e^+ e^- \rightarrow \pi^+ \pi^-$, $\pi^+ \pi^- \pi^0$, $\pi^0 \gamma$, $\eta \gamma$ data.

$\Gamma(e^+ e^-)/\Gamma_{total} \times \Gamma(\pi^0 \gamma)/\Gamma_{total}$ — $\Gamma_9/\Gamma \times \Gamma_2/\Gamma$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
6.02±0.20 OUR FIT Error includes scale factor of 1.9.					
6.45±0.17 OUR AVERAGE					
6.47±0.14±0.39	18680	AKHMETSHIN	05	CMD2	0.60-1.38 $e^+ e^- \rightarrow \pi^0 \gamma$
6.50±0.11±0.20	36500	[1] ACHASOV	03	SND	0.60–0.97 $e^+ e^- \rightarrow \pi^0 \gamma$
6.34±0.21±0.21	10625	[2] DOLINSKY	89	ND	$e^+ e^- \rightarrow \pi^0 \gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
6.80±0.13		[3] BENAYOUN	10	RVUE	0.4–1.05 $e^+ e^-$

[1] Using $\sigma_{\phi \rightarrow \pi^0 \gamma}$ from ACHASOV 00 and m_ω= 782.57 MeV in the model with the energy-independent phase of ρ-ω interference equal to $(-10.2 \pm 7.0)^\circ$.
[2] Recalculated by us from the cross section in the peak.
[3] A simultaneous fit of $e^+ e^- \rightarrow \pi^+ \pi^-$, $\pi^+ \pi^- \pi^0$, $\pi^0 \gamma$, $\eta \gamma$ data.

$\Gamma(e^+e^-)/\Gamma_{total} \times \Gamma(\pi^+\pi^-)/\Gamma_{total}$ — $\Gamma_9/\Gamma \times \Gamma_3/\Gamma$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
1.225±0.058±0.041	800k	[1] ACHASOV	06	SND	$e^+e^- \to \pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.146±0.057		[2] BENAYOUN	10	RVUE	0.4–1.05 e^+e^-

[1] Supersedes ACHASOV 05A.
[2] A simultaneous fit of $e^+e^- \to \pi^+\pi^-$, $\pi^+\pi^-\pi^0$, $\pi^0\gamma$, $\eta\gamma$ data.

$\Gamma(e^+e^-)/\Gamma_{total} \times \Gamma(\eta\gamma)/\Gamma_{total}$ — $\Gamma_9/\Gamma \times \Gamma_5/\Gamma$

VALUE (units 10^{-8})	EVTS	DOCUMENT ID		TECN	COMMENT
3.32±0.28 OUR FIT	Error includes scale factor of 1.1.				
3.18±0.28 OUR AVERAGE					
3.10±0.31±0.11	33k	[1] ACHASOV	07B	SND	0.6–1.38 $e^+e^- \to \eta\gamma$
$3.17^{+1.85}_{-1.31}\pm0.21$	17.4k	[2] AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \eta\gamma$
3.41±0.52±0.21	23k	[3,4] AKHMETSHIN	01B	CMD2	$e^+e^- \to \eta\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4.50±0.10		[5] BENAYOUN	10	RVUE	0.4–1.05 e^+e^-

[1] From a combined fit of $\sigma(e^+e^- \to \eta\gamma)$ with $\eta \to 3\pi^0$ and $\eta \to \pi^+\pi^-\pi^0$, and fixing B($\eta \to 3\pi^0$) / B($\eta \to \pi^+\pi^-\pi^0$) = 1.44 ± 0.04. Recalculated by us from the cross section at the peak. Supersedes ACHASOV 00D and ACHASOV 06A.
[2] From the $\eta \to 2\gamma$ decay and using B($\eta \to \gamma\gamma$)= 39.43 ± 0.26%.
[3] From the $\eta \to 3\pi^0$ decay and using B($\eta \to 3\pi^0$)= (32.24 ± 0.29) × 10^{-2}.
[4] 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).
[5] A simultaneous fit of $e^+e^- \to \pi^+\pi^-$, $\pi^+\pi^-\pi^0$, $\pi^0\gamma$, $\eta\gamma$ data.

$\omega(782)$ BRANCHING RATIOS

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_1/Γ

NIECKNIG 12 describes final-state interactions between the three pions in a dispersive framework using data on the $\pi\pi$ *P*-wave scattering phase shift.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.9024±0.0019		[1] AMBROSINO	08G	KLOE	1.0–1.03 $e^+e^- \to \pi^+\pi^-2\pi^0$, $2\pi^0\gamma$
0.8965±0.0016±0.0048	1.2M	[2,3] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
0.880 ±0.020 ±0.032	11200	[3,4] AKHMETSHIN	00C	CMD2	$e^+e^- \to \pi^+\pi^-\pi^0$
0.8942±0.0062		[3] DOLINSKY	89	ND	$e^+e^- \to \pi^+\pi^-\pi^0$

[1] Not independent of $\Gamma(\pi^0\gamma)$ / $\Gamma(\pi^+\pi^-\pi^0)$ from AMBROSINO 08G.
[2] Using ACHASOV 03, ACHASOV 03D and B($\omega \to \pi^+\pi^-$) = (1.70 ± 0.28)%.
[3] Not independent of the corresponding $\Gamma(e^+e^-) \times \Gamma(\pi^+\pi^-\pi^0)/\Gamma^2_{total}$.
[4] Using $\Gamma(e^+e^-)$=0.60 ± 0.02 keV.

