NODE=M004

$\phi(1020)$

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

$\phi(1020)$ MASS

NODE=M004M

NODE=M004M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT	
1019.460 ±0.016 OUR AVERAGE						
1019.444 ±0.013 ±0.060		DRUZHININ	25	SND	$e^+e^- \to K^0_L K^0_S$	
1019.463 ±0.061	2.3M	[1] KOZYREV	18	CMD3	$e^+e^- \to K^+K^-$, $K^0_S K^0_L$	OCCUR=2
1019.462 ±0.042 ±0.056	28k	[2] LEES	14H	BABR	$e^+e^- \to K^0_S K^0_L \gamma$	
1019.51 ±0.02 ±0.05		[3] LEES	13Q	BABR	$e^+e^- \to K^+K^-\gamma$	
1019.30 ±0.02 ±0.10	105k	AKHMETSHIN	06	CMD2	0.98–1.06 $e^+e^- \to \pi^+\pi^-\pi^0$	
1019.52 ±0.05 ±0.05	17.4k	AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \eta\gamma$	
1019.483 ±0.011 ±0.025	272k	[4] AKHMETSHIN	04	CMD2	$e^+e^- \to K^0_L K^0_S$	
1019.42 ±0.05	1900k	[5] ACHASOV	01E	SND	$e^+e^- \to K^+K^-$, $K_S K_L$, $\pi^+\pi^-\pi^0$	
1019.40 ±0.04 ±0.05	23k	AKHMETSHIN	01B	CMD2	$e^+e^- \to \eta\gamma$	
1019.36 ±0.12		[6] ACHASOV	00B	SND	$e^+e^- \to \eta\gamma$	
1019.38 ±0.07 ±0.08	2200	[7] AKHMETSHIN	99F	CMD2	$e^+e^- \to \pi^+\pi^- \geq 2\gamma$	
1019.51 ±0.07 ±0.10	11169	AKHMETSHIN	98	CMD2	$e^+e^- \to \pi^+\pi^-\pi^0$	
1019.5 ±0.4		BARBERIS	98	OMEG	450 $pp \to pp2K^+2K^-$	
1019.42 ±0.06	55600	AKHMETSHIN	95	CMD2	$e^+e^- \to$ hadrons	
1019.7 ±0.3	2012	DAVENPORT	86	MPSF	400 $pA \to 4KX$	
1019.7 ±0.1 ±0.1	5079	ALBRECHT	85D	ARG	10 $e^+e^- \to K^+K^-X$	
1019.3 ±0.1	1500	ARENTON	82	AEMS	11.8 polar. $pp \to KK$	
1019.67 ±0.17	25080	[8] PELLINEN	82	RVUE		
1019.52 ±0.13	3681	BUKIN	78C	OLYA	$e^+e^- \to$ hadrons	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1019.443 ±0.010 ±0.060	1.28M	[9,10] ACHASOV	24	SND	$e^+e^- \to K^0_L K^0_S$	
1019.0330±0.0084		[11] DUBNICKA	24	RVUE	$e^+e^- \to K^+K^-$, $K^0_S K^0_L$	
1019.761 ±0.130	34M	[12] IGNATOV	24	CMD3	$e^+e^- \to \pi^+\pi^-$	
1018.4 ±0.5 ±0.1		[13] ALBRECHT	20	CBAR	0.9 $\overline{p}p \to K^+K^-\pi^0$	
1019.21 ±0.04 ±0.03		[14] HOID	20	RVUE	$e^+e^- \to \pi^0\gamma$	
1019.54 ±0.10 ±0.51		[15] AAIJ	19H	LHCB	$pp \to D^\pm X$	OCCUR=2
1019.20 ±0.02 ±0.01		[16] HOFERICHT...	19	RVUE	$e^+e^- \to \pi^+\pi^-\pi^0$	
1019.469 ±0.061	1.7M	KOZYREV	18	CMD3	$e^+e^- \to K^+K^-$	
1019.457 ±0.061	610k	KOZYREV	16	CMD3	$e^+e^- \to K^0_S K^0_L$	
1019.48 ±0.01		LEES	13F	BABR	$D^+ \to K^+K^-\pi^+$	
1019.441 ±0.008 ±0.080	542k	[17] AKHMETSHIN	08	CMD2	1.02 $e^+e^- \to K^+K^-$	
1019.63 ±0.07	12540	[18] AUBERT,B	05J	BABR	$D^0 \to \overline{K}^0 K^+K^-$	
1019.8 ±0.7		ARMSTRONG	86	OMEG	85 $\pi^+/pp \to \pi^+/p4Kp$	
1020.1 ±0.11	5526	[18] ATKINSON	86	OMEG	20–70 γp	
1019.7 ±1.0		BEBEK	86	CLEO	$e^+e^- \to \Upsilon(4S)$	
1019.411 ±0.008	642k	[19] DIJKSTRA	86	SPEC	100–200 $\pi^\pm$, $\overline{p}$, p, $K^\pm$, on Be	
1020.9 ±0.2		[18] FRAME	86	OMEG	13 $K^+p \to \phi K^+p$	
1021.0 ±0.2		[18] ARMSTRONG	83B	OMEG	18.5 $K^-p \to K^-K^+\Lambda$	
1020.0 ±0.5		[18] ARMSTRONG	83B	OMEG	18.5 $K^-p \to K^-K^+\Lambda$	OCCUR=2
1019.7 ±0.3		[18] BARATE	83	GOLI	190 π^-Be $\to 2\mu X$	
1019.8 ±0.2 ±0.5	766	IVANOV	81	OLYA	1–1.4 $e^+e^- \to K^+K^-$	
1019.4 ±0.5	337	COOPER	78B	HBC	0.7–0.8 $\overline{p}p \to K^0_S K^0_L \pi^+\pi^-$	

1020	±1	383	[18] BALDI	77	CNTR	10 $\pi^- p \to \pi^- \phi p$	OCCUR=2
1018.9	±0.6	800	COHEN	77	ASPK	6 $\pi^\pm N \to K^+ K^- N$	
1019.7	±0.5	454	KALBFLEISCH	76	HBC	2.18 $K^- p \to \Lambda K \overline{K}$	
1019.4	±0.8	984	BESCH	74	CNTR	2 $\gamma p \to p K^+ K^-$	
1020.3	±0.4	100	BALLAM	73	HBC	2.8–9.3 γp	
1019.4	±0.7		BINNIE	73B	CNTR	$\pi^- p \to \phi n$	
1019.6	±0.5	120	[20] AGUILAR-...	72B	HBC	3.9,4.6 $K^- p \to \Lambda K^+ K^-$	
1019.9	±0.5	100	[20] AGUILAR-...	72B	HBC	3.9,4.6 $K^- p \to K^- p K^+ K^-$	OCCUR=2
1020.4	±0.5	131	COLLEY	72	HBC	10 $K^+ p \to K^+ p \phi$	
1019.9	±0.3	410	STOTTLE...	71	HBC	2.9 $K^- p \to \Sigma / \Lambda K \overline{K}$	

[1] Average of KOZYREV 16 and KOZYREV 18 values taking into account the correlated uncertainties. Supersedes individual KOZYREV 16 and KOZYREV 18 results. NODE=M004M;LINKAGE=G

[2] Using a vector meson dominance model with contribution from $\phi(1020)$ and higher mass excitations of $\rho(770)$, $\omega(782)$, and $\phi(1020)$. NODE=M004M;LINKAGE=E

[3] Using a phenomenological model based on KUHN 90 with a sum of Breit-Wigner resonances for $\rho(770)$, $\omega(782)$, $\phi(1020)$ and their higher mass excitations. NODE=M004M;LINKAGE=C

[4] Update of AKHMETSHIN 99D NODE=M004M;LINKAGE=GS

[5] From the combined fit assuming that the total $\phi(1020)$ production cross section is saturated by those of K^+K^-, $K_S K_L$, $\pi^+\pi^-\pi^0$, and $\eta\gamma$ decays modes and using ACHASOV 00B for the $\eta\gamma$ decay mode. NODE=M004M;LINKAGE=AE

[6] Using a total width of 4.43 ± 0.05 MeV. Systematic uncertainty included. NODE=M004M;LINKAGE=G2

[7] Using a total width of 4.43 ± 0.05 MeV. NODE=M004M;LINKAGE=F2

[8] PELLINEN 82 review includes AKERLOF 77, DAUM 81, BALDI 77, AYRES 74, DEGROOT 74. NODE=M004M;LINKAGE=R

[9] From a fit of the cross section in the energy region $1.000 < \sqrt{s} < 1.100$ GeV using a vector meson dominance model with contribution from $\phi(1020)$, $\rho(770)$, $\omega(782)$ and higher vector resonances. NODE=M004M;LINKAGE=Q

[10] Superseded by DRUZHININ 25. NODE=M004M;LINKAGE=T

[11] From the fit to data of CMD3, BABAR and BES3. NODE=M004M;LINKAGE=P

[12] From a fit of the pion form factor in the energy range $0.32 < \sqrt{s} < 1.2$ GeV using the GOUNARIS 68 parametrization with the complex phase of the $\rho - \omega$ interference leaving $\rho(1450)$, $\rho(1700)$ resonances as free parameters of the fit. Systematic errors not estimated. NODE=M004M;LINKAGE=O

[13] Width fixed at 4.2 MeV. NODE=M004M;LINKAGE=J

[14] The values were extracted from a dispersively improved Breit-Wigner parameterization and do not include vacuum polarization. Inclusion of vacuum polarization gives 1019.457 ± 0.020 MeV. NODE=M004M;LINKAGE=M

[15] From the $D^\pm \to K^\pm K^+ K^-$ Dalitz plot fit with the Triple-M amplitude in the multi-meson model of AOUDE 18. NODE=M004M;LINKAGE=I

[16] The values were extracted from a dispersively improved Breit-Wigner parameterization and do not include vacuum polarization. NODE=M004M;LINKAGE=N

[17] Strongly correlated with AKHMETSHIN 04. NODE=M004M;LINKAGE=AH

[18] Systematic errors not evaluated. NODE=M004M;LINKAGE=A

[19] Weighted and scaled average of 12 measurements of DIJKSTRA 86. NODE=M004M;LINKAGE=B

[20] Mass errors enlarged by us to $\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass. NODE=M004M;LINKAGE=D

ϕ(1020) WIDTH

NODE=M004W

NODE=M004W

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*	
4.249±0.013 OUR AVERAGE		Error includes scale factor of 1.1.				
4.234±0.22 ±0.12		DRUZHININ	25	SND	$e^+e^- \to K^0_L K^0_S$	
4.245±0.013	2.3M	[1] KOZYREV	18	CMD3	$e^+e^- \to K^+K^-$, $K^0_S K^0_L$	OCCUR=2
4.205±0.103±0.067	28k	[2] LEES	14H	BABR	$e^+e^- \to K^0_S K^0_L \gamma$	
4.29 ±0.04 ±0.07		[3] LEES	13Q	BABR	$e^+e^- \to K^+K^-\gamma$	
4.30 ±0.06 ±0.17	105k	AKHMETSHIN	06	CMD2	0.98–1.06 $e^+e^- \to \pi^+\pi^-\pi^0$	
4.280±0.033±0.025	272k	[4] AKHMETSHIN	04	CMD2	$e^+e^- \to K^0_L K^0_S$	
4.21 ±0.04	1900k	[5] ACHASOV	01E	SND	$e^+e^- \to K^+K^-$, $K_S K_L$, $\pi^+\pi^-\pi^0$	
4.44 ±0.09	55600	AKHMETSHIN	95	CMD2	$e^+e^- \to$ hadrons	
4.5 ±0.7	1500	ARENTON	82	AEMS	11.8 polar. $pp \to K K$	
4.2 ±0.6	766	[6] IVANOV	81	OLYA	1–1.4 $e^+e^- \to K^+K^-$	
4.3 ±0.6		[6] CORDIER	80	DM1	$e^+e^- \to \pi^+\pi^-\pi^0$	
4.36 ±0.29	3681	[6] BUKIN	78C	OLYA	$e^+e^- \to$ hadrons	
4.4 ±0.6	984	[6] BESCH	74	CNTR	2 $\gamma p \to p K^+K^-$	
4.67 ±0.72	681	[6] BALAKIN	71	OSPK	$e^+e^- \to$ hadrons	
4.09 ±0.29		BIZOT	70	OSPK	$e^+e^- \to$ hadrons	

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

4.212±0.20 ±0.13	1.28M	[7,8] ACHASOV	24	SND	$e^+e^- \to K^0_L K^0_S$	
4.151±0.018		[9] DUBNICKA	24	RVUE	$e^+e^- \to K^+K^-$, $K^0_S K^0_L$	
4.681±0.277	34M	[10] IGNATOV	24	CMD3	$e^+e^- \to \pi^+\pi^-$	
4.07 ±0.13 ±0.01		[11] HOID	20	RVUE	$e^+e^- \to \pi^0\gamma$	
4.23 ±0.04 ±0.02		[12] HOFERICHT...	19	RVUE	$e^+e^- \to \pi^+\pi^-\pi^0$	
4.249±0.015	1.7M	KOZYREV	18	CMD3	$e^+e^- \to K^+K^-$	
4.240±0.017	610k	KOZYREV	16	CMD3	$e^+e^- \to K^0_S K^0_L$	
4.37 ±0.02		LEES	13F	BABR	$D^+ \to K^+K^-\pi^+$	
4.24 ±0.02 ±0.03	542k	[13] AKHMETSHIN	08	CMD2	1.02 $e^+e^- \to K^+K^-$	
4.28 ±0.13	12540	[14] AUBERT,B	05J	BABR	$D^0 \to \overline{K}^0 K^+K^-$	
4.45 ±0.06	271k	DIJKSTRA	86	SPEC	100 π^- Be	
3.6 ±0.8	337	[6] COOPER	78B	HBC	0.7–0.8 $\overline{p}p \to K^0_S K^0_L \pi^+\pi^-$	
4.5 ±0.50	1300	[6,14] AKERLOF	77	SPEC	400 pA $\to K^+K^-$X	
4.5 ±0.8	500	[6,14] AYRES	74	ASPK	3–6 $\pi^- p \to K^+K^- n$, $K^- p \to K^+K^-\Lambda/\Sigma^0$	
3.81 ±0.37		COSME	74B	OSPK	$e^+e^- \to K^0_L K^0_S$	
3.8 ±0.7	454	[6] BORENSTEIN	72	HBC	2.18 $K^- p \to K\overline{K}n$	

[1] Average of KOZYREV 16 and KOZYREV 18 values taking into account the correlated uncertainties. Supersedes individual KOZYREV 16 and KOZYREV 18 results. NODE=M004W;LINKAGE=G

[2] Using a vector meson dominance model with contribution from $\phi(1020)$ and higher mass excitations of $\rho(770)$, $\omega(782)$, and $\phi(1020)$. NODE=M004W;LINKAGE=E

[3] Using a phenomenological model based on KUHN 90 with a sum of Breit-Wigner resonances for $\rho(770)$, $\omega(782)$, $\phi(1020)$ and their higher mass excitations. NODE=M004W;LINKAGE=C

[4] Update of AKHMETSHIN 99D NODE=M004W;LINKAGE=GS

[5] From the combined fit assuming that the total $\phi(1020)$ production cross section is saturated by those of K^+K^-, $K_S K_L$, $\pi^+\pi^-\pi^0$, and $\eta\gamma$ decays modes and using ACHASOV 00B for the $\eta\gamma$ decay mode. NODE=M004W;LINKAGE=AE

[6] Width errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass. NODE=M004W;LINKAGE=D

