$\omega(782)$

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

$\omega(782)$ 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 $pd \to {}^3\mathrm{He}\omega$
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. • • •					
781.78±0.10		[6] 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 $p\overline{p} \to K_1K_1\omega$
783.7 ±1.0	3583	[7] 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		[8] BIGGS	70B	CNTR	<4.1 $\gamma\mathrm{C} \to \pi^+\pi^-\mathrm{C}$
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.

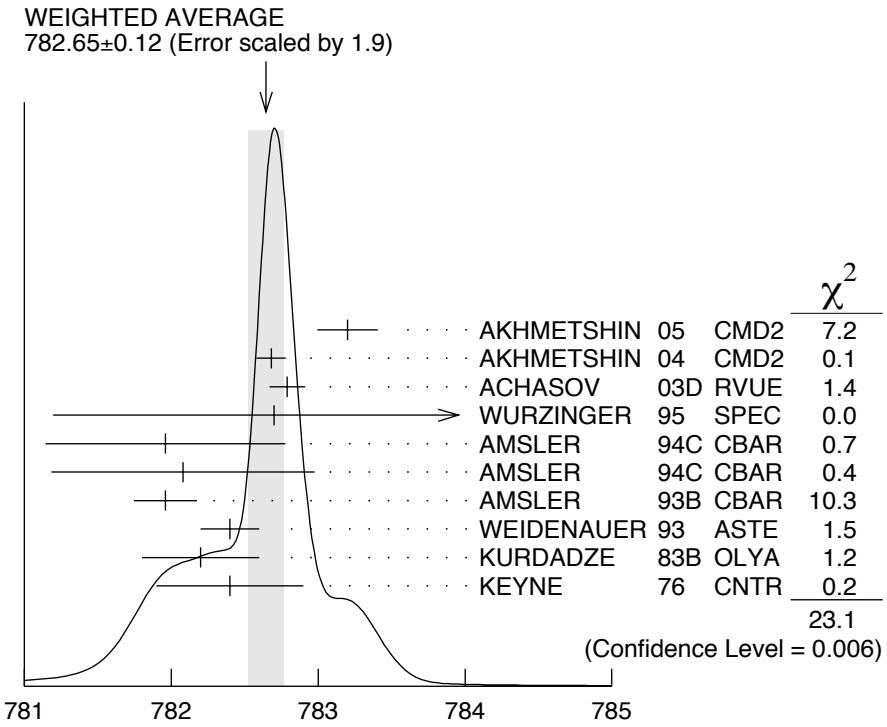
[4] From the $\eta \to 3\pi^0$ decay.

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

[6] Systematic uncertainties underestimated.

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

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



ω(782) WIDTH

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
8.49±0.08 OUR AVERAGE					
8.68±0.23±0.10	11200	[9] AKHMETSHIN	04	CMD2	$e^+e^- \to \pi^+\pi^-\pi^0$
8.68±0.04±0.15	1.2M	[10] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
8.2 ±0.3	19500	WURZINGER	95	SPEC	1.33 $pd \to {}^3\mathrm{He}\omega$
8.4 ±0.1		[11] AULCHENKO	87	ND	$e^+e^- \to \pi^+\pi^-\pi^0$
8.30±0.40		BARKOV	87	CMD	$e^+e^- \to \pi^+\pi^-\pi^0$
9.8 ±0.9	1488	KURDADZE	83B	OLYA	$e^+e^- \to \pi^+\pi^-\pi^0$
9.0 ±0.8	433	CORDIER	80	DM1	$e^+e^- \to \pi^+\pi^-\pi^0$
9.1 ±0.8	451	BENAKSAS	72B	OSPK	$e^+e^- \to \pi^+\pi^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
12 ±2	1430	COOPER	78B	HBC	0.7–0.8 $\overline{p}p \to 5\pi$
9.4 ±2.5	2100	GESSAROLI	77	HBC	11 $\pi^- p \to \omega n$
10.22±0.43	20000	[12] KEYNE	76	CNTR	$\pi^- p \to \omega n$
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 $\pi^- p \to n\mathrm{MM}$
10.3 ±1.4	510	BIZZARRI	71	HBC	0.0 $p\overline{p} \to K_1 K_1 \omega$
12.8 ±3.0	248	BIZZARRI	71	HBC	0.0 $p\overline{p} \to K^+K^-\omega$
9.5 ±1.0	3583	COYNE	71	HBC	3.7 $\pi^+ p \to p\pi^+\pi^+\pi^-\pi^0$