$\Gamma(\pi^0\gamma)/\Gamma_{total}$ — Γ_2/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
8.09 ± 0.14		[1] AMBROSINO	08G	KLOE	$e^+e^- \to \pi^+\pi^- 2\pi^0$, $2\pi^0\gamma$
$9.06\pm0.20\pm0.57$	18680	[2,3] AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \pi^0\gamma$
$9.34\pm0.15\pm0.31$	36500	[3] ACHASOV	03	SND	0.60–0.97 $e^+e^- \to \pi^0\gamma$
$8.65\pm0.16\pm0.42$	1.2M	[4,5] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
8.39 ± 0.24	9975	[6] BENAYOUN	96	RVUE	$e^+e^- \to \pi^0\gamma$
8.88 ± 0.62	10625	[3] DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$

[1] Not independent of $\Gamma(\pi^0\gamma)$ / $\Gamma(\pi^+\pi^-\pi^0)$ from AMBROSINO 08G.
[2] Using $B(\omega \to e^+e^-) = (7.14 \pm 0.13) \times 10^{-5}$.
[3] Not independent of the corresponding $\Gamma(e^+e^-) \times \Gamma(\pi^0\gamma)/\Gamma^2_{total}$.
[4] Using ACHASOV 03, ACHASOV 03D and $B(\omega \to \pi^+\pi^-) = (1.70 \pm 0.28)\%$.
[5] Not independent of the corresponding $\Gamma(e^+e^-) \times \Gamma(\pi^+\pi^-\pi^0)/\Gamma^2_{total}$.
[6] Reanalysis of DRUZHININ 84, DOLINSKY 89, DOLINSKY 91 taking into account the triangle anomaly contributions.

$\Gamma(\pi^0\gamma)/\Gamma(\pi^+\pi^-\pi^0)$ — Γ_2/Γ_1

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
9.28±0.31 OUR FIT Error includes scale factor of 2.3.				
9.05±0.27 OUR AVERAGE Error includes scale factor of 1.8.				
8.97 ± 0.16	AMBROSINO	08G	KLOE	$e^+e^- \to \pi^+\pi^- 2\pi^0$, $2\pi^0\gamma$
$9.94\pm0.36\pm0.38$	[1] AULCHENKO	00A	SND	$e^+e^- \to \pi^+\pi^- 2\pi^0$, $2\pi^0\gamma$
$8.4\ \pm1.3$	KEYNE	76	CNTR	$\pi^- p \to \omega n$
$10.9\ \pm2.5$	BENAKSAS	72C	OSPK	$e^+e^- \to \pi^0\gamma$
$8.1\ \pm2.0$	BALDIN	71	HLBC	2.9 $\pi^+ p$
$13\ \ \pm4$	JACQUET	69B	HLBC	2.05 $\pi^+ p \to \pi^+ p\omega$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$9.7\ \pm0.2\ \pm0.5$	[2,3] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
$9.9\ \pm0.7$	[2] DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$

[1] From $\sigma_0^{\omega\pi^0 \to \pi^0\pi^0\gamma}(m_\phi)/\sigma_0^{\omega\pi^0 \to \pi^+\pi^-\pi^0\pi^0}(m_\phi)$ with a phase-space correction factor of 1/1.023.
[2] Not independent of the corresponding $\Gamma(e^+e^-) \times \Gamma(\pi^0\gamma)/\Gamma^2_{total}$.
[3] Using ACHASOV 03. Based on 1.2M events.

$\Gamma(\pi^+\pi^-)/\Gamma_{total}$ — Γ_3/Γ

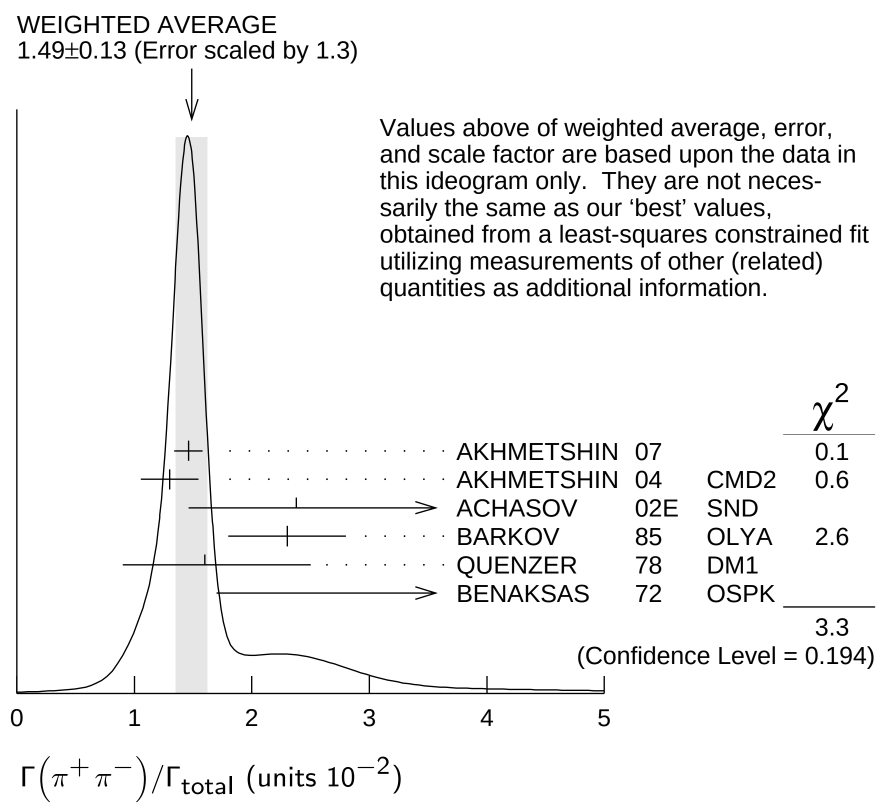
See also $\Gamma(\pi^+\pi^-)/\Gamma(\pi^+\pi^-\pi^0)$.