[7] From a fit of the cross section in the energy region $1.000 < \sqrt{s} < 1.100$ GeV using a vector meson dominance model with contribution from $\phi(1020)$, $\rho(770)$, $\omega(782)$ and higher vector resonances. NODE=M004W;LINKAGE=N

[8] Superseded by DRUZHININ 25. NODE=M004W;LINKAGE=O

[9] From the fit to data of CMD3, BABAR and BES3. NODE=M004W;LINKAGE=M

[10] From a fit of the pion form factor in the energy range $0.32 < \sqrt{s} < 1.2$ GeV using the GOUNARIS 68 parametrization with the complex phase of the $\rho - \omega$ interference leaving $\rho(1450)$, $\rho(1700)$ resonances as free parameters of the fit. Systematic errors not estimated. NODE=M004W;LINKAGE=L

[11] The values were extracted from a dispersively improved Breit-Wigner parameterization. NODE=M004W;LINKAGE=I

[12] The values were extracted from a dispersively improved Breit-Wigner parameterization and do not include vacuum polarization. NODE=M004W;LINKAGE=K

[13] Strongly correlated with AKHMETSHIN 04. NODE=M004W;LINKAGE=AH

[14] Systematic errors not evaluated. NODE=M004W;LINKAGE=A

ϕ(1020) DECAY MODES

NODE=M004215;NODE=M004

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	
Γ_1	K^+K^-	(50.1 ±0.6) %	S=1.6	DESIG=1
Γ_2	$K^0_L K^0_S$	(33.6 ±0.4) %	S=1.3	DESIG=2
Γ_3	$\rho\pi + \pi^+\pi^-\pi^0$	(14.7 ±0.4) %	S=1.5	DESIG=24
Γ_4	$\pi^+\pi^-\pi^0$			DESIG=3
Γ_5	$\eta\gamma$	(1.306±0.024) %	S=1.2	DESIG=4
Γ_6	$\pi^0\gamma$	(1.33 ±0.05) $\times 10^{-3}$		DESIG=7
Γ_7	$\ell^+\ell^-$	—		DESIG=256;OUR EVAL;→ UNCHECKED ←
Γ_8	e^+e^-	(2.963±0.034) $\times 10^{-4}$	S=1.4	DESIG=5
Γ_9	$\mu^+\mu^-$	(2.86 ±0.22) $\times 10^{-4}$	S=1.2	DESIG=6
Γ_{10}	ηe^+e^-	(1.08 ±0.04) $\times 10^{-4}$		DESIG=17
Γ_{11}	$\pi^+\pi^-$	(9.5 ±1.9) $\times 10^{-5}$	S=2.0	DESIG=8
Γ_{12}	$\omega\pi^0$	(4.7 ±0.5) $\times 10^{-5}$		DESIG=25
Γ_{13}	$\omega\gamma$	< 5 %	CL=84%	DESIG=10
Γ_{14}	$\rho\gamma$	< 1.2 $\times 10^{-5}$	CL=90%	DESIG=12
Γ_{15}	$\pi^+\pi^-\gamma$	(4.1 ±1.3) $\times 10^{-5}$		DESIG=9

Γ_{16}	$f_0(980)\gamma$		$(3.22 \pm 0.19) \times 10^{-4}$	S=1.1	DESIG=20
Γ_{17}	$\pi^0\pi^0\gamma$		$(1.13 \pm 0.06) \times 10^{-4}$		DESIG=19
Γ_{18}	$\pi^+\pi^-\pi^+\pi^-$		$(3.9 \ {}^{+2.8}_{-2.2}) \times 10^{-6}$		DESIG=15
Γ_{19}	$\pi^+\pi^+\pi^-\pi^-\pi^0$		$< 4.6 \times 10^{-6}$	CL=90%	DESIG=14
Γ_{20}	$\pi^0 e^+ e^-$		$(1.33 \ {}^{+0.07}_{-0.10}) \times 10^{-5}$		DESIG=21
Γ_{21}	$\pi^0\eta\gamma$		$(7.27 \pm 0.30) \times 10^{-5}$	S=1.5	DESIG=22
Γ_{22}	$a_0(980)\gamma$		$(7.6 \pm 0.6) \times 10^{-5}$		DESIG=23
Γ_{23}	$K^0\overline{K}^0\gamma$		$< 1.9 \times 10^{-8}$	CL=90%	DESIG=257
Γ_{24}	$\eta'(958)\gamma$		$(6.23 \pm 0.21) \times 10^{-5}$		DESIG=194
Γ_{25}	$\eta\pi^0\pi^0\gamma$		$< 2 \times 10^{-5}$	CL=90%	DESIG=195
Γ_{26}	$\mu^+\mu^-\gamma$		$(1.4 \pm 0.5) \times 10^{-5}$		DESIG=196
Γ_{27}	$\rho\gamma\gamma$		$< 1.2 \times 10^{-4}$	CL=90%	DESIG=250
Γ_{28}	$\eta\pi^+\pi^-$		$< 1.8 \times 10^{-5}$	CL=90%	DESIG=255
Γ_{29}	$\eta\mu^+\mu^-$		$< 9.4 \times 10^{-6}$	CL=90%	DESIG=26
Γ_{30}	$\eta U \to \eta e^+ e^-$		$< 1 \times 10^{-6}$	CL=90%	DESIG=259
Γ_{31}	invisible		$< 1.7 \times 10^{-4}$	CL=90%	DESIG=260

Lepton Family number (*LF*) violating modes NODE=M004;CLUMP=A

Γ_{32}	$e^\pm\mu^\mp$	*LF*	$< 2 \times 10^{-6}$	CL=90%	DESIG=258
Γ_{33}	$\pi^+\pi^+e^-e^-$	*L*	$< 1.3 \times 10^{-5}$	CL=90%	DESIG=261

CONSTRAINED FIT INFORMATION

An overall fit to 30 branching ratios uses 84 measurements and one constraint to determine 14 parameters. The overall fit has a $\chi^2 = 98.5$ for 71 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_1	x_2	x_3	x_5	x_6	x_8	x_9	x_{11}	x_{12}	x_{16}
x_2	−70									
x_3	−67	−6								
x_5	−25	28	0							
x_6	−14	17	1	8						
x_8	60	−77	−3	−37	−23					
x_9	−6	7	0	3	2	−9				
x_{11}	−4	4	0	2	1	−6	1			
x_{12}	−5	6	0	3	2	−8	1	0		
x_{16}	0	0	0	0	0	0	0	0	0	
x_{17}	−12	15	0	18	4	−19	2	1	2	0
x_{18}	−1	1	0	1	0	−2	0	0	0	0
x_{22}	0	0	0	0	0	0	0	0	0	0
x_{24}	−8	9	0	32	3	−12	1	1	1	0

	x_{17}	x_{18}	x_{22}
x_{18}	0		
x_{22}	0	0	
x_{24}	6	0	0

ϕ(1020) PARTIAL WIDTHS

NODE=M004218

$\Gamma(\eta\gamma)$ Γ_5

NODE=M004W6
NODE=M004W6

VALUE (keV)	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$58.9 \pm 0.5 \pm 2.4$	ACHASOV	00	SND	$e^+e^- \to \eta\gamma$

$\Gamma(\pi^0\gamma)$ Γ_6

NODE=M004W7

VALUE (keV)	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$5.40\pm0.16^{+0.43}_{-0.40}$	ACHASOV 00	SND	$e^+e^- \to \pi^0\gamma$

$\Gamma(\ell^+\ell^-)$ Γ_7

NODE=M004W5

VALUE (keV)	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$1.320\pm0.017\pm0.015$	[1] AMBROSINO 05	KLOE	1.02 $e^+e^- \to \mu^+\mu^-$

[1] Weighted average of Γ_{ee} and $\sqrt{\Gamma_{ee}\Gamma_{\mu\mu}}$ from AMBROSINO 05 assuming lepton universality.

NODE=M004W5;LINKAGE=AM

$\Gamma(e^+e^-)$ Γ_8

NODE=M004W8

→ UNCHECKED ←

VALUE (keV)	DOCUMENT ID	TECN	COMMENT
1.27 ±0.04 OUR EVALUATION			
1.251±0.021 OUR AVERAGE Error includes scale factor of 1.1.			
$1.235\pm0.006\pm0.022$	[1] AKHMETSHIN 11	CMD2	1.02 $e^+e^- \to \phi$
$1.32\pm0.05\pm0.03$	[2] AMBROSINO 05	KLOE	1.02 $e^+e^- \to e^+e^-$
1.28 ± 0.05	AKHMETSHIN 95	CMD2	1.02 $e^+e^- \to \phi$

[1] Combined analysis of the CMD-2 data on $\phi \to K^+K^-$, $K^0_S K^0_L$, $\pi^+\pi^-\pi^0$, $\eta\gamma$ assuming that the sum of their branching fractions is 0.99741 ± 0.00007.

NODE=M004W8;LINKAGE=AK

[2] From forward-backward asymmetry and using $\Gamma_{\text{total}} = 4.26 \pm 0.05$ MeV from the 2004 edition of this Review.

NODE=M004W8;LINKAGE=AM

$(\Gamma(e^+e^-) \times \Gamma(\mu^+\mu^-))^{1/2}$ $(\Gamma_8\Gamma_9)^{1/2}$

NODE=M004W9

VALUE (keV)	DOCUMENT ID	TECN	COMMENT
$1.320\pm0.018\pm0.017$	AMBROSINO 05	KLOE	1.02 $e^+e^- \to \mu^+\mu^-$

$\phi(1020)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

NODE=M004223

$\Gamma(K^+K^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_1\Gamma_8/\Gamma$

NODE=M004G01

VALUE (keV)	EVTS	DOCUMENT ID	TECN	COMMENT
$0.6340\pm0.0070\pm0.0039$		[1] LEES 13Q	BABR	$e^+e^- \to K^+K^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.669\pm0.001\pm0.023$	1.7M	KOZYREV 18	CMD3	$e^+e^- \to K^+K^-$

[1] Using a phenomenological model based on KUHN 90 with a sum of Breit-Wigner resonances for $\rho(770)$, $\omega(782)$, $\phi(1020)$ and their higher mass excitations. The first error combines statistical and systematic uncertainties. The second one is due to the parametrization of the charged kaon form factor and mass calibration.

NODE=M004G01;LINKAGE=A

$\Gamma(K^0_L K^0_S) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_2\Gamma_8/\Gamma$

NODE=M004GXX

VALUE (keV)	EVTS	DOCUMENT ID	TECN	COMMENT
$0.4200\pm0.0033\pm0.0123$	28k	[1] LEES 14H	BABR	$e^+e^- \to K^0_S K^0_L\gamma$

[1] Using a vector meson dominance model with contribution from $\phi(1020)$ and higher mass excitations of $\rho(770)$, $\omega(782)$, and $\phi(1020)$.

NODE=M004GXX;LINKAGE=A

$[\Gamma(\rho\pi) + \Gamma(\pi^+\pi^-\pi^0)] \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_3\Gamma_8/\Gamma$

NODE=M004R03

VALUE (eV)	DOCUMENT ID	TECN	COMMENT
$184.1\pm2.1\pm8.0$	[1] LEES 21B	BABR	10.5 $e^+e^- \to \pi^+\pi^-\pi^0\gamma$

[1] From the cross section for $e^+e^- \to \pi^+\pi^-\pi^0$ with contributions from $\rho(770)$, $\omega(782)$, $\phi(1020)$, $\omega(1420)$, and $\omega(1650)$.

NODE=M004R03;LINKAGE=A

$\phi(1020)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma^2(\text{total})$

NODE=M004224

$\Gamma(K^+K^-)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_1/\Gamma \times \Gamma_8/\Gamma$

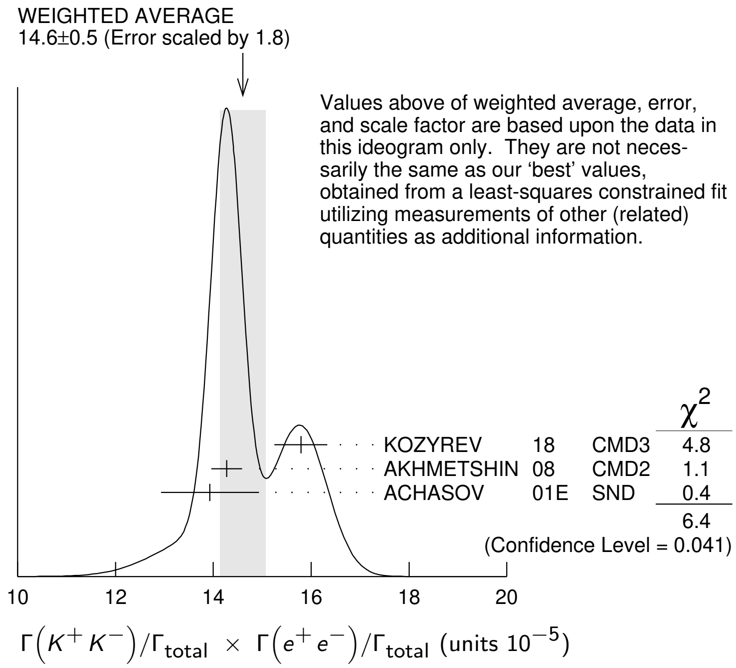
NODE=M004G10

NEW

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
14.85 ±0.30 OUR FIT Error includes scale factor of 1.6. [$(14.79\pm0.30)\times10^{-5}$ OUR 2025 FIT Scale factor = 1.5]				
14.6 ±0.5 OUR AVERAGE Error includes scale factor of 1.8. See the ideogram below.				
15.789 ± 0.541	1.7M	KOZYREV 18	CMD3	$e^+e^- \to K^+K^-$
$14.27\pm0.05\pm0.31$	542k	AKHMETSHIN 08	CMD2	1.02 $e^+e^- \to K^+K^-$
$13.93\pm0.14\pm0.99$	1000k	[1] ACHASOV 01E	SND	$e^+e^- \to K^+K^-$, $K_S K_L$, $\pi^+\pi^-\pi^0$

[1] From the combined fit assuming that the total $\phi(1020)$ production cross section is saturated by those of K^+K^-, $K_S K_L$, $\pi^+\pi^-\pi^0$, and $\eta\gamma$ decays modes and using ACHASOV 00B for the $\eta\gamma$ decay mode.