[9] Update of AKHMETSHIN 00C.
[10] 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.
[11] Relativistic Breit-Wigner includes radiative corrections.
[12] 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	$\pi^+\pi^-\pi^0$	(89.1 $\pm$0.7) %	S=1.1
Γ_2	$\pi^0\gamma$	($8.90^{+0.27}_{-0.23}$) %	S=1.1
Γ_3	$\pi^+\pi^-$	(1.70$\pm$0.27) %	S=1.4
Γ_4	neutrals (excluding $\pi^0\gamma$)	($1.6\ ^{+7.4}_{-1.1}$) $\times 10^{-3}$	
Γ_5	$\eta\gamma$	(4.9 $\pm$0.5) $\times 10^{-4}$	
Γ_6	$\pi^0 e^+ e^-$	(7.7 $\pm$0.9) $\times 10^{-4}$	S=1.1
Γ_7	$\pi^0\mu^+\mu^-$	(9.6 $\pm$2.3) $\times 10^{-5}$	
Γ_8	$\eta e^+ e^-$		
Γ_9	$e^+ e^-$	(7.18$\pm$0.12) $\times 10^{-5}$	S=1.1
Γ_{10}	$\pi^+\pi^-\pi^0\pi^0$	$<$ 2 %	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}	$\pi^0\pi^0\gamma$	(6.7 $\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	$<$ 1 $\times 10^{-3}$	CL=90%
Γ_{18}	$3\pi^0$ C	$<$ 3 $\times 10^{-4}$	CL=90%

CONSTRAINED FIT INFORMATION

An overall fit to 15 branching ratios uses 47 measurements and one constraint to determine 10 parameters. The overall fit has a $\chi^2 = 33.3$ for 38 degrees of freedom.

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

x_2	28								
x_3	−36	−10							
x_4	−89	−55	1						
x_5	6	8	−2	−8					
x_6	−1	0	0	0	0				
x_7	0	0	0	0	0	0			
x_9	−44	−53	16	53	−15	1	0		
x_{13}	1	3	0	−2	0	0	0	−2	
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

$\Gamma(e^+e^-)$ 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	[13,14] AKHMETSHIN	04	CMD2	$e^+e^- \to \pi^+\pi^-\pi^0$
0.653±0.003±0.021	1.2M	[15] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
0.600±0.031	10625	DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$

[13] Using B($\omega \to \pi^+\pi^-\pi^0$) = 0.891 ± 0.007 and $\Gamma_{\rm total}$ = 8.44 ± 0.09 MeV.
[14] Update of AKHMETSHIN 00C.
[15] Using ACHASOV 03, ACHASOV 03D and B($\omega \to \pi^+\pi^-$) = (1.70 ± 0.28)%.

$\Gamma(\pi^0\gamma)$ 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	[16] ACHASOV	03	SND	0.60–0.97 $e^+e^- \to \pi^0\gamma$
764±51	10625	DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$

[16] Using Γ_ω = 8.44 ± 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	[17] DOLINSKY	89	ND	$e^+e^- \to \eta\gamma$

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

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

$\Gamma(e^+e^-) \times \Gamma(\pi^+\pi^-\pi^0)/\Gamma^2_{total}$ $\Gamma_9\Gamma_1/\Gamma^2$

VALUE (units 10^{-5})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
6.39±0.10 OUR FIT Error includes scale factor of 1.1.					
6.38±0.10 OUR AVERAGE Error includes scale factor of 1.1.					
6.24±0.11±0.08	11200	[18] AKHMETSHIN	04	CMD2	$e^+e^- \to \pi^+\pi^-\pi^0$
6.70±0.06±0.27		AUBERT,B	04N	BABR	10.6 $e^+e^- \to \pi^+\pi^-\pi^0\gamma$
6.74±0.04±0.24	1.2M	[19,20] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
6.37±0.35		[19] DOLINSKY	89	ND	$e^+e^- \to \pi^+\pi^-\pi^0$
6.45±0.24		[19] BARKOV	87	CMD	$e^+e^- \to \pi^+\pi^-\pi^0$
5.79±0.42	1488	[19] KURDADZE	83B	OLYA	$e^+e^- \to \pi^+\pi^-\pi^0$
5.89±0.54	433	[19] CORDIER	80	DM1	$e^+e^- \to \pi^+\pi^-\pi^0$
7.54±0.84	451	[19] BENAKSAS	72B	OSPK	$e^+e^- \to \pi^+\pi^-\pi^0$