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
$1.53^{+0.11}_{-0.13}$ OUR FIT Error includes scale factor of 1.2.					
1.49±0.13 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below.					
$1.46\pm0.12\pm0.02$	900k	[1] AKHMETSHIN	07		$e^+e^- \to \pi^+\pi^-$
$1.30\pm0.24\pm0.05$	11.2k	[2] AKHMETSHIN	04	CMD2	$e^+e^- \to \pi^+\pi^-$
$2.38^{+1.77}_{-0.90}\pm0.18$	5.4k	[3] ACHASOV	02E	SND	1.1–1.38 $e^+e^- \to \pi^+\pi^-\pi^0$
$2.3\ \pm0.5$		BARKOV	85	OLYA	$e^+e^- \to \pi^+\pi^-$
$1.6\ ^{+0.9}_{-0.7}$		QUENZER	78	DM1	$e^+e^- \to \pi^+\pi^-$
$3.6\ \pm1.9$		BENAKSAS	72	OSPK	$e^+e^- \to \pi^+\pi^-$

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

1.75 ± 0.11	4.5M	[4] ACHASOV	05A	SND	$e^+e^- \to \pi^+\pi^-$
2.01 ± 0.29		[5] BENAYOUN	03	RVUE	$e^+e^- \to \pi^+\pi^-$
$1.9\ \pm0.3$		[6] GARDNER	99	RVUE	$e^+e^- \to \pi^+\pi^-$
$2.3\ \pm0.4$		[7] BENAYOUN	98	RVUE	$e^+e^- \to \pi^+\pi^-$, $\mu^+\mu^-$
$1.0\ \pm0.11$		[8] WICKLUND	78	ASPK	3,4,6 $\pi^\pm N$
1.22 ± 0.30		ALVENSLEB...	71C	CNTR	Photoproduction
$1.3\ ^{+1.2}_{-0.9}$		MOFFEIT	71	HBC	2.8,4.7 γp
$0.80^{+0.28}_{-0.20}$		[9] BIGGS	70B	CNTR	$4.2\gamma C \to \pi^+\pi^- C$

[1] A combined fit of AKHMETSHIN 07, AULCHENKO 06, and AULCHENKO 05.
[2] Update of AKHMETSHIN 02.
[3] From the $m_{\pi^+\pi^-}$ spectrum taking into account the interference of the $\rho\pi$ and $\omega\pi$ amplitudes.
[4] Using $\Gamma(\omega \to e^+e^-)$ from the 2004 Edition of this Review (PDG 04).
[5] Using the data of AKHMETSHIN 02 in the hidden local symmetry model.
[6] Using the data of BARKOV 85.
[7] Using the data of BARKOV 85 in the hidden local symmetry model.
[8] From a model-dependent analysis assuming complete coherence.
[9] Re-evaluated under $\Gamma(\pi^+\pi^-)/\Gamma(\pi^+\pi^-\pi^0)$ by BEHREND 71 using more accurate $\omega \to \rho$ photoproduction cross-section ratio.



$\Gamma(\pi^+\pi^-)/\Gamma(\pi^+\pi^-\pi^0)$ — Γ_3/Γ_1

See also $\Gamma(\pi^+\pi^-)/\Gamma_{total}$.

VALUE	DOCUMENT ID		TECN	COMMENT
0.0172±0.0014 OUR FIT Error includes scale factor of 1.2.				
0.026 ±0.005 OUR AVERAGE				
$0.021^{+0.028}_{-0.009}$	[1,2] RATCLIFF	72	ASPK	15 $\pi^- p \rightarrow n 2\pi$
0.028 ±0.006	[1] BEHREND	71	ASPK	Photoproduction
$0.022^{+0.009}_{-0.01}$	[3] ROOS	70	RVUE	

[1] The fitted width of these data is 160 MeV in agreement with present average, thus the ω contribution is overestimated. Assuming ρ width 145 MeV.
[2] Significant interference effect observed. NB of $\omega \rightarrow 3\pi$ comes from an extrapolation.
[3] ROOS 70 combines ABRAMOVICH 70 and BIZZARRI 70.

$\Gamma(\pi^+\pi^-)/\Gamma(\pi^0\gamma)$ — Γ_3/Γ_2

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.20±0.04	1.98M	[1] ALOISIO	03	KLOE	1.02 $e^+ e^- \rightarrow \pi^+\pi^-\pi^0$

[1] Using the data of ALOISIO 02D.

$\Gamma(\text{neutrals})/\Gamma_{total}$ — $(\Gamma_2+\Gamma_4)/\Gamma$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.091±0.006 OUR FIT					
0.081±0.011 OUR AVERAGE					
0.075±0.025		BIZZARRI	71	HBC	0.0 $p\overline{p}$
0.079±0.019		DEINET	69B	OSPK	1.5 $\pi^- p$
0.084±0.015		BOLLINI	68C	CNTR	2.1 $\pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.073±0.018	42	BASILE	72B	CNTR	1.67 $\pi^- p$