NODE=M004G10;LINKAGE=AE



$\Gamma(K^0_L K^0_S)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_2/\Gamma \times \Gamma_8/\Gamma$

NODE=M004G6
NODE=M004G6

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
9.96 ±0.08 OUR FIT				
[$(9.97 \pm 0.08) \times 10^{-5}$ OUR 2025 FIT]				
9.93 ±0.08 OUR AVERAGE				
[$(9.94 \pm 0.08) \times 10^{-5}$ OUR 2025 AVERAGE]				
9.83 ±0.04 ±0.10		DRUZHININ 25	SND	$e^+e^- \to K^0_L K^0_S$
10.078±0.223	610k	[1] KOZYREV 16	CMD3	$e^+e^- \to K^0_S K^0_L$
10.01 ±0.04 ±0.17	272k	[2] AKHMETSHIN 04	CMD2	$e^+e^- \to K^0_L K^0_S$
10.27 ±0.07 ±0.34	500k	[3] ACHASOV 01E	SND	$e^+e^- \to K^+K^-$, $K_S K_L$, $\pi^+\pi^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
9.85 ±0.03 ±0.10	1.28M	[4,5] ACHASOV 24	SND	$e^+e^- \to K^0_L K^0_S$

NEW
NEW
OCCUR=2

[1] KOZYREV 16 also reports $\Gamma(e^+e^-)$ B($\phi \to K^0_S K^0_L$) = $(0.428 \pm 0.001 \pm 0.009)$ keV. NODE=M004G6;LINKAGE=A

[2] Update of AKHMETSHIN 99D NODE=M004G;LINKAGE=GS

[3] From the combined fit assuming that the total $\phi(1020)$ production cross section is saturated by those of K^+K^-, $K_S K_L$, $\pi^+\pi^-\pi^0$, and $\eta\gamma$ decays modes and using ACHASOV 00B for the $\eta\gamma$ decay mode. NODE=M004G6;LINKAGE=AE

[4] From a fit of the cross section in the energy region $1.000 < \sqrt{s} < 1.100$ GeV using a vector meson dominance model with contribution from $\phi(1020)$, $\rho(770)$, $\omega(782)$ and higher vector resonances. NODE=M004G6;LINKAGE=B

[5] Superseded by DRUZHININ 25. NODE=M004G6;LINKAGE=C

$\left[\Gamma(\rho\pi) + \Gamma(\pi^+\pi^-\pi^0)\right]/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_3/\Gamma \times \Gamma_8/\Gamma$

NODE=M004G7
NODE=M004G7

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
4.35 ±0.13 OUR FIT Error includes scale factor of 1.4. [$(4.42 \pm 0.11) \times 10^{-5}$ OUR 2025 FIT Scale factor = 1.2]				
4.51 ±0.14 OUR AVERAGE				
4.51 ±0.16 ±0.11	105k	AKHMETSHIN 06	CMD2	0.98–1.06 $e^+e^- \to \pi^+\pi^-\pi^0$
4.665±0.042±0.261	400k	[1] ACHASOV 01E	SND	$e^+e^- \to K^+K^-$, $K_S K_L$, $\pi^+\pi^-\pi^0$
4.35 ±0.27 ±0.08	11169	[2] AKHMETSHIN 98	CMD2	$e^+e^- \to \pi^+\pi^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
4.38 ±0.12		BENAYOUN 10	RVUE	0.4–1.05 e^+e^-
4.30 ±0.08 ±0.21		[3] AUBERT,B 04N	BABR	10.6 $e^+e^- \to \pi^+\pi^-\pi^0\gamma$

NEW

[1] From the combined fit assuming that the total $\phi(1020)$ production cross section is saturated by those of K^+K^-, $K_S K_L$, $\pi^+\pi^-\pi^0$, and $\eta\gamma$ decays modes and using ACHASOV 00B for the $\eta\gamma$ decay mode. NODE=M004G7;LINKAGE=AE

[2] Recalculated by us from the cross section in the peak. NODE=M004G;LINKAGE=B

[3] Superseeded by LEES 21B. NODE=M004G7;LINKAGE=A

$\Gamma(\eta\gamma)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_5/\Gamma \times \Gamma_8/\Gamma$

NODE=M004G2
NODE=M004G2

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
3.87 ±0.07 OUR FIT Error includes scale factor of 1.2.					
3.93 ±0.09 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below.					
$4.050 \pm 0.067 \pm 0.118$	33k	[1] ACHASOV	07B	SND	0.6–1.38 $e^+e^- \to \eta\gamma$
$4.093^{+0.040}_{-0.043} \pm 0.247$	17.4k	[2] AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \eta\gamma$
$3.850 \pm 0.041 \pm 0.159$	23k	[3,4] AKHMETSHIN	01B	CMD2	$e^+e^- \to \eta\gamma$
$4.00 \pm 0.04 \pm 0.11$		[5] ACHASOV	00	SND	$e^+e^- \to \eta\gamma$
$3.53 \pm 0.08 \pm 0.17$	2200	[6,7] AKHMETSHIN	99F	CMD2	$e^+e^- \to \eta\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4.19 ± 0.06		[8] 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. NODE=M004G2;LINKAGE=AH

[2] From the $\eta \to 2\gamma$ decay and using B($\eta \to \gamma\gamma$) = 39.43 ± 0.26%. NODE=M004G2;LINKAGE=AK

[3] From the $\eta \to 3\pi^0$ decay and using B($\eta \to 3\pi^0$)= $(32.24 \pm 0.29) \times 10^{-2}$. NODE=M004G;LINKAGE=AK

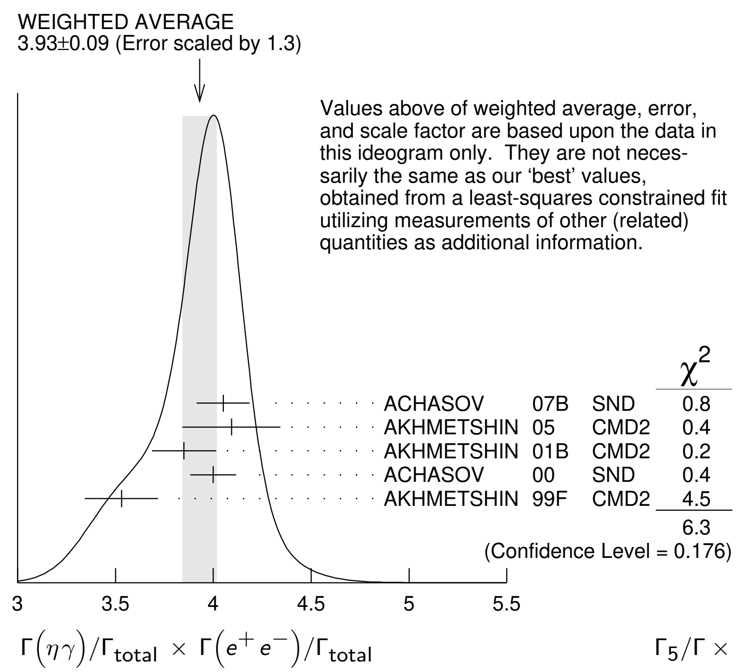
[4] The combined fit from 600 to 1380 MeV taking into account $\rho(770)$, $\omega(782)$, $\phi(1020)$, and $\rho(1450)$ (mass and width fixed at 1450 MeV and 310 MeV respectively). NODE=M004G;LINKAGE=BQ

[5] From the $\eta \to 2\gamma$ decay and using B($\eta \to 2\gamma$) $=(39.21 \pm 0.34) \times 10^{-2}$. NODE=M004G2;LINKAGE=A

[6] Recalculated by the authors from the cross section in the peak. NODE=M004G;LINKAGE=A

[7] From the $\eta \to \pi^+\pi^-\pi^0$ decay and using B($\eta \to \pi^+\pi^-\pi^0$) $=(23.1 \pm 0.5) \times 10^{-2}$. NODE=M004G2;LINKAGE=C

[8] A simultaneous fit of $e^+e^- \to \pi^+\pi^-$, $\pi^+\pi^-\pi^0$, $\pi^0\gamma$, $\eta\gamma$ data. NODE=M004G7;LINKAGE=BE



$\Gamma(\pi^0\gamma)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_6/\Gamma \times \Gamma_8/\Gamma$

NODE=M004G3
NODE=M004G3

VALUE (units 10^{-7})	EVTS	DOCUMENT ID		TECN	COMMENT
3.94±0.16 OUR FIT					
3.95±0.17 OUR AVERAGE					
$4.04 \pm 0.09 \pm 0.19$		[1] ACHASOV	16A	SND	0.60–1.38 $e^+e^- \to \pi^0\gamma$
$3.75 \pm 0.11 \pm 0.29$	18k	AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \pi^0\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4.29 ± 0.11		[2] BENAYOUN	10	RVUE	0.4–1.05 e^+e^-
$3.67 \pm 0.10^{+0.27}_{-0.25}$		[3] ACHASOV	00	SND	$e^+e^- \to \pi^0\gamma$

[1] From the VMD model with the interfering $\rho(770)$, $\omega(782)$, $\phi(1020)$ resonances, and an additional resonance describing the total contribution of the $\rho(1450)$ and $\omega(1420)$ states. Supersedes ACHASOV 00. NODE=M004G3;LINKAGE=B

[2] A simultaneous fit of $e^+e^- \to \pi^+\pi^-$, $\pi^+\pi^-\pi^0$, $\pi^0\gamma$, $\eta\gamma$ data. NODE=M004G3;LINKAGE=BE

[3] From the $\pi^0 \to 2\gamma$ decay and using B($\pi^0 \to 2\gamma$) = $(98.798 \pm 0.032) \times 10^{-2}$. NODE=M004G3;LINKAGE=A

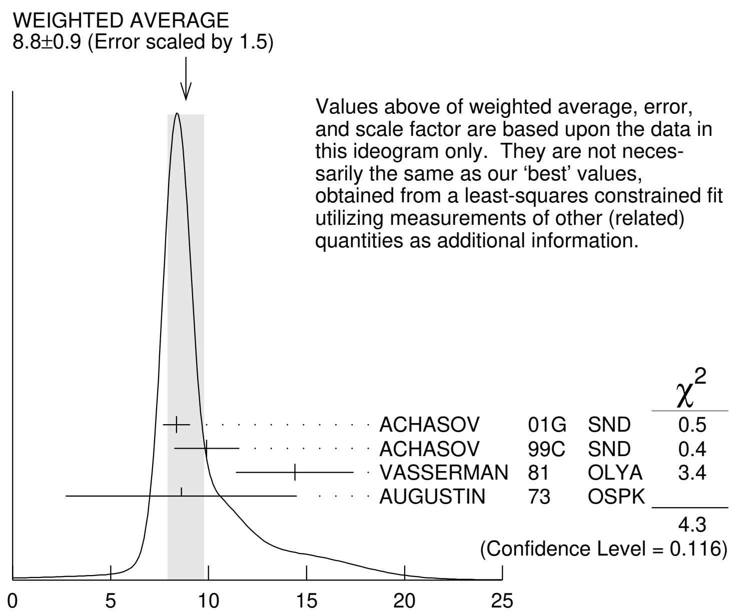
$\Gamma(\mu^+\mu^-)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_9/\Gamma \times \Gamma_8/\Gamma$

NODE=M004G5
NODE=M004G5

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
8.5 ±0.6 OUR FIT Error includes scale factor of 1.2.				
8.8 ±0.9 OUR AVERAGE Error includes scale factor of 1.5. See the ideogram below.				
8.36±0.59±0.37	ACHASOV	01G	SND	$e^+e^- \rightarrow \mu^+\mu^-$
9.9 ±1.4 ±0.9	[1] ACHASOV	99C	SND	$e^+e^- \rightarrow \mu^+\mu^-$
14.4 ±3.0	[2] VASSERMAN	81	OLYA	$e^+e^- \rightarrow \mu^+\mu^-$
8.6 ±5.9	[2] AUGUSTIN	73	OSPK	$e^+e^- \rightarrow \mu^+\mu^-$

[1] Recalculated by the authors from the cross section in the peak. NODE=M004G5;LINKAGE=A

[2] Recalculated by us from the cross section in the peak. NODE=M004G5;LINKAGE=B



$\Gamma(\mu^+\mu^-)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_9/\Gamma \times \Gamma_8/\Gamma$

$\Gamma(\pi^+\pi^-)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{11}/\Gamma \times \Gamma_8/\Gamma$

NODE=M004G4
NODE=M004G4

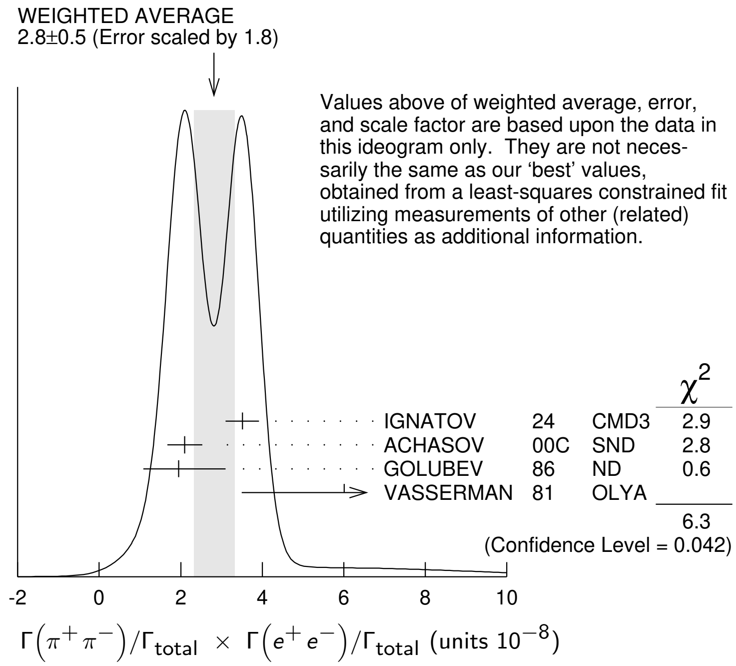
VALUE (units 10^{-8})	EVTS	DOCUMENT ID		TECN	COMMENT
2.8 ±0.6 OUR FIT Error includes scale factor of 2.0.					
2.8 ±0.5 OUR AVERAGE Error includes scale factor of 1.8. See the ideogram below.					
3.51±0.33±0.24	34M	[1] IGNATOV	24	CMD3	$e^+e^- \rightarrow \pi^+\pi^-$
2.1 ±0.3 ±0.3		[2] ACHASOV	00C	SND	$e^+e^- \rightarrow \pi^+\pi^-$
$1.95^{+1.15}_{-0.87}$		[3] GOLUBEV	86	ND	$e^+e^- \rightarrow \pi^+\pi^-$
$6.01^{+3.19}_{-2.51}$		[3] VASSERMAN	81	OLYA	$e^+e^- \rightarrow \pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3.31±0.99		[4] BENAYOUN	13	RVUE	0.4–1.05 e^+e^-

[1] From a fit of the pion form factor in the energy range $0.32 < \sqrt{s} < 1.2$ GeV using the GOUNARIS 68 parametrization with the complex phase of the $\rho - \omega$ interference with ω and ϕ masses and widths constrained by the values and their errors from PDG 22, and leaving $\rho(1450)$, $\rho(1700)$ resonances as free parameters of the fit. A fit without the constraints from PDG 22 gives a value $\Gamma(e^+e^-) \times \Gamma(\pi^+\pi^-)/\Gamma^2_{total} = (3.65 \pm 0.24) \times 10^{-8}$. NODE=M004G4;LINKAGE=C

[2] Recalculated by the authors from the cross section in the peak. NODE=M004G4;LINKAGE=AC

[3] Recalculated by us from the cross section in the peak. NODE=M004G4;LINKAGE=B

[4] A simultaneous fit to $e^+e^- \rightarrow \pi^+\pi^-$, $\pi^+\pi^-\pi^0$, $\pi^0\gamma$, $\eta\gamma$, $K\overline{K}$, and $\tau^- \rightarrow \pi^-\pi^0\nu_\tau$ data. NODE=M004G4;LINKAGE=A



$\Gamma(\omega\pi^0)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{12}/\Gamma \times \Gamma_8/\Gamma$

NODE=M004G11
NODE=M004G11

VALUE (units 10^{-8})	DOCUMENT ID	TECN	COMMENT
1.40±0.15 OUR FIT			
1.37±0.17±0.01	[1,2] AMBROSINO 08G	KLOE	$e^+e^- \to \pi^+\pi^-2\pi^0$, $2\pi^0\gamma$

[1] Recalculated by the authors from the cross section at the peak.

NODE=M004G11;LINKAGE=AB

[2] AMBROSINO 08G reports $[\Gamma(\phi(1020) \to \omega\pi^0)/\Gamma_{total} \times \Gamma(\phi(1020) \to e^+e^-)/\Gamma_{total}] \times [B(\omega(782) \to \pi^+\pi^-\pi^0)] = (1.22 \pm 0.13 \pm 0.08) \times 10^{-8}$ which we divide by our best value $B(\omega(782) \to \pi^+\pi^-\pi^0) = (89.2 \pm 0.7) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M004G11;LINKAGE=AM

$\Gamma(\pi^0\pi^0\gamma)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{17}/\Gamma \times \Gamma_8/\Gamma$

NODE=M004G9
NODE=M004G9

VALUE (units 10^{-8})	DOCUMENT ID	TECN	COMMENT
3.34±0.17 OUR FIT			
$\mathbf{3.33^{+0.04}_{-0.09}{}^{+0.19}_{-0.20}}$	[1] AMBROSINO 07	KLOE	$e^+e^- \to \pi^0\pi^0\gamma$

[1] Calculated by the authors from the cross section at the peak.