$\Gamma(e^+e^-) \times \Gamma(\pi^0\gamma)/\Gamma^2_{total}$ $\Gamma_9\Gamma_2/\Gamma^2$

VALUE (units 10^{-6})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$6.39^{+0.16}_{-0.14}$ OUR FIT					
6.45±0.17 OUR AVERAGE					
6.47±0.14±0.39	18680	AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \pi^0\gamma$
6.50±0.11±0.20	36500	[21] ACHASOV	03	SND	0.60–0.97 $e^+e^- \to \pi^0\gamma$
6.34±0.21±0.21	10625	[19] DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$

$\Gamma(e^+e^-) \times \Gamma(\eta\gamma)/\Gamma^2_{total}$ $\Gamma_9\Gamma_5/\Gamma^2$

VALUE (units 10^{-8})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
3.51±0.35 OUR FIT					
3.3 ±0.4 OUR AVERAGE					
$3.17^{+1.85}_{-1.31}\pm0.21$	17400	[22] AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \eta\gamma$
3.41±0.52±0.21	23k	[23,24] AKHMETSHIN	01B	CMD2	$e^+e^- \to \eta\gamma$
3.25±0.51±0.10	312	[25] ACHASOV	00D	SND	$e^+e^- \to \eta\gamma$

$\Gamma(e^+e^-) \times \Gamma(\pi^+\pi^-)/\Gamma^2_{total}$ $\Gamma_9\Gamma_3/\Gamma^2$

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.247±0.062±0.042	4.5M	[26] ACHASOV	05A	SND	$e^+e^- \to \pi^+\pi^-$

[18] Update of AKHMETSHIN 00C.
[19] Recalculated by us from the cross section in the peak.
[20] 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.
[21] Using $\sigma_{\phi\ \to\pi^0\gamma}$ from ACHASOV 00 and m_ω= 782.57 MeV in the model with the energy-independent phase of ρ-ω interference equal to $(-10.2 \pm 7.0)^\circ$.
[22] From the $\eta \to\ 2\gamma$ decay and using B($\eta \to\ \gamma\gamma$)= 39.43 $\pm$ 0.26%.
[23] From the $\eta \to\ 3\pi^0$ decay and using B($\eta \to\ 3\pi^0$)= (32.24 $\pm$ 0.29) $\times 10^{-2}$.
[24] 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).
[25] From the $\eta \to\ 3\pi^0$ decay and using B($\eta \to\ 3\pi^0$) = (32.2 $\pm$ 0.4) $\times 10^{-2}$.
[26] A fit of the SND data from 400 to 1000 MeV using parameters of the $\rho(1450)$ and $\rho(1700)$ from a fit of the data of BARKOV 85, BISELLO 89 and ANDERSON 00A. Using $\omega(782)$ mass and width from ACHASOV 03D.

$\omega(782)$ BRANCHING RATIOS

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.102±0.008 OUR FIT					
$0.103^{+0.011}_{-0.010}$ 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 π^-p
0.097±0.016	348	FLATTE	66	HBC	1.4 – 1.7 $K^-p \to$ ΛMM
$0.06\ ^{+0.05}_{-0.02}$		JAMES	66	HBC	2.1 π^+p
0.08 ±0.03	35	KRAEMER	64	DBC	1.2 π^+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

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

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.0191±0.0030 OUR FIT Error includes scale factor of 1.4.				
0.026 ±0.005 OUR AVERAGE				
$0.021\ ^{+0.028}_{-0.009}$	[28] RATCLIFF	72	ASPK	15 $\pi^-p \to\ n2\pi$
0.028 ±0.006	BEHREND	71	ASPK	Photoproduction
$0.022\ ^{+0.009}_{-0.01}$	[29] ROOS	70	RVUE	