$\Gamma(\text{neutrals})/\Gamma(\pi^+\pi^-\pi^0)$ — $(\Gamma_2+\Gamma_4)/\Gamma_1$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.102±0.008 OUR FIT					
$\mathbf{0.103^{+0.011}_{-0.010}}$ **OUR AVERAGE**					
0.15 ±0.04	46	AGUILAR-...	72B	HBC	3.9,4.6 $K^- p$
0.10 ±0.03	19	BARASH	67B	HBC	0.0 $\overline{p} p$
0.134±0.026	850	DIGIUGNO	66B	CNTR	1.4 $\pi^- p$
0.097±0.016	348	FLATTE	66	HBC	1.4 – 1.7 $K^- p \rightarrow \Lambda$MM
$0.06^{+0.05}_{-0.02}$		JAMES	66	HBC	2.1 $\pi^+ p$
0.08 ±0.03	35	KRAEMER	64	DBC	1.2 $\pi^+ d$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.11 ±0.02	20	BUSCHBECK	63	HBC	1.5 $K^- p$

$\Gamma(\pi^0\gamma)/\Gamma(\text{neutrals})$ — $\Gamma_2/(\Gamma_2+\Gamma_4)$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.78±0.07		[1] DAKIN	72	OSPK	1.4 $\pi^- p \to n$MM
>0.81	90	DEINET	69B	OSPK	

[1] Error statistical only. Authors obtain good fit also assuming $\pi^0\gamma$ as the only neutral decay.

$\Gamma(\text{neutrals})/\Gamma(\text{charged particles})$ — $(\Gamma_2+\Gamma_4)/(\Gamma_1+\Gamma_3)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.100±0.008 OUR FIT				
0.124±0.021	FELDMAN	67C	OSPK	1.2 $\pi^- p$

$\Gamma(\eta\gamma)/\Gamma_{total}$ — Γ_5/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
4.6 ±0.4 OUR FIT Error includes scale factor of 1.1.					
6.3 ±1.3 OUR AVERAGE Error includes scale factor of 1.2.					
6.6 ±1.7		[1] ABELE	97E	CBAR	0.0 $\overline{p}p \to 5\gamma$
8.3 ±2.1		ALDE	93	GAM2	$38\pi^- p \to \omega n$
$3.0\ ^{+2.5}_{-1.8}$		[2] ANDREWS	77	CNTR	6.7–10 γCu
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4.3 ±0.5 ±0.1	33k	[3] ACHASOV	07B	SND	0.6–1.38 $e^+e^- \to \eta\gamma$
$4.44^{+2.59}_{-1.83}\pm0.28$	17.4k	[4,5] AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \eta\gamma$
5.10±0.72±0.34	23k	[6] AKHMETSHIN	01B	CMD2	$e^+e^- \to \eta\gamma$
0.7 to 5.5		[7] CASE	00	CBAR	0.0 $p\overline{p} \to \eta\eta\gamma$
$6.56^{+2.41}_{-2.55}$	3525	[2,8] BENAYOUN	96	RVUE	$e^+e^- \to \eta\gamma$
7.3 ±2.9		[2,4] DOLINSKY	89	ND	$e^+e^- \to \eta\gamma$

[1] No flat $\eta\eta\gamma$ background assumed.
[2] Solution corresponding to constructive ω-ρ interference.
[3] ACHASOV 07B reports $[\Gamma(\omega(782) \to \eta\gamma)/\Gamma_{total}] \times [B(\omega(782) \to e^+e^-)] = (3.10 \pm 0.31 \pm 0.11) \times 10^{-8}$ which we divide by our best value $B(\omega(782) \to e^+e^-) = (7.28 \pm 0.14) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Supersedes ACHASOV 00D and ACHASOV 06A.
[4] Not independent of the corresponding $\Gamma(e^+e^-) \times \Gamma(\eta\gamma)/\Gamma^2_{total}$.
[5] Using $B(\omega \to e^+e^-) = (7.14 \pm 0.13) \times 10^{-5}$ and $B(\eta \to \gamma\gamma) = 39.43 \pm 0.26\%$.
[6] Using $B(\omega \to e^+e^-) = (7.07 \pm 0.19) \times 10^{-5}$ and using $B(\eta \to 3\pi^0) = (32.24 \pm 0.29) \times 10^{-2}$. Solution corresponding to constructive ω-ρ interference. 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). Not independent of the corresponding $\Gamma(e^+e^-) \times \Gamma(\eta\gamma)/\Gamma^2_{total}$.
[7] Depending on the degree of coherence with the flat $\eta\eta\gamma$ background and using $B(\omega \to \pi^0\gamma) = (8.5 \pm 0.5) \times 10^{-2}$.
[8] Reanalysis of DRUZHININ 84, DOLINSKY 89, DOLINSKY 91 taking into account the triangle anomaly contributions.

$\Gamma(\eta\gamma)/\Gamma(\pi^0\gamma)$ — Γ_5/Γ_2

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.0098±0.0024	[1] ALDE	93	GAM2	$38\pi^- p \to \omega n$
0.0082±0.0033	[2] DOLINSKY	89	ND	$e^+e^- \to \eta\gamma$
0.010 ±0.045	APEL	72B	OSPK	4–8 $\pi^- p \to n 3\gamma$

[1] Model independent determination.
[2] Solution corresponding to constructive ω-ρ interference.