NODE=M004G9;LINKAGE=AM

$\Gamma(\pi^+\pi^-\pi^+\pi^-)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{18}/\Gamma \times \Gamma_8/\Gamma$

NODE=M004G8
NODE=M004G8

VALUE (units 10^{-9})	EVTS	DOCUMENT ID	TECN	COMMENT
$\mathbf{1.2^{+0.8}_{-0.7}}$ **OUR FIT**				
1.17±0.52±0.64	3285	[1] AKHMETSHIN 00E	CMD2	$e^+e^- \to \pi^+\pi^-\pi^+\pi^-$

[1] Recalculated by the authors from the cross section in the peak.

NODE=M004G8;LINKAGE=A

ϕ(1020) BRANCHING RATIOS

NODE=M004220

$\Gamma(K^+K^-)/\Gamma_{total}$ Γ_1/Γ

NODE=M004R1
NODE=M004R1
NEW

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.501±0.006 OUR FIT Error includes scale factor of 1.6. [0.499 ± 0.005 OUR 2025 FIT Scale factor = 1.5]				
0.493±0.010 OUR AVERAGE				
0.492±0.012	2913	AKHMETSHIN 95	CMD2	$e^+e^- \to K^+K^-$
0.44 ±0.05	321	KALBFLEISCH 76	HBC	2.18 $K^-p \to \Lambda K^+K^-$
0.49 ±0.06	270	DEGROOT 74	HBC	4.2 $K^-p \to \Lambda\phi$
0.540±0.034	565	BALAKIN 71	OSPK	$e^+e^- \to K^+K^-$
0.48 ±0.04	252	LINDSEY 66	HBC	2.1–2.7 $K^-p \to \Lambda K^+K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.493±0.003±0.007		[1] AKHMETSHIN 11	CMD2	1.02 $e^+e^- \to K^+K^-$
0.476±0.017	1000k	[2] ACHASOV 01E	SND	$e^+e^- \to K^+K^-$, $K_S K_L$, $\pi^+\pi^-\pi^0$

[1] Combined analysis of the CMD-2 data on $\phi \to K^+K^-$, $K^0_S K^0_L$, $\pi^+\pi^-\pi^0$, $\eta\gamma$ assuming that the sum of their branching fractions is 0.99741 ± 0.00007.

NODE=M004R1;LINKAGE=AK

[2] Using $B(\phi \to e^+e^-) = (2.93 \pm 0.14) \times 10^{-4}$.

NODE=M004R1;LINKAGE=B2

$\Gamma(K^0_L K^0_S)/\Gamma_{total}$ — Γ_2/Γ

NODE=M004R2
NODE=M004R2

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.336±0.004 OUR FIT Error includes scale factor of 1.3. [0.336 ± 0.004 OUR 2025 FIT Scale factor = 1.3]					
0.331±0.009 OUR AVERAGE					
0.335±0.010	40644	AKHMETSHIN	95	CMD2	$e^+e^- \rightarrow K^0_L K^0_S$
0.326±0.035		DOLINSKY	91	ND	$e^+e^- \rightarrow K^0_L K^0_S$
0.310±0.024		DRUZHININ	84	ND	$e^+e^- \rightarrow K^0_L K^0_S$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.336±0.002±0.006		[1] AKHMETSHIN	11	CMD2	1.02 $e^+e^- \rightarrow K^0_S K^0_L$
0.351±0.013	500k	[2] ACHASOV	01E	SND	$e^+e^- \rightarrow K^+K^-$, $K_S K_L$, $\pi^+\pi^-\pi^0$
0.27 ±0.03	133	KALBFLEISCH	76	HBC	2.18 $K^- p \rightarrow \Lambda K^0_L K^0_S$
0.257±0.030	95	[3] BALAKIN	71	OSPK	$e^+e^- \rightarrow K^0_L K^0_S$
0.40 ±0.04	167	LINDSEY	66	HBC	2.1–2.7 $K^- p \rightarrow \Lambda K^0_L K^0_S$

NEW

[1] Combined analysis of the CMD-2 data on $\phi \rightarrow K^+K^-$, $K^0_S K^0_L$, $\pi^+\pi^-\pi^0$, $\eta\gamma$ assuming that the sum of their branching fractions is 0.99741 ± 0.00007.
NODE=M004R2;LINKAGE=AK

[2] Using B($\phi \rightarrow e^+e^-$)= (2.93 ± 0.14) × 10^{-4}.
NODE=M004R2;LINKAGE=B2

[3] Balakin error increased by Paul.
NODE=M004R2;LINKAGE=01

$\Gamma(K^0_L K^0_S)/\Gamma(K^+K^-)$ — Γ_2/Γ_1

NODE=M004R19
NODE=M004R19

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.671±0.014 OUR FIT Error includes scale factor of 1.5. [0.674 ± 0.014 OUR 2025 FIT Scale factor = 1.4]					
0.740±0.031 OUR AVERAGE					
0.70 ±0.06	2732	BUKIN	78C	OLYA	$e^+e^- \rightarrow K^0_L K^0_S$
0.82 ±0.08		LOSTY	78	HBC	4.2 $K^- p \rightarrow \phi$hyperon
0.71 ±0.05		LAVEN	77	HBC	10 $K^- p \rightarrow K^+K^-\Lambda$
0.71 ±0.08		LYONS	77	HBC	3–4 $K^- p \rightarrow \Lambda\phi$
0.89 ±0.10	144	AGUILAR-...	72B	HBC	3.9,4.6 $K^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.644±0.017		[1] DUBNICKA	24	RVUE	$e^+e^- \rightarrow K^+K^-$, $K^0_S K^0_L$
0.638±0.022	2.3M	[2] KOZYREV	18	CMD3	$e^+e^- \rightarrow K^0_L K^0_S$, K^+K^-
0.68 ±0.03		[3] AKHMETSHIN	95	CMD2	$e^+e^- \rightarrow K^0_L K^0_S$, K^+K^-

NEW

[1] From a fit to CMD3, BABAR and BES3 data.
NODE=M004R19;LINKAGE=B

[2] The prediction taking into account phase-space difference, radiative corrections, isospin breaking, and the Sommerfeld-Gamow-Sakharov factor gives 0.630.
NODE=M004R19;LINKAGE=A

[3] Theoretical analysis of BRAMON 00 taking into account phase-space difference, electromagnetic radiative corrections, as well as isospin breaking, predicts 0.62. FLOREZ-BAEZ 08 predicts 0.63 considering also structure-dependent radiative corrections. FISCHBACH 02 calculates additional corrections caused by the close threshold and predicts 0.68. See also BENAYOUN 01 and DUBYNSKIY 07. BENAYOUN 12 obtains 0.71 ± 0.01 in the HLS model.
NODE=M004R19;LINKAGE=KH

$\Gamma(K^0_L K^0_S)/\Gamma(K\overline{K})$ — $\Gamma_2/(\Gamma_1+\Gamma_2)$

NODE=M004R5
NODE=M004R5

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.402±0.005 OUR FIT Error includes scale factor of 1.5. [0.403 ± 0.005 OUR 2025 FIT Scale factor = 1.4]					
0.45 ±0.04 OUR AVERAGE					
0.44 ±0.07		[1] LONDON	66	HBC	2.24 $K^- p \rightarrow \Lambda K\overline{K}$
0.48 ±0.07	52	BADIER	65B	HBC	3 $K^- p$
0.40 ±0.10	34	SCHLEIN	63	HBC	1.95 $K^- p \rightarrow \Lambda K\overline{K}$

NEW

[1] This is probably not affected by their controversial background subtraction; the value is from their numbers of $K_1 K_2$ vs K^+K^- events.
NODE=M004R5;LINKAGE=01

$[\Gamma(\rho\pi) + \Gamma(\pi^+\pi^-\pi^0)]/\Gamma_{total}$ — Γ_3/Γ

NODE=M004R3
NODE=M004R3

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.147±0.004 OUR FIT Error includes scale factor of 1.5. [0.149 ± 0.004 OUR 2025 FIT Scale factor = 1.3]					
0.151±0.009 OUR AVERAGE Error includes scale factor of 1.7.					
0.161±0.008	11761	AKHMETSHIN	95	CMD2	$e^+e^- \rightarrow \pi^+\pi^-\pi^0$
0.143±0.007		DOLINSKY	91	ND	$e^+e^- \rightarrow \pi^+\pi^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.155±0.002±0.005		[1] AKHMETSHIN	11	CMD2	1.02 $e^+e^- \rightarrow \pi^+\pi^-\pi^0$
0.159±0.008	400k	[2] ACHASOV	01E	SND	$e^+e^- \rightarrow K^+K^-$, $K_S K_L$, $\pi^+\pi^-\pi^0$
0.145±0.009±0.003	11169	[3] AKHMETSHIN	98	CMD2	$e^+e^- \rightarrow \pi^+\pi^-\pi^0$
0.139±0.007		[4] PARROUR	76B	OSPK	e^+e^-

NEW

[1] Combined analysis of the CMD-2 data on $\phi \to K^+K^-$, $K^0_S K^0_L$, $\pi^+\pi^-\pi^0$, $\eta\gamma$ assuming that the sum of their branching fractions is 0.99741 ± 0.00007. NODE=M004R3;LINKAGE=AK
[2] Using B($\phi \to e^+e^-$)= (2.93 ± 0.14) × 10^{-4}. NODE=M004R3;LINKAGE=B2
[3] Using B($\phi \to e^+e^-$)=(2.99 ± 0.08) × 10^{-4}. NODE=M004R;LINKAGE=8D
[4] Using Γ(ϕ)= 4.1 MeV. If interference between the $\rho\pi$ and 3π modes is neglected, the fraction of the $\rho\pi$ is more than 80% at the 90% confidence level. NODE=M004R3;LINKAGE=E

$[\Gamma(\rho\pi)+\Gamma(\pi^+\pi^-\pi^0)]/\Gamma(K^+K^-)$ — Γ_3/Γ_1

NODE=M004R20
NODE=M004R20

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.293±0.011 OUR FIT Error includes scale factor of 1.6. [0.299 ± 0.010 OUR 2025 FIT Scale factor = 1.4]					
0.229±0.014 OUR AVERAGE [0.232 ± 0.017 OUR 2025 AVERAGE]					
0.230±0.014±0.010		[1] ABLIKIM	25A	BES3	$D^+_s \to \phi\pi^+$
0.222±0.019±0.016		[2] ABLIKIM	25F	BES3	$D^+_s \to \phi\rho^+$
0.28 ±0.09	34	AGUILAR-...	72B	HBC	3.9,4.6 K^-p

NEW
NEW

[1] Using ABLIKIM 21AE. NODE=M004R20;LINKAGE=B
[2] Using ABLIKIM 21U. NODE=M004R20;LINKAGE=A

$[\Gamma(\rho\pi)+\Gamma(\pi^+\pi^-\pi^0)]/\Gamma(K\overline{K})$ — $\Gamma_3/(\Gamma_1+\Gamma_2)$

NODE=M004R6
NODE=M004R6

VALUE	DOCUMENT ID		TECN	COMMENT
0.175±0.006 OUR FIT Error includes scale factor of 1.5. [0.178 ± 0.005 OUR 2025 FIT Scale factor = 1.3]				
0.24 ±0.04 OUR AVERAGE				
0.237±0.039	CERRADA	77B	HBC	4.2 $K^-p \to \Lambda 3\pi$
0.30 ±0.15	LONDON	66	HBC	2.24 $K^-p \to \Lambda\pi^+\pi^-\pi^0$

NEW

$[\Gamma(\rho\pi)+\Gamma(\pi^+\pi^-\pi^0)]/\Gamma(K^0_L K^0_S)$ — Γ_3/Γ_2

NODE=M004R7
NODE=M004R7

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.437±0.013 OUR FIT Error includes scale factor of 1.4. [0.443 ± 0.012 OUR 2025 FIT Scale factor = 1.2]					
0.51 ±0.05 OUR AVERAGE					
0.56 ±0.07	3681	BUKIN	78C	OLYA	$e^+e^- \to K^0_L K^0_S$, $\pi^+\pi^-\pi^0$
0.47 ±0.06	516	COSME	74	OSPK	$e^+e^- \to \pi^+\pi^-\pi^0$

NEW

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_4/Γ

NODE=M004R46
NODE=M004R46

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
≃ 0.0087		1.98M	[1,2] ALOISIO	03	KLOE	1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
<0.0006	90		[3] ACHASOV	02	SND	1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
<0.23	90		[3] CORDIER	80	DM1	$e^+e^- \to \pi^+\pi^-\pi^0$
<0.20	90		[3] PARROUR	76B	OSPK	$e^+e^- \to \pi^+\pi^-\pi^0$

[1] From a fit without limitations on charged and neutral ρ masses and widths. NODE=M004R;LINKAGE=L1
[2] Adding the direct and $\omega\pi$ contributions and considering the interference between the $\rho\pi$ and $\pi^+\pi^-\pi^0$. NODE=M004R;LINKAGE=L2
[3] Neglecting the interference between the $\rho\pi$ and $\pi^+\pi^-\pi^0$. NODE=M004R;LINKAGE=46

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

NODE=M004R11
NODE=M004R11

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.306±0.024 OUR FIT Error includes scale factor of 1.2.					
1.26 ±0.04 OUR AVERAGE					
1.246±0.025±0.057	10k	[1] ACHASOV	98F	SND	$e^+e^- \to 7\gamma$
1.18 ±0.11	279	[2] AKHMETSHIN	95	CMD2	$e^+e^- \to \pi^+\pi^- 3\gamma$
1.30 ±0.06		[3] DRUZHININ	84	ND	$e^+e^- \to 3\gamma$
1.4 ±0.2		[4] DRUZHININ	84	ND	$e^+e^- \to 6\gamma$
0.88 ±0.20	290	KURDADZE	83C	OLYA	$e^+e^- \to 3\gamma$
1.35 ±0.29		ANDREWS	77	CNTR	6.7–10 γCu
1.5 ±0.4	54	[3] COSME	76	OSPK	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.38 ±0.02 ±0.02		[5] AKHMETSHIN	11	CMD2	1.02 $e^+e^- \to \eta\gamma$
1.37 ±0.05 ±0.02	33k	[6] ACHASOV	07B	SND	0.6–1.38 $e^+e^- \to \eta\gamma$
1.373±0.014±0.085	17.4k	[7,8] AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \eta\gamma$
1.287±0.013±0.063		[9,10] AKHMETSHIN	01B	CMD2	$e^+e^- \to \eta\gamma$
1.338±0.012±0.052		[11] ACHASOV	00	SND	$e^+e^- \to \eta\gamma$
1.18 ±0.03 ±0.06	2200	[12] AKHMETSHIN	99F	CMD2	$e^+e^- \to \eta\gamma$
1.21 ±0.07		[13] BENAYOUN	96	RVUE	0.54-1.04 $e^+e^- \to \eta\gamma$