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.0999^{+0.0029}_{-0.0025}$ OUR FIT Error includes scale factor of 1.1.					
0.097 ±0.005 OUR AVERAGE					
0.0994±0.0036±0.0038		[30] AULCHENKO	00A	SND	$e^+e^- \to \pi^+\pi^-\pi^0\pi^0$, $\pi^0\pi^0\gamma$
0.084 ±0.013		KEYNE	76	CNTR	$\pi^- p \to \omega n$
0.109 ±0.025		BENAKSAS	72C	OSPK	$e^+e^- \to \pi^0\gamma$
0.081 ±0.020		BALDIN	71	HLBC	2.9 $\pi^+ p$
0.13 ±0.04		JACQUET	69B	HLBC	2.05 $\pi^+ p \to \pi^+ p\omega$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.097 ±0.002 ±0.005	1.2M	[31,32] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
0.099 ±0.007		[31] DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$

$\Gamma(\pi^+\pi^-\gamma)/\Gamma(\pi^+\pi^-\pi^0)$ 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 $K^- p \to \Lambda\pi^+\pi^-\gamma$

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

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1\times10^{-3}$	90	KURDADZE	88	OLYA	$e^+e^- \to \pi^+\pi^-\pi^+\pi^-$

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

VALUE (units 10^{-2})	CL%	DOCUMENT ID		TECN	COMMENT
<2	90	KURDADZE	86	OLYA	$e^+e^- \to \pi^+\pi^-\pi^0\pi^0$

$\Gamma(\mu^+\mu^-)/\Gamma(\pi^+\pi^-\pi^0)$ 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 $K^- p$

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

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
6.7±1.1 OUR FIT					
6.5±1.2 OUR AVERAGE					
$6.4^{+2.4}_{-2.0}\pm0.8$	190	[33] 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	[34] AKHMETSHIN	04B	CMD2	0.6–0.97 $e^+e^- \to \pi^0\pi^0\gamma$
$7.8\pm2.7\pm2.0$	63	[33,35] ACHASOV	00G	SND	$e^+e^- \to \pi^0\pi^0\gamma$
$12.7\pm2.3\pm2.5$	63	[34,35] ACHASOV	00G	SND	$e^+e^- \to \pi^0\pi^0\gamma$

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
(7.6 ±1.3) × 10^{-4} OUR FIT						
0.00085±0.00029		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. • • •						
< 0.005	90		DOLINSKY	89	ND	$e^+e^- \to \pi^0\pi^0\gamma$
< 0.18	95		KEYNE	76	CNTR	$\pi^- p \to \omega n$
< 0.15	90		BENAKSAS	72C	OSPK	e^+e^-
< 0.14			BALDIN	71	HLBC	2.9 $\pi^+ p$
< 0.1	90		BARMIN	64	HLBC	1.3–2.8 $\pi^- p$

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

Violates C conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.001	90	ALDE	94B	GAM2	$38\pi^- p \to \eta\pi^0 n$

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

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

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.016	90	[36] 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 $\pi^+ p \to \pi^+ p\omega$

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

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

$\Gamma(\pi^0\pi^0\gamma)/\Gamma(\pi^+\pi^-\pi^0)$ 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 $\pi^+ p \to \pi^+ p\omega$

$\Gamma(\eta\gamma)/\Gamma(\pi^0\gamma)$ 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	[37] ALDE	93	GAM2	$38\pi^- p \to \omega n$
0.0082±0.0033	[38] DOLINSKY	89	ND	$e^+e^- \to \eta\gamma$
0.010 ±0.045	APEL	72B	OSPK	4–8 $\pi^- p \to n3\gamma$

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

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
0.96±0.23 OUR FIT				
0.96±0.23	DZHELYADIN	81B	CNTR	25–33 $\pi^- p \to \omega n$

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

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
7.7 ±0.9 OUR FIT Error includes scale factor of 1.1.					
7.7 ±0.9 OUR AVERAGE Error includes scale factor of 1.1.					
8.19±0.71±0.62		AKHMETSHIN	05A	CMD2	0.72-0.84 e^+e^-
5.9 ±1.9	43	DOLINSKY	88	ND	$e^+e^- \to \pi^0 e^+e^-$