$\Gamma(\pi^0 e^+ e^-)/\Gamma_{\rm total}$ — Γ_6/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
7.7 ±0.6 OUR FIT					
7.7 ±0.6 OUR AVERAGE					
7.61±0.53±0.64		ACHASOV	08	SND	0.36–0.97 $e^+e^- \to \pi^0 e^+e^-$
8.19±0.71±0.62		AKHMETSHIN	05A	CMD2	0.72-0.84 e^+e^-
5.9 ±1.9	43	DOLINSKY	88	ND	$e^+e^- \to \pi^0 e^+e^-$

$\Gamma(\pi^0 \mu^+ \mu^-)/\Gamma_{\rm total}$ — Γ_7/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.3 ±0.4 OUR FIT Error includes scale factor of 2.1.					
1.3 ±0.4 OUR AVERAGE Error includes scale factor of 2.1.					
1.72±0.25±0.14	3k	ARNALDI	09	NA60	158A In−In collisions
0.96±0.23		DZHELYADIN	81B	CNTR	25–33 $\pi^- p \to \omega n$

$\Gamma(\eta e^+ e^-)/\Gamma_{\rm total}$ — Γ_8/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<1.1	AKHMETSHIN	05A	CMD2	0.72-0.84 e^+e^-

$\Gamma(e^+ e^-)/\Gamma_{\rm total}$ — Γ_9/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.728±0.014 OUR FIT Error includes scale factor of 1.3.					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.700±0.016	11200	[1,2] AKHMETSHIN	04	CMD2	$e^+e^- \to \pi^+\pi^-\pi^0$
0.752±0.004±0.024	1.2M	[2,3] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
0.714±0.036		[2] DOLINSKY	89	ND	$e^+e^- \to \pi^+\pi^-\pi^0$
0.72 ±0.03		[2] BARKOV	87	CMD	$e^+e^- \to \pi^+\pi^-\pi^0$
0.64 ±0.04	1488	[2] KURDADZE	83B	OLYA	$e^+e^- \to \pi^+\pi^-\pi^0$
0.675±0.069	433	[2] CORDIER	80	DM1	$e^+e^- \to \pi^+\pi^-\pi^0$
0.83 ±0.10	451	[2] BENAKSAS	72B	OSPK	$e^+e^- \to \pi^+\pi^-\pi^0$
0.77 ±0.06		[4] AUGUSTIN	69D	OSPK	$e^+e^- \to \pi^+\pi^-\pi^0$
0.65 ±0.13	33	[5] ASTVACAT...	68	OSPK	Assume SU(3)+mixing

[1] Using $B(\omega \to \pi^+\pi^-\pi^0) = 0.891 \pm 0.007$. Update of AKHMETSHIN 00C.
[2] Not independent of the corresponding $\Gamma(e^+e^-) \times \Gamma(\pi^+\pi^-\pi^0)/\Gamma^2_{\rm total}$.
[3] Using ACHASOV 03, ACHASOV 03D and $B(\omega \to \pi^+\pi^-) = (1.70 \pm 0.28)\%$.
[4] Rescaled by us to correspond to ω width 8.4 MeV. Systematic errors underestimated.
[5] Not resolved from ρ decay. Error statistical only.

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

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
< 2	90	ACHASOV	09A	SND	$e^+e^- \to \pi^+\pi^-\pi^0\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<200	90	KURDADZE	86	OLYA	$e^+e^- \to \pi^+\pi^-\pi^0\pi^0$

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0036	95	WEIDENAUER	90	ASTE	$p\overline{p} \to \pi^+\pi^-\pi^+\pi^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.004	95	BITYUKOV	88B	SPEC	$32\ \pi^- p \to \pi^+\pi^-\gamma X$

$\Gamma(\pi^+\pi^-\gamma)/\Gamma(\pi^+\pi^-\pi^0)$ — Γ_{11}/Γ_1

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.066	90	KALBFLEISCH	75	HBC	$2.18\ K^- p \to \Lambda\pi^+\pi^-\gamma$
<0.05	90	FLATTE	66	HBC	$1.2–1.7\ K^- p \to \Lambda\pi^+\pi^-\gamma$

$\Gamma(\pi^+\pi^-\pi^+\pi^-)/\Gamma_{total}$ — Γ_{12}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1 \times 10^{-3}$	90	KURDADZE	88	OLYA	$e^+e^- \to \pi^+\pi^-\pi^+\pi^-$

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

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
6.6±1.1 OUR FIT					
6.5±1.2 OUR AVERAGE					
$6.4^{+2.4}_{-2.0}\pm0.8$	190	[1] AKHMETSHIN	04B	CMD2	$0.6–0.97\ e^+e^- \to \pi^0\pi^0\gamma$
$6.6^{+1.4}_{-1.3}\pm0.6$	295	ACHASOV	02F	SND	$0.36–0.97\ e^+e^- \to \pi^0\pi^0\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$11.8^{+2.1}_{-1.9}\pm1.4$	190	[2] AKHMETSHIN	04B	CMD2	$0.6–0.97\ e^+e^- \to \pi^0\pi^0\gamma$
$7.8\pm2.7\pm2.0$	63	[1,3] ACHASOV	00G	SND	$e^+e^- \to \pi^0\pi^0\gamma$
$12.7\pm2.3\pm2.5$	63	[2,3] ACHASOV	00G	SND	$e^+e^- \to \pi^0\pi^0\gamma$

[1] In the model assuming the $\rho \to \pi^0\pi^0\gamma$ decay via the $\omega\pi$ and $f_0(500)\gamma$ mechanisms.
[2] In the model assuming the $\rho \to \pi^0\pi^0\gamma$ decay via the $\omega\pi$ mechanism only.
[3] Superseded by ACHASOV 02F.