OCCUR=2

[1] Using B($\phi \to e^+e^-$) = $(2.99 \pm 0.08) \times 10^{-4}$ and B($\eta \to 3\pi^0$)= $(32.2 \pm 0.4) \times 10^{-2}$. NODE=M004R11;LINKAGE=AC
[2] From $\pi^+\pi^-\pi^0$ decay mode of η. NODE=M004R11;LINKAGE=Z3
[3] From 2γ decay mode of η. NODE=M004R11;LINKAGE=A
[4] From $3\pi^0$ decay mode of η. NODE=M004R11;LINKAGE=C
[5] Combined analysis of the CMD-2 data on $\phi \to K^+K^-$, $K^0_S K^0_L$, $\pi^+\pi^-\pi^0$, $\eta\gamma$ assuming that the sum of their branching fractions is 0.99741 ± 0.00007. NODE=M004R11;LINKAGE=AN
[6] ACHASOV 07B reports [Γ($\phi(1020) \to \eta\gamma$)/$\Gamma_{total}$] × [B($\phi(1020) \to e^+e^-$)] = $(4.050 \pm 0.067 \pm 0.118) \times 10^{-6}$ which we divide by our best value B($\phi(1020) \to e^+e^-$) = $(2.963 \pm 0.034) \times 10^{-4}$. 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. NODE=M004R11;LINKAGE=AO
[7] Using B($\phi \to e^+e^-$) = $(2.98 \pm 0.04) \times 10^{-4}$ and B($\eta \to \gamma\gamma$) = 39.43 ± 0.26%. NODE=M004R11;LINKAGE=AH
[8] Not independent of the corresponding $\Gamma(e^+e^-) \times \Gamma(\eta\gamma)/\Gamma^2_{total}$. NODE=M004R11;LINKAGE=AK
[9] Using B($\phi \to e^+e^-$) = $(2.99 \pm 0.08) \times 10^{-4}$ and B($\eta \to 3\pi^0$)=$(32.24 \pm 0.29) \times 10^{-2}$. NODE=M004R;LINKAGE=AK
[10] 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). NODE=M004R;LINKAGE=BQ
[11] From the $\eta \to 2\gamma$ decay and using B($\phi \to e^+e^-$) =$(2.99 \pm 0.08) \times 10^{-4}$. NODE=M004R;LINKAGE=GA
[12] From $\pi^+\pi^-\pi^0$ decay mode of η and using B($\phi \to e^+e^-$)= $(2.99 \pm 0.08) \times 10^{-4}$. NODE=M004R;LINKAGE=FF
[13] Reanalysis of DRUZHININ 84, DOLINSKY 89, and DOLINSKY 91 taking into account a triangle anomaly contribution. NODE=M004R;LINKAGE=TS

$\Gamma(\pi^0\gamma)/\Gamma_{total}$ — Γ_6/Γ

NODE=M004R17
NODE=M004R17

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.33 ±0.05 OUR FIT					
1.31 ±0.13 OUR AVERAGE					
1.30 ±0.13		DRUZHININ	84	ND	$e^+e^- \to 3\gamma$
1.4 ±0.5	32	COSME	76	OSPK	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.367±0.072		[1] ACHASOV	16A	SND	0.60–1.38 $e^+e^- \to \pi^0\gamma$
1.258±0.037±0.077	18k	[2,3] AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \pi^0\gamma$
$1.226 \pm 0.036^{+0.096}_{-0.089}$		[4] ACHASOV	00	SND	$e^+e^- \to \pi^0\gamma$
1.26 ±0.17		[5] BENAYOUN	96	RVUE	0.54-1.04 $e^+e^- \to \pi^0\gamma$

OCCUR=3

[1] Using B($\phi \to e^+e^-$) from PDG 15. Supersedes ACHASOV 00. NODE=M004R17;LINKAGE=D
[2] Using B($\phi \to e^+e^-$) = $(2.98 \pm 0.04) \times 10^{-4}$. NODE=M004R17;LINKAGE=AH
[3] Not independent of the corresponding $\Gamma(e^+e^-) \times \Gamma(\pi^0\gamma)/\Gamma^2_{total}$. NODE=M004R17;LINKAGE=AK
[4] From the $\pi^0 \to 2\gamma$ decay and using B($\phi \to e^+e^-$) = $(2.99 \pm 0.08) \times 10^{-4}$. NODE=M004R;LINKAGE=3G
[5] Reanalysis of DRUZHININ 84, DOLINSKY 89, and DOLINSKY 91 taking into account a triangle anomaly contribution. NODE=M004R17;LINKAGE=TS

$\Gamma(\eta\gamma)/\Gamma(\pi^0\gamma)$ — Γ_5/Γ_6

NODE=M004R42
NODE=M004R42

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$10.9 \pm 0.3^{+0.7}_{-0.8}$	ACHASOV	00	SND	$e^+e^- \to \eta\gamma$, $\pi^0\gamma$

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

NODE=M004R16
NODE=M004R16

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.963±0.034 OUR FIT Error includes scale factor of 1.4. [$(2.964 \pm 0.033) \times 10^{-4}$ OUR 2025 FIT Scale factor = 1.4]					
2.98 ±0.07 OUR AVERAGE Error includes scale factor of 1.1.					
2.93 ±0.14	1900k	[1] ACHASOV	01E	SND	$e^+e^- \to K^+K^-$, $K_S K_L$, $\pi^+\pi^-\pi^0$
2.88 ±0.09	55600	AKHMETSHIN	95	CMD2	$e^+e^- \to$ hadrons
3.00 ±0.21	3681	BUKIN	78C	OLYA	$e^+e^- \to$ hadrons
3.10 ±0.14		[2] PARROUR	76	OSPK	e^+e^-
3.3 ±0.3		COSME	74	OSPK	$e^+e^- \to$ hadrons
2.81 ±0.25	681	BALAKIN	71	OSPK	$e^+e^- \to$ hadrons
3.50 ±0.27		CHATELUS	71	OSPK	e^+e^-

NEW

[1] From the combined fit assuming that the total $\phi(1020)$ production cross section is saturated by those of K^+K^-, $K_S K_L$, $\pi^+\pi^-\pi^0$, and $\eta\gamma$ decays modes and using ACHASOV 00B for the $\eta\gamma$ decay mode. NODE=M004R16;LINKAGE=AE
[2] Using total width 4.2 MeV. They detect 3π mode and observe significant interference with ω tail. This is accounted for in the result quoted above. NODE=M004R16;LINKAGE=E

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

NODE=M004R10
NODE=M004R10

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
2.86 ±0.22 OUR FIT Error includes scale factor of 1.2.				
2.96 ±0.16 OUR AVERAGE Error includes scale factor of 1.1.				
2.69 ±0.46	[1] HAYES	71	CNTR	8.3,9.8 $\gamma C \to \mu^+\mu^- X$
2.17 ±0.60	[1] EARLES	70	CNTR	6.0 $\gamma C \to \mu^+\mu^- X$
• • • We use the following data for averages but not for fits. • • •				
3.045±0.049±0.148	[2] AAIJ	24B	LHCB	D^+, $D_s^+ \to \pi^+\phi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.87 ±0.20 ±0.14	[3] ACHASOV	01G	SND	$e^+e^- \to \mu^+\mu^-$
3.30 ±0.45 ±0.32	[4] ACHASOV	99C	SND	$e^+e^- \to \mu^+\mu^-$
4.83 ±1.02	[5] VASSERMAN	81	OLYA	$e^+e^- \to \mu^+\mu^-$
2.87 ±1.98	[5] AUGUSTIN	73	OSPK	$e^+e^- \to \mu^+\mu^-$

NOTFITTED

[1] Neglecting interference between resonance and continuum. NODE=M004R10;LINKAGE=A

[2] Value not independent from the measurement of B($\phi \to \mu^+\mu^-$)/B($\phi \to e^+e^-$). NODE=M004R10;LINKAGE=B

[3] Using B($\phi \to e^+e^-$) = (2.91 ± 0.07) × 10^{-4}. NODE=M004R;LINKAGE=GZ

[4] Using B($\phi \to e^+e^-$)=(2.99 ± 0.08) × 10^{-4}. NODE=M004R10;LINKAGE=8D

[5] Recalculated by us using B($\phi \to e^+e^-$)= (2.99 ± 0.08) × 10^{-4}. NODE=M004R;LINKAGE=VA

$\Gamma(\mu^+\mu^-)/\Gamma(e^+e^-)$ — Γ_9/Γ_8

NODE=M004R04
NODE=M004R04

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT	
1.022±0.012±0.048	24k	AAIJ	24B	LHCB	D^+, $D_s^+ \to \pi^+\phi$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1.026±0.020±0.056	7.5k	AAIJ	24B	LHCB	$D^+ \to \pi^+\phi$	OCCUR=2
1.017±0.013±0.051	16.7k	AAIJ	24B	LHCB	$D_s^+ \to \pi^+\phi$	OCCUR=3

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

NODE=M004R24
NODE=M004R24

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT	
1.08 ±0.04 OUR AVERAGE						
1.075±0.007±0.038	30k	[1] BABUSCI	15	KLOE	1.02 $e^+e^- \to \eta e^+e^-$	
1.19 ±0.19 ±0.12	213	[2] ACHASOV	01B	SND	$e^+e^- \to \eta e^+e^-$	
1.14 ±0.10 ±0.06	355	[3] AKHMETSHIN	01	CMD2	$e^+e^- \to \eta e^+e^-$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1.13 ±0.14 ±0.07	183	[4] AKHMETSHIN	01	CMD2	$e^+e^- \to \eta e^+e^-$	OCCUR=2
1.21 ±0.14 ±0.09	130	[5] AKHMETSHIN	01	CMD2	$e^+e^- \to \eta e^+e^-$	OCCUR=3
1.04 ±0.20 ±0.08	42	[6] AKHMETSHIN	01	CMD2	$e^+e^- \to \eta e^+e^-$	OCCUR=4
1.3 $^{+0.8}_{-0.6}$	7	GOLUBEV	85	ND	$e^+e^- \to \eta e^+e^-$	

[1] Using B($\eta \to 3\pi^0$) = (32.57 ± 0.23)% from PDG 12. NODE=M004R24;LINKAGE=A

[2] Using B($\eta \to \gamma\gamma$) = (39.25 ± 0.32)%, B($\phi \to \eta\gamma$) = (1.26 ± 0.06)%, and B($\phi \to e^+e^-$) = (3.00 ± 0.06) × 10^{-4}. NODE=M004R;LINKAGE=VM

[3] The average of the branching ratios separately obtained from the $\eta \to \gamma\gamma$, $3\pi^0$, $\pi^+\pi^-\pi^0$ decays. NODE=M004R;LINKAGE=H1

[4] From $\eta \to \gamma\gamma$ decays and using B($\eta \to \gamma\gamma$) = (39.33 ± 0.25) × 10^{-2}, B($\eta \to \pi^+\pi^-\gamma$) = (4.75 ± 11) × 10^{-2}, and B($\phi \to \eta\gamma$) = (1.297 ± 0.033) × 10^{-2}. NODE=M004R;LINKAGE=H2

[5] From $\eta \to 3\pi^0$ decays and using B($\pi^0 \to \gamma\gamma$) = (98.798 ± 0.033) × 10^{-2}, B($\eta \to 3\pi^0$) = (32.24 ± 0.29) × 10^{-2}, B($\eta \to \pi^+\pi^-\gamma$) = (4.75 ± 0.11) × 10^{-2}, and B($\phi \to \eta\gamma$) = (1.297 ± 0.033) × 10^{-2}. NODE=M004R;LINKAGE=H3

[6] From $\eta \to \pi^+\pi^-\pi^0$ decays and using B($\pi^0 \to \gamma\gamma$) = (98.798 ± 0.033) × 10^{-2}, B($\pi^0 \to e^+e^-\gamma$) = (1.198 ± 0.032) × 10^{-2}, B($\eta \to \pi^+\pi^-\pi^0$) = (23.0 ± 0.4) × 10^{-2}, B($\phi \to \pi^+\pi^-\pi^0$) = (15.5 ± 0.6) × 10^{-2}, and B($\phi \to \eta\gamma$) = (1.297 ± 0.033) × 10^{-2}. NODE=M004R;LINKAGE=H4

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

NODE=M004R18
NODE=M004R18

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.71±0.11±0.09		[1] ACHASOV	00C	SND	$e^+e^- \to \pi^+\pi^-$
0.65 $^{+0.38}_{-0.29}$		[1] GOLUBEV	86	ND	$e^+e^- \to \pi^+\pi^-$
2.01 $^{+1.07}_{-0.84}$		[1] VASSERMAN	81	OLYA	$e^+e^- \to \pi^+\pi^-$
<6.6	95	BUKIN	78B	OLYA	$e^+e^- \to \pi^+\pi^-$
<2.7	95	ALVENSLEB...	72	CNTR	6.7 $\gamma C \to C\pi^+\pi^-$

[1] Using B($\phi \to e^+e^-$)=(2.99 ± 0.08) × 10^{-4}. NODE=M004R18;LINKAGE=8D

$\Gamma(\omega\pi^0)/\Gamma_{total}$ — Γ_{12}/Γ

NODE=M004R28
NODE=M004R28

VALUE (units 10^{-5})	DOCUMENT ID	TECN	COMMENT
4.7±0.5 OUR FIT			
$5.2^{+1.3}_{-1.1}$	[1,2] AULCHENKO 00A	SND	$e^+e^- \to \pi^+\pi^-\pi^0\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
4.4±0.6	[3] AMBROSINO 08G	KLOE	$e^+e^- \to \pi^+\pi^-2\pi^0$, $2\pi^0\gamma$
~ 5.4	[4] ACHASOV 00E	SND	$e^+e^- \to \pi^0\pi^0\gamma$
$5.5^{+1.6}_{-1.4}\pm0.3$	[2,5] AULCHENKO 00A	SND	$e^+e^- \to \pi^+\pi^-\pi^0\pi^0$
$4.8^{+1.9}_{-1.7}\pm0.8$	[4] ACHASOV 99	SND	$e^+e^- \to \pi^+\pi^-\pi^0\pi^0$

OCCUR=2

[1] Using the 1996 and 1998 data. NODE=M004R28;LINKAGE=K2
[2] (2.3 ± 0.3)% correction for other decay modes of the $\omega(782)$ applied. NODE=M004R28;LINKAGE=K3
[3] Not independent of the corresponding $\Gamma(\omega\pi^0) \times \Gamma(e^+e^-)$ / Γ^2(total). NODE=M004R28;LINKAGE=AM
[4] Using the 1996 data. NODE=M004R28;LINKAGE=VS
[5] Using the 1998 data. NODE=M004R28;LINKAGE=K1

$\Gamma(\omega\gamma)/\Gamma_{total}$ — Γ_{13}/Γ

NODE=M004R14
NODE=M004R14

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.05	84	LINDSEY 66	HBC	2.1–2.7 $K^-p \to \Lambda\pi^+\pi^-$ neutrals

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

NODE=M004R15
NODE=M004R15

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
< 0.12	90	[1] AKHMETSHIN 99B	CMD2	$e^+e^- \to \pi^+\pi^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 7	90	AKHMETSHIN 97C	CMD2	$e^+e^- \to \pi^+\pi^-\gamma$
<200	84	LINDSEY 66	HBC	2.1–2.7 $K^-p \to \Lambda\pi^+\pi^-$ neutrals

[1] Supersedes AKHMETSHIN 97C. NODE=M004R;LINKAGE=1N

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

NODE=M004R12
NODE=M004R12

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
0.41±0.12±0.04		30175	[1] AKHMETSHIN 99B	CMD2	$e^+e^- \to \pi^+\pi^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 0.3	90		[2] AKHMETSHIN 97C	CMD2	$e^+e^- \to \pi^+\pi^-\gamma$
<600	90		KALBFLEISCH 75	HBC	2.18 $K^-p \to \Lambda\pi^+\pi^-\gamma$
< 70	90		COSME 74	OSPK	$e^+e^- \to \pi^+\pi^-\gamma$
<400	90		LINDSEY 65	HBC	2.1–2.7 $K^-p \to \Lambda\pi^+\pi^-$ neutrals