$\Gamma(\eta e^+ e^-)/\Gamma_{total}$ 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^-

$\Gamma(e^+e^-)/\Gamma_{total}$ Γ_9/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.718±0.012 OUR FIT Error includes scale factor of 1.1.					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.700±0.016	11200	[39,40] AKHMETSHIN	04	CMD2	$e^+e^- \to \pi^+\pi^-\pi^0$
0.752±0.004±0.024	1.2M	[39,41] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
0.714±0.036		[39] DOLINSKY	89	ND	$e^+e^- \to \pi^+\pi^-\pi^0$
0.72 ±0.03		[39] BARKOV	87	CMD	$e^+e^- \to \pi^+\pi^-\pi^0$
0.64 ±0.04	1488	[39] KURDADZE	83B	OLYA	$e^+e^- \to \pi^+\pi^-\pi^0$
0.675±0.069	433	[39] CORDIER	80	DM1	$e^+e^- \to \pi^+\pi^-\pi^0$
0.83 ±0.10	451	[39] BENAKSAS	72B	OSPK	$e^+e^- \to \pi^+\pi^-\pi^0$
0.77 ±0.06		[42] AUGUSTIN	69D	OSPK	$e^+e^- \to \pi^+\pi^-\pi^0$
0.65 ±0.13	33	[43] ASTVACAT...	68	OSPK	Assume SU(3)+mixing

$\Gamma(\mu^+\mu^-)/\Gamma_{total}$ 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	$Z \to \mu^+\mu^- + X$

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

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 $\pi^- p$

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

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.70±0.27 OUR FIT Error includes scale factor of 1.4.					
1.57±0.24 OUR AVERAGE Error includes scale factor of 1.2.					
1.30±0.24±0.05	11200	[44] AKHMETSHIN	04	CMD2	$e^+e^- \to \pi^+\pi^-$
$2.38^{+1.77}_{-0.90}\pm0.18$	5.4k	[45] ACHASOV	02E	SND	1.1–1.38 $e^+e^- \to \pi^+\pi^-\pi^0$
2.3 ±0.5		BARKOV	85	OLYA	$e^+e^- \to \pi^+\pi^-$
$1.6\ ^{+0.9}_{-0.7}$		QUENZER	78	DM1	$e^+e^- \to \pi^+\pi^-$
3.6 ±1.9		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	[46] ACHASOV	05A	SND	$e^+e^- \to \pi^+\pi^-$
2.01±0.29		[47] BENAYOUN	03	RVUE	$e^+e^- \to \pi^+\pi^-$
1.9 ±0.3		[48] GARDNER	99	RVUE	$e^+e^- \to \pi^+\pi^-$
2.3 ±0.4		[49] BENAYOUN	98	RVUE	$e^+e^- \to \pi^+\pi^-$, $\mu^+\mu^-$
1.0 ±0.11		[50] 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
$0.80^{+0.28}_{-0.20}$		[51] BIGGS	70B	CNTR	4.2γC $\to \pi^+\pi^-$C

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.20±0.04	1.98M	[52] ALOISIO	03	KLOE	1.02 $e^+e^- \to \pi^+\pi^-\pi^0$

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.22±0.07		[27] DAKIN	72	OSPK	1.4 $\pi^- p \to n$MM
<0.19	90	DEINET	69B	OSPK	

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

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.78±0.07		[53] DAKIN	72	OSPK	1.4 $\pi^- p \to n$MM
>0.81	90	DEINET	69B	OSPK	

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

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
4.9 ±0.5 OUR FIT					
6.3 ±1.3 OUR AVERAGE Error includes scale factor of 1.2.					
6.6 ±1.7		[54] ABELE	97E	CBAR	0.0 $\overline{p}p \to 5\gamma$
8.3 ±2.1		ALDE	93	GAM2	$38\pi^- p \to \omega n$
$3.0\ ^{+2.5}_{-1.8}$		[55] ANDREWS	77	CNTR	6.7–10 γ Cu
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$4.44^{+2.59}_{-1.83}\pm0.28$	17400	[56,57] AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \eta\gamma$
5.10±0.72±0.34	23k	[58] AKHMETSHIN	01B	CMD2	$e^+e^- \to \eta\gamma$
4.60±0.72±0.19	312	[56,59] ACHASOV	00D	SND	$e^+e^- \to \eta\gamma$
0.7 to 5.5		[60] CASE	00	CBAR	0.0 $p\overline{p} \to \eta\eta\gamma$
$6.56^{+2.41}_{-2.55}$	3525	[55,61] BENAYOUN	96	RVUE	$e^+e^- \to \eta\gamma$
7.3 ±2.9		[55,56] DOLINSKY	89	ND	$e^+e^- \to \eta\gamma$