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.00045	90	DOLINSKY	89	ND	$e^+e^- \to \pi^0\pi^0\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.08	95	JACQUET	69B	HLBC	$2.05\ \pi^+ p \to \pi^+ p\omega$

$\Gamma(\pi^0\pi^0\gamma)/\Gamma(\pi^0\gamma)$ — Γ_{13}/Γ_2

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
8.0±1.3 OUR FIT						
8.5±2.9		40 ± 14	ALDE	94B	GAM2	$38\pi^- p \to \pi^0\pi^0\gamma n$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 50	90		DOLINSKY	89	ND	$e^+e^- \to \pi^0\pi^0\gamma$
<1800	95		KEYNE	76	CNTR	$\pi^- p \to \omega n$
<1500	90		BENAKSAS	72C	OSPK	e^+e^-
<1400			BALDIN	71	HLBC	2.9 $\pi^+ p$
<1000	90		BARMIN	64	HLBC	1.3–2.8 $\pi^- p$

$\Gamma(\pi^0\pi^0\gamma)/\Gamma(\text{neutrals})$ — $\Gamma_{13}/(\Gamma_2+\Gamma_4)$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.22±0.07		[1] DAKIN	72	OSPK	1.4 $\pi^- p \to n$MM
<0.19	90	DEINET	69B	OSPK	

[1] See $\Gamma(\pi^0\gamma)/\Gamma(\text{neutrals})$.

$\Gamma(\eta\pi^0\gamma)/\Gamma_{\text{total}}$ — Γ_{14}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<3.3	90	AKHMETSHIN	04B	CMD2	0.6–0.97 $e^+e^- \to \eta\pi^0\gamma$

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

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
9.0±3.1 OUR FIT					
9.0±2.9±1.1	18	HEISTER	02C	ALEP	$Z \to \mu^+\mu^- + X$

$\Gamma(\mu^+\mu^-)/\Gamma(\pi^+\pi^-\pi^0)$ — Γ_{15}/Γ_1

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<0.2	90	WILSON	69	OSPK	12 π^- C → Fe
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.7	74	FLATTE	66	HBC	1.2 – 1.7 $K^- p \to \Lambda\mu^+\mu^-$
<1.2		BARBARO-...	65	HBC	2.7 $K^- p$

$\Gamma(\pi^0\mu^+\mu^-)/\Gamma(\mu^+\mu^-)$ — Γ_7/Γ_{15}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.2±0.6	30	[1] DZHELYADIN	79	CNTR	25–33 $\pi^- p$

[1] Superseded by DZHELYADIN 81B result above.

$\Gamma(3\gamma)/\Gamma_{\text{total}}$ — Γ_{16}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<1.9	95	[1] ABELE	97E	CBAR	0.0 $\overline{p}p \to 5\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<2	90	[1] PROKOSHKIN	95	GAM2	38 $\pi^- p \to 3\gamma n$

[1] From direct 3γ decay search.

$\Gamma(\eta\pi^0)/\Gamma_{total}$ — Γ_{17}/Γ

Violates C conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.001	90	ALDE	94B	GAM2	$38\pi^- p \to \eta\pi^0 n$

$[\Gamma(\eta\gamma)+\Gamma(\eta\pi^0)]/\Gamma(\pi^+\pi^-\pi^0)$ — $(\Gamma_5+\Gamma_{17})/\Gamma_1$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.016	90	[1] FLATTE	66	HBC	$1.2-1.7\ K^- p \to \Lambda\pi^+\pi^-$ MM
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.045	95	JACQUET	69B	HLBC	$2.05\ \pi^+ p \to \pi^+ p\omega$

[1] Restated by us using B($\eta \to$ charged modes) = 29.2%.

$\Gamma(\eta\pi^0)/\Gamma(\pi^0\gamma)$ — Γ_{17}/Γ_2

Violates C conservation.

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<2.6	90	[1] STAROSTIN	09	CRYM	$\gamma p \to \eta\pi^0 p$

[1] STAROSTIN 09 reports $[\Gamma(\omega(782) \to \eta\pi^0)/\Gamma(\omega(782) \to \pi^0\gamma)] \times [B(\eta \to 2\gamma)] < 1.01 \times 10^{-3}$ which we divide by our best value $B(\eta \to 2\gamma) = 39.41 \times 10^{-2}$.

$\Gamma(2\pi^0)/\Gamma(\pi^0\gamma)$ — Γ_{18}/Γ_2

Violates C conservation and Bose-Einstein statistics.

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<2.59	90	STAROSTIN	09	CRYM	$\gamma p \to 2\pi^0 p$

$\Gamma(3\pi^0)/\Gamma_{total}$ — Γ_{19}/Γ

Violates C conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<3 \times 10^{-4}$	90	PROKOSHKIN	95	GAM2	$38\ \pi^- p \to 3\pi^0 n$

$\Gamma(3\pi^0)/\Gamma(\pi^0\gamma)$ — Γ_{19}/Γ_2

Violates C conservation.

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<2.72	90	STAROSTIN	09	CRYM	$\gamma p \to 3\pi^0 p$

$\Gamma(3\pi^0)/\Gamma(\pi^+\pi^-\pi^0)$ — Γ_{19}/Γ_1

Violates C conservation.

VALUE	CL%	DOCUMENT ID		COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.009	90	BARBERIS	01	$450\ pp \to p_f 3\pi^0 p_s$

PARAMETER Λ IN $\omega \to \pi^0\mu^+\mu^-$ DECAY

In the pole approximation the electromagnetic transition form factor for a resonance of mass M is given by the expression:

$$|F|^2 = (1 - M^2/\Lambda^2)^{-2},$$

where for the parameter Λ vector dominance predicts $\Lambda = M_\rho \approx 0.770$ GeV. The ARNALDI 09 measurement is in obvious conflict with this expectation. Note that for $\eta \rightarrow \mu^+\mu^-\gamma$ decay ARNALDI 09 and DZHELYADIN 80 obtain the value of Λ consistent with vector dominance.