[1] For $E_\gamma > 20$ MeV and assuming that B($\phi(1020) \to f_0(980)\gamma$) is negligible. Supersedes AKHMETSHIN 97C. NODE=M004R;LINKAGE=2N
[2] For $E_\gamma > 20$ MeV and assuming that B($\phi(1020) \to f_0(980)\gamma$) is negligible. NODE=M004R12;LINKAGE=Z3

$\Gamma(f_0(980)\gamma)/\Gamma_{total}$ — Γ_{16}/Γ

NODE=M004R30
NODE=M004R30

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
3.22±0.19 OUR FIT Error includes scale factor of 1.1.					
3.21±0.19 OUR AVERAGE					
$3.21^{+0.03}_{-0.09}\pm0.18$			[1] AMBROSINO 07	KLOE	$e^+e^- \to \pi^0\pi^0\gamma$
2.90±0.21±1.54			[2] AKHMETSHIN 99C	CMD2	$e^+e^- \to \pi^+\pi^-\gamma$, $\pi^0\pi^0\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4.47±0.21		2438	[3] ALOISIO 02D	KLOE	$e^+e^- \to \pi^0\pi^0\gamma$
$3.5\ \pm0.3\ ^{+1.3}_{-0.5}$		419	[4,5] ACHASOV 00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$
1.93±0.46±0.50		27188	[6] AKHMETSHIN 99B	CMD2	$e^+e^- \to \pi^+\pi^-\gamma$
3.05±0.25±0.72		268	[7] AKHMETSHIN 99C	CMD2	$e^+e^- \to \pi^0\pi^0\gamma$
1.5 ±0.5		268	[8] AKHMETSHIN 99C	CMD2	$e^+e^- \to \pi^0\pi^0\gamma$
3.42±0.30±0.36		164	[4] ACHASOV 98I	SND	$e^+e^- \to 5\gamma$
< 1	90		[9] AKHMETSHIN 97C	CMD2	$e^+e^- \to \pi^+\pi^-\gamma$
< 7	90		[10] AKHMETSHIN 97C	CMD2	$e^+e^- \to \pi^+\pi^-\gamma$
< 20	90		DRUZHININ 87	ND	$e^+e^- \to \pi^0\pi^0\gamma$

OCCUR=3
OCCUR=2
OCCUR=2

[1] Obtained by the authors taking into account the $\pi^+\pi^-$ decay mode. Includes a component due to $\pi\pi$ production via the $f_0(500)$ meson. Supersedes ALOISIO 02D. NODE=M004R30;LINKAGE=MB
[2] From the combined fit of the photon spectra in the reactions $e^+e^- \to \pi^+\pi^-\gamma$, $\pi^0\pi^0\gamma$. NODE=M004R;LINKAGE=SL
[3] From the negative interference with the $f_0(500)$ meson of AITALA 01B using the ACHASOV 89 parameterization for the $f_0(980)$, a Breit-Wigner for the $f_0(500)$, and ACHASOV 01F for the $\rho\pi$ contribution. Superseded by AMBROSINO 07. NODE=M004R;LINKAGE=KD
[4] Assuming that the $\pi^0\pi^0\gamma$ final state is completely determined by the $f_0\gamma$ mechanism, neglecting the decay B($\phi \to K\overline{K}\gamma$) and using B($f_0 \to \pi^+\pi^-$)= 2B($f_0 \to \pi^0\pi^0$). NODE=M004R;LINKAGE=AI
[5] Using the value B($\phi \to \eta\gamma$)=(1.338 ± 0.053) × 10^{-2}. NODE=M004R;LINKAGE=U8
[6] For $E_\gamma > 20$ MeV. Supersedes AKHMETSHIN 97C. NODE=M004R;LINKAGE=3N
[7] Neglecting other intermediate mechanisms ($\rho\pi$, $\sigma\gamma$). NODE=M004R;LINKAGE=SM
[8] A narrow pole fit taking into account $f_0(980)$ and $f_0(1200)$ intermediate mechanisms. NODE=M004R;LINKAGE=ST
[9] For destructive interference with the Bremsstrahlung process NODE=M004R30;LINKAGE=A
[10] For constructive interference with the Bremsstrahlung process NODE=M004R30;LINKAGE=B

$\Gamma(f_0(980)\gamma)/\Gamma(\eta\gamma)$ — Γ_{16}/Γ_5

NODE=M004R44
NODE=M004R44

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
2.47±0.15 OUR FIT Error includes scale factor of 1.1.				
2.6 ±0.2 $^{+0.8}_{-0.3}$	419	[1] ACHASOV 00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$

[1] Assuming that the $\pi^0\pi^0\gamma$ final state is completely determined by the $f_0\gamma$ mechanism, neglecting the decay B($\phi \to K\overline{K}\gamma$) and using B($f_0 \to \pi^+\pi^-$)= 2B($f_0 \to \pi^0\pi^0$). NODE=M004R44;LINKAGE=AI

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

NODE=M004R26
NODE=M004R26

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
1.07 ±0.06 OUR AVERAGE					
1.07 $^{+0.01}_{-0.03}$ $^{+0.06}_{-0.06}$			[1] AMBROSINO 07	KLOE	$e^+e^- \to \pi^0\pi^0\gamma$
1.08 ±0.17 ±0.09		268	AKHMETSHIN 99C	CMD2	$e^+e^- \to \pi^0\pi^0\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.09 ±0.03 ±0.05		2438	ALOISIO 02D	KLOE	$e^+e^- \to \pi^0\pi^0\gamma$
1.158±0.093±0.052		419	[2,3] ACHASOV 00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$
<10	90		DRUZHININ 87	ND	$e^+e^- \to 5\gamma$

[1] Supersedes ALOISIO 02D. NODE=M004R26;LINKAGE=MB
[2] Using the value B($\phi \to \eta\gamma$)=(1.338 ± 0.053) × 10^{-2}. NODE=M004R26;LINKAGE=U8
[3] Supersedes ACHASOV 98I. Excluding $\omega\pi^0$. NODE=M004R26;LINKAGE=V8

$\Gamma(\pi^0\pi^0\gamma)/\Gamma(\eta\gamma)$ — Γ_{17}/Γ_5

NODE=M004R39
NODE=M004R39

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
0.86 ±0.04 OUR FIT				
0.865±0.070±0.017	419	[1] ACHASOV 00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.90 ±0.08 ±0.07	164	ACHASOV 98I	SND	$e^+e^- \to 5\gamma$

[1] Supersedes ACHASOV 98I. Excluding $\omega\pi^0$. NODE=M004R39;LINKAGE=V8

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

NODE=M004R22
NODE=M004R22

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
6.5 ±2.7 ±1.6		6.8k	[1] AKHMETSHIN 17	CMD3	$e^+e^- \to \pi^+\pi^-\pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3.93±1.74±2.14		3.3k	AKHMETSHIN 00E	CMD2	$e^+e^- \to \pi^+\pi^-\pi^+\pi^-$
< 870	90		CORDIER 79	WIRE	$e^+e^- \to \pi^+\pi^-\pi^+\pi^-$

[1] Using the cross section at the ϕ meson peak $\sigma(\phi) = 4172 \pm 42$ nb, the nonresonant cross section $\sigma(0) = 1.263 \pm 0.027$ nb and Re(Z) = 0.146 ± 0.030, Im(Z) = -0.002 ± 0.024 for the complex amplitude of the $\phi \to \pi^+\pi^-\pi^+\pi^-$ transition. NODE=M004R22;LINKAGE=A

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

NODE=M004R27
NODE=M004R27

VALUE (units 10^{-6})	CL%	DOCUMENT ID	TECN	COMMENT
< 4.6	90	AKHMETSHIN 00E	CMD2	$e^+e^- \to \pi^+\pi^-\pi^+\pi^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<150	95	BARKOV 88	CMD	$e^+e^- \to \pi^+\pi^-\pi^+\pi^-\pi^0$

$\Gamma(\pi^0 e^+ e^-)/\Gamma_{total}$ Γ_{20}/Γ

NODE=M004R31
NODE=M004R31

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$1.33^{+0.07}_{-0.10}$ OUR AVERAGE						
$1.35\pm0.05^{+0.05}_{-0.10}$		9.5k	[1] ANASTASI	16B	KLOE	$e^+e^- \rightarrow \pi^0 e^+ e^-$
$1.01\pm0.28\pm0.29$		52	[2] ACHASOV	02D	SND	$e^+e^- \rightarrow \pi^0 e^+ e^-$
$1.22\pm0.34\pm0.21$		46	[3] AKHMETSHIN	01C	CMD2	$e^+e^- \rightarrow \pi^0 e^+ e^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<12	90		DOLINSKY	88	ND	$e^+e^- \rightarrow \pi^0 e^+ e^-$

[1] Using B($\pi^0 \rightarrow \gamma\gamma$) from the 2014 Edition of this Review (PDG 14). NODE=M004R31;LINKAGE=A

[2] Using various branching ratios from the 2000 Edition of this Review (PDG 00). NODE=M004R;LINKAGE=DS

[3] Using B($\pi^0 \rightarrow \gamma\gamma$) = 0.98798 ± 0.00032, B($\phi \rightarrow \eta\gamma$) = (1.297 ± 0.033) × 10^{-2}, and B($\eta \rightarrow \pi^+\pi^-\gamma$) = (4.75 ± 0.11) × 10^{-2}. NODE=M004R;LINKAGE=5H

$\Gamma(\pi^0 \eta\gamma)/\Gamma_{total}$ Γ_{21}/Γ

NODE=M004R32
NODE=M004R32

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT	
7.27±0.30 OUR AVERAGE Error includes scale factor of 1.5. See the ideogram below.							
7.06 ± 0.22		16.9k	[1] AMBROSINO	09F	KLOE	$1.02\ e^+e^- \rightarrow \eta\pi^0\gamma$	
$8.51\pm0.51\pm0.57$		607	[2] ALOISIO	02C	KLOE	$e^+e^- \rightarrow \eta\pi^0\gamma$	
$7.96\pm0.60\pm0.40$		197	[3] ALOISIO	02C	KLOE	$e^+e^- \rightarrow \eta\pi^0\gamma$	OCCUR=2
$8.8\ \pm1.4\ \pm0.9$		36	[4] ACHASOV	00F	SND	$e^+e^- \rightarrow \eta\pi^0\gamma$	
$9.0\ \pm2.4\ \pm1.0$		80	AKHMETSHIN	99C	CMD2	$e^+e^- \rightarrow \eta\pi^0\gamma$	
• • • We do not use the following data for averages, fits, limits, etc. • • •							
$7.01\pm0.10\pm0.20$		13.3k	[2,5] AMBROSINO	09F	KLOE	$1.02\ e^+e^- \rightarrow \eta\pi^0\gamma$	OCCUR=2
$7.12\pm0.13\pm0.22$		3.6k	[3,6] AMBROSINO	09F	KLOE	$1.02\ e^+e^- \rightarrow \eta\pi^0\gamma$	OCCUR=3
$8.3\ \pm2.3\ \pm1.2$		20	ACHASOV	98B	SND	$e^+e^- \rightarrow 5\gamma$	
<250	90		DOLINSKY	91	ND	$e^+e^- \rightarrow \pi^0\eta\gamma$	

[1] Combined results of $\eta \rightarrow \gamma\gamma$ and $\eta \rightarrow \pi^+\pi^-\pi^0$ decay modes measurements. NODE=M004R32;LINKAGE=AM

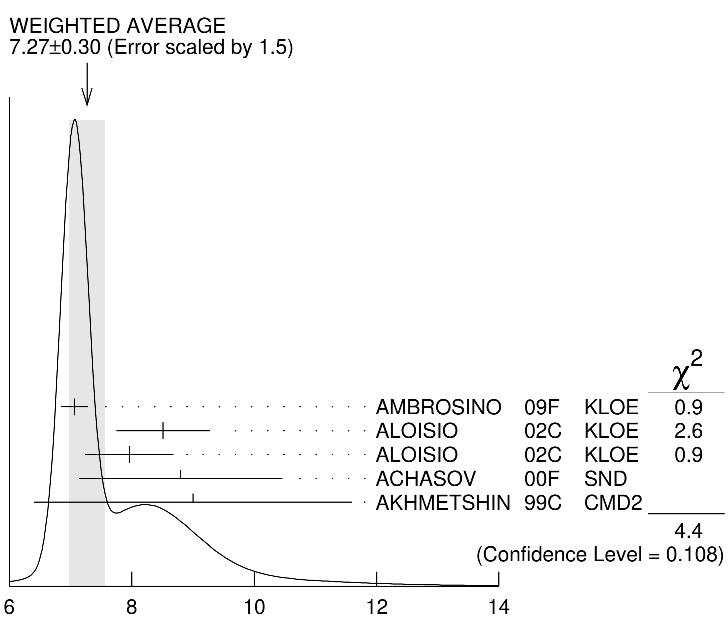
[2] From the decay mode $\eta \rightarrow \gamma\gamma$. NODE=M004R;LINKAGE=C1

[3] From the decay mode $\eta \rightarrow \pi^+\pi^-\pi^0$. NODE=M004R;LINKAGE=C2

[4] Supersedes ACHASOV 98B. NODE=M004R32;LINKAGE=AF

[5] Using B($\phi \rightarrow \eta\gamma$) = (1.304 ± 0.025)%, B($\eta \rightarrow 3\pi^0$) = (32.56 ± 0.23)%, and B($\eta \rightarrow \gamma\gamma$) = (39.31 ± 0.20)%. NODE=M004R32;LINKAGE=AB

[6] Using B($\phi \rightarrow \eta\gamma$) = (1.304 ± 0.025)%, B($\eta \rightarrow 3\pi^0$) = (32.56 ± 0.23)%, and B($\eta \rightarrow \pi^+\pi^-\pi^0$) = (22.73 ± 0.28)%. NODE=M004R32;LINKAGE=AR



$\Gamma(\pi^0\eta\gamma)/\Gamma_{total}$ (units 10^{-5})

$\Gamma(a_0(980)\gamma)/\Gamma_{total}$ — Γ_{22}/Γ

NODE=M004R33
NODE=M004R33

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
7.6±0.6 OUR FIT						
7.6±0.6 OUR AVERAGE						
7.4±0.7			[1] ALOISIO	02C	KLOE	$e^+e^- \to \eta\pi^0\gamma$
8.8±1.7		36	[2] ACHASOV	00F	SND	$e^+e^- \to \eta\pi^0\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
11 ±2			[3] GOKALP	02	RVUE	$e^+e^- \to \eta\pi^0\gamma$
<500	90		DOLINSKY	91	ND	$e^+e^- \to \pi^0\eta\gamma$

[1] Using $M_{a_0(980)}$=984.8 MeV and assuming $a_0(980)\gamma$ dominance. NODE=M004R;LINKAGE=C3

[2] Assuming $a_0(980)\gamma$ dominance in the $\eta\pi^0\gamma$ final state. NODE=M004R33;LINKAGE=AF

[3] Using data of ACHASOV 00F. NODE=M004R;LINKAGE=GK

$\Gamma(f_0(980)\gamma)/\Gamma(a_0(980)\gamma)$ — Γ_{16}/Γ_{22}

NODE=M004R47
NODE=M004R47

VALUE	DOCUMENT ID		TECN	COMMENT
6.1±0.6	[1] ALOISIO	02C	KLOE	$e^+e^- \to \eta\pi^0\gamma$

[1] Using results of ALOISIO 02D and assuming that $f_0(980)$ decays into $\pi\pi$ only and $a_0(980)$ into $\eta\pi$ only. NODE=M004R;LINKAGE=C4