$\Gamma(\pi^0\mu^+\mu^-)/\Gamma(\mu^+\mu^-)$ 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	[62] DZHELYADIN	79	CNTR	25–33 $\pi^- p$

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

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.8965±0.0016±0.0048	1.2M	[39,41] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
0.880 ±0.020 ±0.032	11200	[39,63] AKHMETSHIN	00C	CMD2	$e^+e^- \to \pi^+\pi^-\pi^0$
0.8942±0.0062		[39] DOLINSKY	89	ND	$e^+e^- \to \pi^+\pi^-\pi^0$

$\Gamma(3\pi^0)/\Gamma_{\text{total}}$ Γ_{18}/Γ

Violates C conservation.

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.0003	90	PROKOSHKIN	95	GAM2	38 $\pi^- p \to 3\pi^0 n$

$\Gamma(3\pi^0)/\Gamma(\pi^+\pi^-\pi^0)$ Γ_{18}/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 $pp \to p_f 3\pi^0 p_s$

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

VALUE (units 10^{-4})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<1.9	95	[64] 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	[64] PROKOSHKIN	95	GAM2	38 $\pi^- p \to 3\gamma n$

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

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$9.06\pm0.20\pm0.57$	18680	[31,65] AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \pi^0\gamma$
$9.34\pm0.15\pm0.31$	36500	[31] ACHASOV	03	SND	0.60–0.97 $e^+e^- \to \pi^0\gamma$
$8.65\pm0.16\pm0.42$	1.2M	[39,41] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
8.39 ± 0.24	9975	[66] BENAYOUN	96	RVUE	$e^+e^- \to \pi^0\gamma$
8.88 ± 0.62	10625	[31] DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$

[28] Significant interference effect observed. NB of $\omega \to 3\pi$ comes from an extrapolation.
[29] ROOS 70 combines ABRAMOVICH 70 and BIZZARRI 70.
[30] 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.
[31] Not independent of the corresponding $\Gamma(e^+e^-)\times\Gamma(\pi^0\gamma)/\Gamma^2_{\text{total}}$.
[32] Using ACHASOV 03.
[33] In the model assuming the $\rho \to \pi^0\pi^0\gamma$ decay via the $\omega\pi$ and $f_0(600)\gamma$ mechanisms.
[34] In the model assuming the $\rho \to \pi^0\pi^0\gamma$ decay via the $\omega\pi$ mechanism only.
[35] Superseded by ACHASOV 02F.
[36] Restated by us using B($\eta \to$ charged modes) = 29.2%.
[37] Model independent determination.
[38] Solution corresponding to constructive ω-ρ interference.
[39] Not independent of the corresponding $\Gamma(e^+e^-)\times\Gamma(\pi^+\pi^-\pi^0)/\Gamma^2_{\text{total}}$.
[40] Using B($\omega \to \pi^+\pi^-\pi^0$) = 0.891 ± 0.007. Update of AKHMETSHIN 00C.
[41] Using ACHASOV 03, ACHASOV 03D and B($\omega \to \pi^+\pi^-$) = (1.70 ± 0.28)%.
[42] Rescaled by us to correspond to ω width 8.4 MeV. Systematic errors underestimated.
[43] Not resolved from ρ decay. Error statistical only.
[44] Update of AKHMETSHIN 02.
[45] From the $m_{\pi^+\pi^-}$ spectrum taking into account the interference of the $\rho\pi$ and $\omega\pi$ amplitudes.
[46] Using $\Gamma(\omega \to e^+e^-)$ from the 2004 Edition of this Review (PDG 04).
[47] Using the data of AKHMETSHIN 02 in the hidden local symmetry model.
[48] Using the data of BARKOV 85.
[49] Using the data of BARKOV 85 in the hidden local symmetry model.
[50] From a model-dependent analysis assuming complete coherence.
[51] Re-evaluated under $\Gamma(\pi^+\pi^-)/\Gamma(\pi^+\pi^-\pi^0)$ by BEHREND 71 using more accurate $\omega \to \rho$ photoproduction cross-section ratio.
[52] Using the data of ALOISIO 02D.
[53] Error statistical only. Authors obtain good fit also assuming $\pi^0\gamma$ as the only neutral decay.
[54] No flat $\eta\eta\gamma$ background assumed.
[55] Solution corresponding to constructive ω-ρ interference.
[56] Not independent of the corresponding $\Gamma(e^+e^-)\times\Gamma(\eta\gamma)/\Gamma^2_{\text{total}}$.
[57] Using B($\omega \to e^+e^-$) = (7.14 ± 0.13) × 10^{-5} and B($\eta \to \gamma\gamma$) = 39.43 ± 0.26%.
[58] Using B($\omega \to e^+e^-$)= (7.07 ± 0.19) × 10^{-5} and using B($\eta \to 3\pi^0$)= (32.24 ± 0.29) × 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 $\Gamma(e^+e^-)\times\Gamma(\eta\gamma)/\Gamma^2_{\text{total}}$.