VALUE (GeV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.668±0.009±0.003	3k	ARNALDI	09	NA60	158A In−In collisions
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.65 ±0.03		DZHELYADIN	81B	CNTR	25–33 $\pi^- p \rightarrow \omega n$

ω(782) REFERENCES

LEES	12G	PR D86 032013	J.P. Lees *et al.*	(BABAR Collab.)
NIECKNIG	12	EPJ C72 2014	F. Niecknig, B. Kubis, S.P. Schneider	(BONN)
BENAYOUN	10	EPJ C65 211	M. Benayoun *et al.*	
ACHASOV	09A	JETP 109 379	M.N. Achasov *et al.*	(SND Collab.)
		Translated from ZETF 136 442.		
ARNALDI	09	PL B677 260	R. Arnaldi *et al.*	(NA60 Collab.)
STAROSTIN	09	PR C79 065201	A. Starostin *et al.*	(Crystal Ball Collab. at MAMI)
ACHASOV	08	JETP 107 61	M.N. Achasov *et al.*	(SND Collab.)
		Translated from ZETF 134 80.		
AMBROSINO	08G	PL B669 223	F. Ambrosino *et al.*	(KLOE Collab.)
ACHASOV	07B	PR D76 077101	M.N. Achasov *et al.*	(SND Collab.)
AKHMETSHIN	07	PL B648 28	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.		
ACHASOV	06A	PR D74 014016	M.N. Achasov *et al.*	(SND Collab.)
AULCHENKO	06	JETPL 84 413	V.M. Aulchenko *et al.*	(Novosibirsk CMD-2 Collab.)
		Translated from ZETFP 84 491.		
ACHASOV	05A	JETP 101 1053	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
		Translated from ZETF 128 1201.		
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.)
AULCHENKO	05	JETPL 82 743	V.M. Aulchenko *et al.*	(Novosibirsk CMD-2 Collab.)
		Translated from ZETFP 82 841.		
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.)
AUBERT,B	04N	PR D70 072004	B. Aubert *et al.*	(BABAR Collab.)
PDG	04	PL B592 1	S. Eidelman *et al.*	(PDG 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.)
BENAYOUN	03	EPJ C29 397	M. Benayoun *et al.*	
ACHASOV	02E	PR D66 032001	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.)
ALOISIO	02D	PL B537 21	A. Aloisio *et al.*	(KLOE Collab.)
HEISTER	02C	PL B528 19	A. Heister *et al.*	(ALEPH Collab.)
ACHASOV	01E	PR D63 072002	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
AKHMETSHIN	01B	PL B509 217	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
BARBERIS	01	PL B507 14	D. Barberis *et al.*	
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	00C	PL B476 33	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
AULCHENKO	00A	JETP 90 927	V.M. Aulchenko *et al.*	(Novosibirsk SND Collab.)
		Translated from ZETF 117 1067.		
CASE	00	PR D61 032002	T. Case *et al.*	(Crystal Barrel Collab.)
ACHASOV	99E	PL B462 365	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
GARDNER	99	PR D59 076002	S. Gardner, H.B. O'Connell	
BENAYOUN	98	EPJ C2 269	M. Benayoun *et al.*	(IPNP, NOVO, ADLD+)
ABELE	97E	PL B411 361	A. Abele *et al.*	(Crystal Barrel Collab.)
BENAYOUN	96	ZPHY C72 221	M. Benayoun *et al.*	(IPNP, NOVO)
PROKOSHKIN	95	SPD 40 273	Y.D. Prokoshkin, V.D. Samoilenko	(SERP)
		Translated from DANS 342 610.		
WURZINGER	95	PR C51 443	R. Wurzinger *et al.*	(BONN, ORSAY, SACL+)
ALDE	94B	PL B340 122	D.M. Alde *et al.*	(SERP, BELG, LANL, LAPP+)
AMSLER	94C	PL B327 425	C. Amsler *et al.*	(Crystal Barrel Collab.)
ALDE	93	PAN 56 1229	D.M. Alde *et al.*	(SERP, LAPP, LANL, BELG+)
		Translated from YAF 56 137.		