$\Gamma(K^0\overline{K}^0\gamma)/\Gamma_{total}$ — Γ_{23}/Γ

NODE=M004R48
NODE=M004R48

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.9 × 10^{-8}	90	AMBROSINO	09C	KLOE	$e^+e^- \to K^0_S K^0_S\gamma$

$\Gamma(\eta'(958)\gamma)/\Gamma_{total}$ — Γ_{24}/Γ

NODE=M004R25
NODE=M004R25

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
6.23±0.21 OUR FIT						
6.24±0.30 OUR AVERAGE						
6.23±0.27±0.12		3407	[1] AMBROSINO	07A	KLOE	1.02 $e^+e^- \to \pi^+\pi^-7\gamma$
6.7 $^{+2.8}_{-2.4}$ ±0.8		12	[2] AULCHENKO	03B	SND	$e^+e^- \to \eta'\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
6.7 $^{+5.0}_{-4.2}$ ±1.5		7	AULCHENKO	03B	SND	$e^+e^- \to 7\gamma$
6.10±0.61±0.43		120	[3] ALOISIO	02E	KLOE	1.02 $e^+e^- \to \pi^+\pi^-3\gamma$
8.2 $^{+2.1}_{-1.9}$ ±1.1		21	[4] AKHMETSHIN	00B	CMD2	$e^+e^- \to \pi^+\pi^-3\gamma$
4.9 $^{+2.2}_{-1.8}$ ±0.6		9	[5] AKHMETSHIN	00F	CMD2	$e^+e^- \to \pi^+\pi^-\pi^+\pi^- \geq 2\gamma$
6.4 ±1.6		30	[6] AKHMETSHIN	00F	CMD2	$e^+e^- \to \eta'(958)\gamma$
6.7 $^{+3.4}_{-2.9}$ ±1.0		5	[7] AULCHENKO	99	SND	$e^+e^- \to \pi^+\pi^-3\gamma$
<11	90		AULCHENKO	98	SND	$e^+e^- \to 7\gamma$
12 $^{+7}_{-5}$ ±2		6	[4] AKHMETSHIN	97B	CMD2	$e^+e^- \to \pi^+\pi^- 3\gamma$
<41	90		DRUZHININ	87	ND	$e^+e^- \to \gamma\eta\pi^+\pi^-$

OCCUR=2 (AULCHENKO 03B, SND, $e^+e^- \to \eta'\gamma$)

OCCUR=2 (AKHMETSHIN 00F, CMD2, $e^+e^- \to \eta'(958)\gamma$)

[1] AMBROSINO 07A reports $[\Gamma(\phi(1020) \to \eta'(958)\gamma)/\Gamma_{total}]$ / $[B(\phi(1020) \to \eta\gamma)]$ = $(4.77 \pm 0.09 \pm 0.19) \times 10^{-3}$ which we multiply by our best value $B(\phi(1020) \to \eta\gamma)$ = $(1.306 \pm 0.024) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M004R25;LINKAGE=AM

[2] Averaging AULCHENKO 03B with AULCHENKO 99. NODE=M004R25;LINKAGE=BK

[3] Using $B(\phi \to \eta\gamma)$= (1.297 ± 0.033)%. NODE=M004R;LINKAGE=E2

[4] Using the value $B(\phi \to \eta\gamma) = (1.26 \pm 0.06) \times 10^{-2}$. NODE=M004R25;LINKAGE=Q

[5] Using $B(\phi \to K^0_L K^0_S) = (33.8 \pm 0.6)\%$. NODE=M004R;LINKAGE=T2

[6] Averaging AKHMETSHIN 00B with AKHMETSHIN 00F. NODE=M004R;LINKAGE=T3

[7] Using the value $B(\eta' \to \eta\pi^+\pi^-)$= $(43.7 \pm 1.5) \times 10^{-2}$ and $B(\eta \to \gamma\gamma)$= $(39.25 \pm 0.31) \times 10^{-2}$. NODE=M004R25;LINKAGE=AU

$\Gamma(\eta'(958)\gamma)/\Gamma(K^0_L K^0_S)$ — Γ_{24}/Γ_2

NODE=M004R43
NODE=M004R43

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.85±0.06 OUR FIT					
1.46$^{+0.64}_{-0.54}$±0.18	9	[1] AKHMETSHIN	00F	CMD2	$e^+e^- \to \pi^+\pi^-\pi^+\pi^- \geq 2\gamma$

[1] Using various branching ratios of K^0_S, K^0_L, η, η' from the 2000 edition (The European Physical Journal **C15** 1 (2000)) of this Review. NODE=M004R;LINKAGE=T1

$\Gamma(\eta'(958)\gamma)/\Gamma(\eta\gamma)$ — Γ_{24}/Γ_5

NODE=M004R34
NODE=M004R34

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
4.77±0.15 OUR FIT				
4.78±0.20 OUR AVERAGE				
4.77±0.09±0.19	3407	AMBROSINO 07A	KLOE	1.02 $e^+e^- \to \pi^+\pi^-7\gamma$
4.70±0.47±0.31	120	[1] ALOISIO 02E	KLOE	1.02 $e^+e^- \to \pi^+\pi^-3\gamma$
$6.5\ ^{+1.7}_{-1.5}\ \pm0.8$	21	AKHMETSHIN 00B	CMD2	$e^+e^- \to \pi^+\pi^-3\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$9.5\ ^{+5.2}_{-4.0}\ \pm1.4$	6	[2] AKHMETSHIN 97B	CMD2	$e^+e^- \to \pi^+\pi^-3\gamma$

[1] From the decay mode $\eta' \to \eta\pi^+\pi^-$, $\eta \to \gamma\gamma$.
NODE=M004R;LINKAGE=E1

[2] Superseded by AKHMETSHIN 00B.
NODE=M004R;LINKAGE=KS

$\Gamma(\eta\pi^0\pi^0\gamma)/\Gamma_{total}$ — Γ_{25}/Γ

NODE=M004R36
NODE=M004R36

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
<2	90	AULCHENKO 98	SND	$e^+e^- \to 7\gamma$

$\Gamma(\mu^+\mu^-\gamma)/\Gamma_{total}$ — Γ_{26}/Γ

NODE=M004R35
NODE=M004R35

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
1.43±0.45±0.14	27188	[1] AKHMETSHIN 99B	CMD2	$e^+e^- \to \mu^+\mu^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.3 ±1.0	824 ± 33	[2] AKHMETSHIN 97C	CMD2	$e^+e^- \to \mu^+\mu^-\gamma$

[1] For $E_\gamma > 20$ MeV. Supersedes AKHMETSHIN 97C.
NODE=M004R35;LINKAGE=3N

[2] For $E_\gamma > 20$ MeV.
NODE=M004R35;LINKAGE=A

$\Gamma(\rho\gamma\gamma)/\Gamma_{total}$ — Γ_{27}/Γ

NODE=M004R37
NODE=M004R37

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<1.2	90	AULCHENKO 08	CMD2	$\phi \to \pi^+\pi^-\gamma\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<5	90	AKHMETSHIN 98	CMD2	$e^+e^- \to \pi^+\pi^-\gamma\gamma$

$\Gamma(\eta\pi^+\pi^-)/\Gamma_{total}$ — Γ_{28}/Γ

NODE=M004R38
NODE=M004R38

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
< 1.8	90	AKHMETSHIN 00E	CMD2	$e^+e^- \to \pi^+\pi^-\pi^+\pi^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 6.1	90	AULCHENKO 08	CMD2	$\phi \to \eta\pi^+\pi^-$
<30	90	AKHMETSHIN 98	CMD2	$e^+e^- \to \pi^+\pi^-\gamma\gamma$

$\Gamma(\eta\mu^+\mu^-)/\Gamma_{total}$ — Γ_{29}/Γ

NODE=M004R45
NODE=M004R45

VALUE (units 10^{-6})	CL%	DOCUMENT ID	TECN	COMMENT
<9.4	90	AKHMETSHIN 01	CMD2	$e^+e^- \to \eta e^+e^-$

$\Gamma(\eta U \to \eta e^+e^-)/\Gamma_{total}$ — Γ_{30}/Γ

NODE=M004R01
NODE=M004R01

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1 \times 10^{-6}$	90	[1] BABUSCI 13B	KLOE	1.02 $e^+e^- \to \eta e^+e^-$

[1] For a narrow vector U with mass between 5 and 470 MeV, from the combined analysis of $\eta \to \pi^+\pi^-\pi^0$ and $\eta \to \pi^0\pi^0\pi^0$ from ARCHILLI 12. Measured 90% CL limits as a function of m_U range from 2.2×10^{-8} to 10^{-6}.
NODE=M004R01;LINKAGE=A

$\Gamma(\text{invisible})/\Gamma(K^+K^-)$ — Γ_{31}/Γ_1

NODE=M004R02
NODE=M004R02

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.4 \times 10^{-4}$	90	ABLIKIM 18S	BES3	$J/\psi \to \phi\eta \to \phi\pi^+\pi^-\pi^0$

Lepton Family number (LF) violating modes

NODE=M00422A

$\Gamma(e^\pm\mu^\mp)/\Gamma_{total}$ — Γ_{32}/Γ

NODE=M004R29
NODE=M004R29

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2 \times 10^{-6}$	90	ACHASOV 10A	SND	$e^+e^- \to e^\pm\mu^\mp$

$\Gamma(\pi^+\pi^+e^-e^-)/\Gamma_{total}$ — Γ_{33}/Γ

NODE=M004R05
NODE=M004R05

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.3 × 10^{-5}	90	[1] ABLIKIM	25AK	BES3	$J/\psi \to \phi\eta$

[1] B($\phi \to K^+K^-$) = (49.2 ± 0.5)% was used.

NODE=M004R05;LINKAGE=A

$\pi^+\pi^-\pi^0$ / $\rho\pi$ AMPLITUDE RATIO a_1 IN DECAY OF $\phi \to \pi^+\pi^-\pi^0$

NODE=M004D1

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.

NODE=M004D1

NODE=M004D1

VALUE (units 10^{-2})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
9.1±1.2 OUR AVERAGE						
10.1±4.4±1.7		80k	[1] AKHMETSHIN	06	CMD2	1.017–1.021 $e^+e^- \to \pi^+\pi^-\pi^0$
9.0±1.1±0.6		1.98M	[2,3] ALOISIO	03	KLOE	1.02 $e^+e^- \to \pi^+\pi^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$-6 < a_1 < 6$		500k	[3] ACHASOV	02	SND	$e^+e^- \to \pi^+\pi^-\pi^0$
$-16 < a_1 < 11$	90	9.8k	[1,4] AKHMETSHIN	98	CMD2	$e^+e^- \to \pi^+\pi^-\gamma\gamma$

[1] Dalitz plot analysis taking into account interference between the contact and $\rho\pi$ amplitudes.

NODE=M004D1;LINKAGE=AK

[2] From a fit without limitations on charged and neutral ρ masses and widths.

NODE=M004D;LINKAGE=L1

[3] Recalculated by us to match the notations of AKHMETSHIN 98.

NODE=M004D;LINKAGE=L3

[4] Assuming zero phase for the contact term.

NODE=M004D1;LINKAGE=KL

PARAMETER β IN $\phi \to Pe^+e^-$ DECAYS

NODE=M004230

In the one-pole approximation the electromagnetic transition form factor for $\phi \to Pe^+e^-$ ($P = \pi,\eta$) is given as a function of the e^+e^- invariant mass squared, q^2, by the expression:

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

where vector meson dominance predicts parameter $\Lambda \approx 0.770$ GeV ($\Lambda^{-2} \approx 1.687$ GeV^{-2}). The slope of this form factor, $\beta = \mathrm{d}F/\mathrm{d}q^2(q^2{=}0)$, equals Λ^{-2} in this approximation.

The measurements below obtain β in the one-pole approximation.

NODE=M004230

PARAMETER β IN $\phi \to \pi^0e^+e^-$ DECAY

NODE=M004A00
NODE=M004A00

VALUE (GeV^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
2.02±0.11	9.5k	[1] ANASTASI	16B	KLOE	1.02 $e^+e^- \to \pi^0e^+e^-$

[1] The error combines statistical and systematic uncertainties.

NODE=M004A00;LINKAGE=A

PARAMETER β IN $\phi \to \eta e^+e^-$ DECAY

NODE=M004BFP
NODE=M004BFP

VALUE (GeV^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.29±0.13 OUR AVERAGE					
$1.28 \pm 0.10^{+0.09}_{-0.08}$	30k	BABUSCI	15	KLOE	1.02 $e^+e^- \to \eta e^+e^-$
3.8 ±1.8	213	[1] ACHASOV	01B	SND	1.02 $e^+e^- \to \eta e^+e^-$

[1] The uncertainty is statistical only. The systematic one is negligible, in comparison.

NODE=M004BFP;LINKAGE=A

$\phi(1020)$ REFERENCES

NODE=M004

ABLIKIM 25A PRL 134 011904 M. Ablikim *et al.* (BESIII Collab.) REFID=63174
ABLIKIM 25AK CP C49 043001 M. Ablikim *et al.* (BESIII Collab.) REFID=63282
ABLIKIM 25F PRL 134 201902 M. Ablikim *et al.* (BESIII Collab.) REFID=63247
DRUZHININ 25 PPN 56 405 V.P. Druzhinin *et al.* (SND Collab.) REFID=63287
AAIJ 24B JHEP 2405 293 R. Aaij *et al.* (LHCb Collab.) REFID=62690
ACHASOV 24 PR D110 072001 M.N. Achasov *et al.* (SND Collab.) REFID=63024
DUBNICKA 24 PR D110 054019 S. Dubnicka *et al.* (SLOV, CMNS) REFID=63023
IGNATOV 24 PR D109 112002 F.V. Ignatov *et al.* (CMD-3 Collab.) REFID=62672
PDG 22 PTEP 2022 083C01 R.L. Workman *et al.* (PDG Collab.) REFID=61634
ABLIKIM 21AE PR D104 012016 M. Ablikim *et al.* (BESIII Collab.) REFID=61367
ABLIKIM 21U PR D104 032011 M. Ablikim *et al.* (BESIII Collab.) REFID=61155
LEES 21B PR D104 112003 J.P. Lees *et al.* (BABAR Collab.) REFID=61450
ALBRECHT 20 EPJ C80 453 M. Albrecht *et al.* (Crystal Barrel Collab.) REFID=60439
HOID 20 EPJ C80 988 B.-L. Hoid, M. Hoferichter, B. Kubis (BONN, BERN) REFID=61048
AAIJ 19H JHEP 1904 063 R. Aaij *et al.* (LHCb Collab.) REFID=59670
HOFERICHT... 19 JHEP 1908 137 M. Hoferichter, B.-L. Hoid, B. Kubis (WASH, BONN) REFID=60974
ABLIKIM 18S PR D98 032001 M. Ablikim *et al.* (BESIII Collab.) REFID=58971
AOUDE 18 PR D98 056021 R.T. Aoude *et al.* REFID=59987
KOZYREV 18 PL B779 64 E.A. Kozyrev *et al.* (CMD-3 Collab.) REFID=58794
AKHMETSHIN 17 PL B768 345 R.R. Akhmetshin *et al.* (CMD-3 Collab.) REFID=57893