[59] Using $B(\omega \to e^+e^-) = (7.07 \pm 0.19) \times 10^{-5}$ and $B(\eta \to 3\pi^0) = (32.2 \pm 0.4) \times 10^{-2}$.
[60] 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) $\times 10^{-2}$.
[61] Reanalysis of DRUZHININ 84, DOLINSKY 89, DOLINSKY 91 taking into account the triangle anomaly contributions.
[62] Superseded by DZHELYADIN 81B result above.
[63] Using $\Gamma(e^+e^-)$=0.60 $\pm$ 0.02 keV.
[64] From direct 3γ decay search.
[65] Using $B(\omega \to e^+e^-)$= (7.14 $\pm$ 0.13) $\times 10^{-5}$.
[66] Reanalysis of DRUZHININ 84, DOLINSKY 89, DOLINSKY 91 taking into account the triangle anomaly contributions.

ω(782) REFERENCES

ACHASOV	05A	JETP 101 1053	M.N. Achasov *et al.*	(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.)
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.*	
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.)
ANDERSON	00A	PR D61 112002	S. Anderson *et al.*	(CLEO 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.)
BISELLO	89	PL B220 321	D. Bisello *et al.*	(DM2 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)
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)
Proc. Daresbury Study Weekend No. 1.				
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 136B 496	R.W. Kraemer *et al.*	(JHU, NWES, WOOD)
BUSCHBECK	63	Siena Conf. 1 166	B. Buschbeck *et al.*	(VIEN, CERN, ANIK)

OTHER RELATED PAPERS

AZIMOV	03	EPJ A16 209	Ya.I. Aximov	
BENAYOUN	01	EPJ C22 503	M. Benayoun, H.B. O'Connell	
GOKALP	01B	EPJ C22 327	A. Gokalp, Y. Sarac, O. Yilmaz	
DELBOURGO	99B	PR D59 113006	R. Delbourgo *et al.*	
GARDNER	98	PR D57 2716	S. Gardner, H.B. O'Connell	
Also		PR D62 019903 (erratum)	S. Gardner, H.B. O'Connell	
ABELE	97F	PL B411 354	A. Abele *et al.*	(Crystal Barrel Collab.)
DOLINSKY	86	PL B174 453	S.I. Dolinsky *et al.*	(NOVO)
KURDADZE	83	JETPL 37 733	L.M. Kurdadze *et al.*	(NOVO)
		Translated from ZETFP 37 613.		
ALFF-...	62B	PRL 9 325	C. Alff-Steinberger *et al.*	(COLU, RUTG)
STEVENSON	62	PR 125 687	M.L. Stevenson *et al.*	(LRL)
MAGLICH	61	PRL 7 178	B.C. Maglich *et al.*	(LRL)
PEVSNER	61	PRL 7 421	A. Pevsner *et al.*	(JHU)
XUONG	61	PRL 7 327	H. Nguyen Ngoc, G.R. Lynch	(LRL)