Also		ZPHY C61 35	D.M. Alde *et al.*	(SERP, LAPP, LANL, BELG+)
AMSLER	93B	PL B311 362	C. Amsler *et al.*	(Crystal Barrel Collab.)
WEIDENAUER	93	ZPHY C59 387	P. Weidenauer *et al.*	(ASTERIX Collab.)
ANTONELLI	92	ZPHY C56 15	A. Antonelli *et al.*	(DM2 Collab.)
DOLINSKY	91	PRPL 202 99	S.I. Dolinsky *et al.*	(NOVO)
WEIDENAUER	90	ZPHY C47 353	P. Weidenauer *et al.*	(ASTERIX Collab.)
DOLINSKY	89	ZPHY C42 511	S.I. Dolinsky *et al.*	(NOVO)
BITYUKOV	88B	SJNP 47 800	S.I. Bityukov *et al.*	(SERP)
		Translated from YAF 47 1258.		
DOLINSKY	88	SJNP 48 277	S.I. Dolinsky *et al.*	(NOVO)
		Translated from YAF 48 442.		
KURDADZE	88	JETPL 47 512	L.M. Kurdadze *et al.*	(NOVO)
		Translated from ZETFP 47 432.		
AULCHENKO	87	PL B186 432	V.M. Aulchenko *et al.*	(NOVO)
BARKOV	87	JETPL 46 164	L.M. Barkov *et al.*	(NOVO)
		Translated from ZETFP 46 132.		
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)
KURDADZE	83B	JETPL 36 274	A.M. Kurdadze *et al.*	(NOVO)
		Translated from ZETFP 36 221.		
DZHELYADIN	81B	PL 102B 296	R.I. Dzhelyadin *et al.*	(SERP)
CORDIER	80	NP B172 13	A. Cordier *et al.*	(LALO)
DZHELYADIN	80	PL 94B 548	R.I. Dzhelyadin *et al.*	(SERP)
ROOS	80	LNC 27 321	M. Roos, A. Pellinen	(HELS)
BENKHEIRI	79	NP B150 268	P. Benkheiri *et al.*	(EPOL, CERN, CDEF+)
DZHELYADIN	79	PL 84B 143	R.I. Dzhelyadin *et al.*	(SERP)
COOPER	78B	NP B146 1	A.M. Cooper *et al.*	(TATA, CERN, CDEF+)
QUENZER	78	PL 76B 512	A. Quenzer *et al.*	(LALO)
VANAPEL...	78	NP B133 245	G.W. van Apeldoorn *et al.*	(ZEEM)
WICKLUND	78	PR D17 1197	A.B. Wicklund *et al.*	(ANL)
ANDREWS	77	PRL 38 198	D.E. Andrews *et al.*	(ROCH)
GESSAROLI	77	NP B126 382	R. Gessaroli *et al.*	(BGNA, FIRZ, GENO+)
KEYNE	76	PR D14 28	J. Keyne *et al.*	(LOIC, SHMP)
Also		PR D8 2789	D.M. Binnie *et al.*	(LOIC, SHMP)
KALBFLEISCH	75	PR D11 987	G.R. Kalbfleisch, R.C. Strand, J.W. Chapman	(BNL+)
AGUILAR-...	72B	PR D6 29	M. Aguilar-Benitez *et al.*	(BNL)
APEL	72B	PL 41B 234	W.D. Apel *et al.*	(KARLK, KARLE, PISA)
BASILE	72B	Phil. Conf. 153	M. Basile *et al.*	(CERN)
BENAKSAS	72	PL 39B 289	D. Benaksas *et al.*	(ORSAY)
BENAKSAS	72B	PL 42B 507	D. Benaksas *et al.*	(ORSAY)
BENAKSAS	72C	PL 42B 511	D. Benaksas *et al.*	(ORSAY)
BORENSTEIN	72	PR D5 1559	S.R. Borenstein *et al.*	(BNL, MICH)
BROWN	72	PL 42B 117	R.M. Brown *et al.*	(ILL, ILLC)
DAKIN	72	PR D6 2321	J.T. Dakin *et al.*	(PRIN)
RATCLIFF	72	PL 38B 345	B.N. Ratcliff *et al.*	(SLAC)
ALVENSLEB...	71C	PRL 27 888	H. Alvensleben *et al.*	(DESY)
BALDIN	71	SJNP 13 758	A.B. Baldin *et al.*	(ITEP)
		Translated from YAF 13 1318.		
BEHREND	71	PRL 27 61	H.J. Behrend *et al.*	(ROCH, CORN, FNAL)
BIZZARRI	71	NP B27 140	R. Bizzarri *et al.*	(CERN, CDEF)
COYNE	71	NP B32 333	D.G. Coyne *et al.*	(LRL)
MOFFEIT	71	NP B29 349	K.C. Moffeit *et al.*	(LRL, UCB, SLAC+)
ABRAMOVI...	70	NP B20 209	M. Abramovich *et al.*	(CERN)
BIGGS	70B	PRL 24 1201	P.J. Biggs *et al.*	(DARE)
BIZZARRI	70	PRL 25 1385	R. Bizzarri *et al.*	(ROMA, SYRA)
ROOS	70	DNPL/R7 173	M. Roos	(CERN)
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AUGUSTIN	69D	PL 28B 513	J.E. Augustin *et al.*	(ORSAY)
BIZZARRI	69	NP B14 169	R. Bizzarri *et al.*	(CERN, CDEF)
DEINET	69B	PL 30B 426	W. Deinet *et al.*	(KARL, CERN)
JACQUET	69B	NC 63A 743	F. Jacquet *et al.*	(EPOL, BERG)
WILSON	69	Private Comm.	R. Wilson	(HARV)
Also		PR 178 2095	A.A. Wehmann *et al.*	(HARV, CASE, SLAC+)
ASTVACAT...	68	PL 27B 45	R.G. Astvatsaturov *et al.*	(JINR, MOSU)
BOLLINI	68C	NC 56A 531	D. Bollini *et al.*	(CERN, BGNA, STRB)
BARASH	67B	PR 156 1399	N. Barash *et al.*	(COLU)
FELDMAN	67C	PR 159 1219	M. Feldman *et al.*	(PENN)
DIGIUGNO	66B	NC 44A 1272	G. Di Giugno *et al.*	(NAPL, FRAS, TRST)
FLATTE	66	PR 145 1050	S.M. Flatte *et al.*	(LRL)
JAMES	66	PR 142 896	F.E. James, H.L. Kraybill	(YALE, BNL)

BARBARO-...	65	PRL 14 279	A. Barbaro-Galtieri, R.D. Tripp	(LRL)
BARMIN	64	JETP 18 1289	V.V. Barmin *et al.*	(ITEP)
		Translated from ZETF 45 1879.		
KRAEMER	64	PR 136 B496	R.W. Kraemer *et al.*	(JHU, NWES, WOOD)
BUSCHBECK	63	Siena Conf. 1 166	B. Buschbeck *et al.*	(VIEN, CERN, ANIK)