ACHASOV	16A	PR D93 092001	M.N. Achasov *et al.*	(SND Collab.)	REFID=57513
ANASTASI	16B	PL B757 362	A. Anastasi *et al.*	(KLOE-2 Collab.)	REFID=57399
KOZYREV	16	PL B760 314	E.A. Kozyrev *et al.*	(CMD-3 Collab.)	REFID=57514
BABUSCI	15	PL B742 1	D. Babusci *et al.*	(KLOE-2 Collab.)	REFID=56374
PDG	15	RPP 2015 at pdg.lbl.gov		(PDG Collab.)	REFID=56977;ERROR=1
LEES	14H	PR D89 092002	J.P. Lees *et al.*	(BABAR Collab.)	REFID=55940
PDG	14	CP C38 070001	K. Olive *et al.*	(PDG Collab.)	REFID=55687
BABUSCI	13B	PL B720 111	D. Babusci *et al.*	(KLOE-2 Collab.)	REFID=55068
BENAYOUN	13	EPJ C73 2453	M. Benayoun, P. David, L. DelBuono	(PARIN, BERLIN+)	REFID=55357
LEES	13F	PR D87 052010	J.P. Lees *et al.*	(BABAR Collab.)	REFID=55127
LEES	13Q	PR D88 032013	J.P. Lees *et al.*	(BABAR Collab.)	REFID=55404
ARCHILLI	12	PL B706 251	F. Archilli *et al.*	(KLOE-2 Collab.)	REFID=53951
BENAYOUN	12	EPJ C72 1848	M. Benayoun *et al.*		REFID=54281
NIECKNIG	12	EPJ C72 2014	F. Niecknig, B. Kubis, S.P. Schneider	(BONN)	REFID=54305
PDG	12	PR D86 010001	J. Beringer *et al.*	(PDG Collab.)	REFID=54066
AKHMETSHIN	11	PL B695 412	R.R. Akhmetshin *et al.*	(CMD-2 Collab.)	REFID=53645
ACHASOV	10A	PR D81 057102	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=53352
BENAYOUN	10	EPJ C65 211	M. Benayoun *et al.*		REFID=53212
AMBROSINO	09C	PL B679 10	F. Ambrosino *et al.*	(KLOE Collab.)	REFID=52969
AMBROSINO	09F	PL B681 5	F. Ambrosino *et al.*	(KLOE Collab.)	REFID=53105
AKHMETSHIN	08	PL B669 217	R.R. Akhmetshin *et al.*	(CMD-2 Collab.)	REFID=52572
AMBROSINO	08G	PL B669 223	F. Ambrosino *et al.*	(KLOE Collab.)	REFID=52573
AULCHENKO	08	JETPL 88 85	V. Aulchenko *et al.*	(CMD-2 Collab.)	REFID=52268
		Translated from ZETFP 88 93.			
FLOREZ-BAEZ	08	PR D78 077301	F.V. Florez-Baez, G. Lopez Castro		REFID=52584
ACHASOV	07B	PR D76 077101	M.N. Achasov *et al.*	(SND Collab.)	REFID=51942
AMBROSINO	07	EPJ C49 473	F. Ambrosino *et al.*	(KLOE Collab.)	REFID=51616
AMBROSINO	07A	PL B648 267	F. Ambrosino *et al.*	(KLOE Collab.)	REFID=51646
DUBYNSKIY	07	PR D75 113001	S. Dubynskiy *et al.*		REFID=51719
ACHASOV	06A	PR D74 014016	M.N. Achasov *et al.*	(SND Collab.)	REFID=51133
AKHMETSHIN	06	PL B642 203	R.R. Akhmetshin *et al.*	(CMD-2 Collab.)	REFID=51465
AKHMETSHIN	05	PL B605 26	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=50330
AMBROSINO	05	PL B608 199	F. Ambrosino *et al.*	(KLOE Collab.)	REFID=50453
AUBERT,B	05J	PR D72 052008	B. Aubert *et al.*	(BABAR Collab.)	REFID=50824
AKHMETSHIN	04	PL B578 285	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=49609
AUBERT,B	04N	PR D70 072004	B. Aubert *et al.*	(BABAR Collab.)	REFID=50184
ALOISIO	03	PL B561 55	A. Aloisio *et al.*	(KLOE Collab.)	REFID=49404
AULCHENKO	03B	JETP 97 24	V.M. Aulchenko *et al.*	(Novosibirsk SND Collab.)	REFID=49613
		Translated from ZETF 124 28.			
ACHASOV	02	PR D65 032002	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=48549
ACHASOV	02D	JETPL 75 449	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=48814
		Translated from ZETFP 75 539.			
ALOISIO	02C	PL B536 209	A. Aloisio *et al.*	(KLOE Collab.)	REFID=48823
ALOISIO	02D	PL B537 21	A. Aloisio *et al.*	(KLOE Collab.)	REFID=48824
ALOISIO	02E	PL B541 45	A. Aloisio *et al.*	(KLOE Collab.)	REFID=48825
FISCHBACH	02	PL B526 355	E. Fischbach, A.W. Overhauser, B. Woodahl		REFID=48575
GOKALP	02	JP G28 2783	A. Gokalp *et al.*		REFID=49167
ACHASOV	01B	PL B504 275	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=48111
ACHASOV	01E	PR D63 072002	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=48311
ACHASOV	01F	PR D63 094007	N.N. Achasov, V.V. Gubin	(Novosibirsk SND Collab.)	REFID=48312
ACHASOV	01G	PRL 86 1698	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=48315
AITALA	01B	PRL 86 770	E.M. Aitala *et al.*	(FNAL E791 Collab.)	REFID=48005
AKHMETSHIN	01	PL B501 191	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=48110
AKHMETSHIN	01B	PL B509 217	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=48167
AKHMETSHIN	01C	PL B503 237	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=48323
BENAYOUN	01	EPJ C22 503	M. Benayoun, H.B. O'Connell		REFID=48570
ACHASOV	00	EPJ C12 25	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=47417
ACHASOV	00B	JETP 90 17	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=47425
		Translated from ZETF 117 22.			
ACHASOV	00C	PL B474 188	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=47431
ACHASOV	00D	JETPL 72 282	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=47882
		Translated from ZETFP 72 411.			
ACHASOV	00E	NP B569 158	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=47927
ACHASOV	00F	PL B479 53	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=47928
ACHASOV	00H	PL B485 349	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=47930
AKHMETSHIN	00B	PL B473 337	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=47422
AKHMETSHIN	00E	PL B491 81	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=47936
AKHMETSHIN	00F	PL B494 26	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=47937
AULCHENKO	00A	JETP 90 927	V.M. Aulchenko *et al.*	(Novosibirsk SND Collab.)	REFID=47953
		Translated from ZETF 117 1067.			
BRAMON	00	PL B486 406	A. Bramon *et al.*		REFID=47969
PDG	00	EPJ C15 1	D.E. Groom *et al.*	(PDG Collab.)	REFID=47469
ACHASOV	99	PL B449 122	M.N. Achasov *et al.*		REFID=46896
ACHASOV	99C	PL B456 304	M.N. Achasov *et al.*		REFID=46939
AKHMETSHIN	99B	PL B462 371	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=47392
AKHMETSHIN	99C	PL B462 380	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=47393
AKHMETSHIN	99D	PL B466 385	R.R. Akhmetshin *et al.*		REFID=47397
Also		PL B508 217 (errat.)	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=48328
AKHMETSHIN	99F	PL B460 242	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=47473
AULCHENKO	99	JETPL 69 97	V.M. Aulchenko *et al.*		REFID=46920
		Translated from ZETFP 69 87.			
ACHASOV	98B	PL B438 441	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=46317
ACHASOV	98F	JETPL 68 573	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=46321
ACHASOV	98I	PL B440 442	M.N. Achasov *et al.*		REFID=46600
AKHMETSHIN	98	PL B434 426	R.R. Akhmetshin *et al.*	(CMD-2 Collab.)	REFID=46325
AULCHENKO	98	PL B436 199	V.M. Aulchenko *et al.*	(Novosibirsk SND Collab.)	REFID=46336
BARBERIS	98	PL B432 436	D. Barberis *et al.*	(Omega Expt.)	REFID=46344
AKHMETSHIN	97B	PL B415 445	R.R. Akhmetshin *et al.*	(NOVO, BOST, PITT+)	REFID=45801
AKHMETSHIN	97C	PL B415 452	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=45802
BENAYOUN	96	ZPHY C72 221	M. Benayoun *et al.*	(IPNP, NOVO)	REFID=45753
AKHMETSHIN	95	PL B364 199	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=44617
DOLINSKY	91	PRPL 202 99	S.I. Dolinsky *et al.*	(NOVO)	REFID=41369
KUHN	90	ZPHY C48 445	J.H. Kuhn *et al.*	(MPIM)	REFID=45862
ACHASOV	89	NP B315 465	N.N. Achasov, V.N. Ivanchenko		REFID=48021
DOLINSKY	89	ZPHY C42 511	S.I. Dolinsky *et al.*	(NOVO)	REFID=41003
BARKOV	88	SJNP 47 248	L.M. Barkov *et al.*	(NOVO)	REFID=41024
		Translated from YAF 47 393.			
DOLINSKY	88	SJNP 48 277	S.I. Dolinsky *et al.*	(NOVO)	REFID=41022
		Translated from YAF 48 442.			

DRUZHININ	87	ZPHY C37 1	V.P. Druzhinin *et al.*	(NOVO)	REFID=40448
ARMSTRONG	86	PL 166B 245	T.A. Armstrong *et al.*	(ATHU, BARI, BIRM+)	REFID=20563
ATKINSON	86	ZPHY C30 521	M. Atkinson *et al.*	(BONN, CERN, GLAS+)	REFID=20564
BEBEK	86	PRL 56 1893	C. Bebek *et al.*	(CLEO Collab.)	REFID=11540
DAVENPORT	86	PR D33 2519	T.F. Davenport	(TUFTS, ARIZ, FNAL, FSU, NDAM+)	REFID=20567
DIJKSTRA	86	ZPHY C31 375	H. Dijkstra *et al.*	(ANIK, BRIS, CERN+)	REFID=20568
FRAME	86	NP B276 667	D. Frame *et al.*	(GLAS)	REFID=20569
GOLUBEV	86	SJNP 44 409	V.B. Golubev *et al.*	(NOVO)	REFID=40449
		Translated from YAF 44 633.			
ALBRECHT	85D	PL 153B 343	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=20562
GOLUBEV	85	SJNP 41 756	V.B. Golubev *et al.*	(NOVO)	REFID=40450
		Translated from YAF 41 1183.			
DRUZHININ	84	PL 144B 136	V.P. Druzhinin *et al.*	(NOVO)	REFID=20561
ARMSTRONG	83B	NP B224 193	T.A. Armstrong *et al.*	(BARI, BIRM, CERN+)	REFID=20558
BARATE	83	PL 121B 449	R. Barate *et al.*	(SACL, LOIC, SHMP, IND)	REFID=12177
KURDADZE	83C	JETPL 38 366	L.M. Kurdadze *et al.*	(NOVO)	REFID=20560
		Translated from ZETFP 38 306.			
ARENTON	82	PR D25 2241	M.W. Arenton *et al.*	(ANL, ILL)	REFID=20556
PELLINEN	82	PS 25 599	A. Pellinen, M. Roos	(HELS)	REFID=20557
DAUM	81	PL 100B 439	C. Daum *et al.*	(AMST, BRIS, CERN, CRAC+)	REFID=20552
IVANOV	81	PL 107B 297	P.M. Ivanov *et al.*	(NOVO)	REFID=20553
Also		Private Comm.	S.I. Eidelman	(NOVO)	REFID=20554
VASSERMAN	81	PL 99B 62	I.B. Vasserman *et al.*	(NOVO)	REFID=20555
Also		SJNP 35 240	L.M. Kurdadze *et al.*		REFID=47475
		Translated from YAF 35 352.			
CORDIER	80	NP B172 13	A. Cordier *et al.*	(LALO)	REFID=20240
CORDIER	79	PL 81B 389	A. Cordier *et al.*	(LALO)	REFID=20549
BUKIN	78B	SJNP 27 521	A.D. Bukin *et al.*	(NOVO)	REFID=20545
		Translated from YAF 27 985.			
BUKIN	78C	SJNP 27 516	A.D. Bukin *et al.*	(NOVO)	REFID=20544
		Translated from YAF 27 976.			
COOPER	78B	NP B146 1	A.M. Cooper *et al.*	(TATA, CERN, CDEF+)	REFID=20235
LOSTY	78	NP B133 38	M.J. Losty *et al.*	(CERN, AMST, NIJM+)	REFID=20547
AKERLOF	77	PRL 39 861	C.W. Akerlof *et al.*	(FNAL, MICH, PURD)	REFID=20534
ANDREWS	77	PRL 38 198	D.E. Andrews *et al.*	(ROCH)	REFID=20120
BALDI	77	PL 68B 381	R. Baldi *et al.*	(GEVA)	REFID=20536
CERRADA	77B	NP B126 241	M. Cerrada *et al.*	(AMST, CERN, NIJM+)	REFID=20537
COHEN	77	PRL 38 269	D. Cohen *et al.*	(ANL)	REFID=20538
LAVEN	77	NP B127 43	H. Laven *et al.*	(AACH3, BERL, CERN, LOIC+)	REFID=20541
LYONS	77	NP B125 207	L. Lyons, A.M. Cooper, A.G. Clark	(OXF)	REFID=20232
COSME	76	PL 63B 352	G. Cosme *et al.*	(ORSAY)	REFID=20529
KALBFLEISCH	76	PR D13 22	G.R. Kalbfleisch, R.C. Strand, J.W. Chapman	(BNL+)	REFID=20531
PARROUR	76	PL 63B 357	G. Parrour *et al.*	(ORSAY)	REFID=20532
PARROUR	76B	PL 63B 362	G. Parrour *et al.*	(ORSAY)	REFID=20533
KALBFLEISCH	75	PR D11 987	G.R. Kalbfleisch, R.C. Strand, J.W. Chapman	(BNL+)	REFID=20223
AYRES	74	PRL 32 1463	D.S. Ayres *et al.*	(ANL)	REFID=20522
BESCH	74	NP B70 257	H.J. Besch *et al.*	(BONN)	REFID=20523
COSME	74	PL 48B 155	G. Cosme *et al.*	(ORSAY)	REFID=20525
COSME	74B	PL 48B 159	G. Cosme *et al.*	(ORSAY)	REFID=20526
DEGROOT	74	NP B74 77	A.J. de Groot *et al.*	(AMST, NIJM)	REFID=20527
AUGUSTIN	73	PRL 30 462	J.E. Augustin *et al.*	(ORSAY)	REFID=47515
BALLAM	73	PR D7 3150	J. Ballam *et al.*	(SLAC, LBL)	REFID=20520
BINNIE	73B	PR D8 2789	D.M. Binnie *et al.*	(LOIC, SHMP)	REFID=20216
AGUILAR-...	72B	PR D6 29	M. Aguilar-Benitez *et al.*	(BNL)	REFID=20205
ALVENSLEB...	72	PRL 28 66	H. Alvensleben *et al.*	(MIT, DESY)	REFID=20514
BORENSTEIN	72	PR D5 1559	S.R. Borenstein *et al.*	(BNL, MICH)	REFID=20215
COLLEY	72	NP B50 1	D.C. Colley *et al.*	(BIRM, GLAS)	REFID=20519
BALAKIN	71	PL 34B 328	V.E. Balakin *et al.*	(NOVO)	REFID=20507
CHATELUS	71	Thesis LAL 1247	Y. Chatelus	(STRB)	REFID=20508
Also		PL 32B 416	J.C. Bizot *et al.*	(ORSAY)	REFID=20501
HAYES	71	PR D4 899	S. Hayes *et al.*	(CORN)	REFID=20511
STOTTLE...	71	Thesis ORO 2504 170	A.R. Stottlemyer	(UMD)	REFID=20512
BIZOT	70	PL 32B 416	J.C. Bizot *et al.*	(ORSAY)	REFID=20501
Also		Liverpool Sym. 69	J.P. Perez-y-Jorba		REFID=20502
EARLES	70	PRL 25 1312	D.R. Earles *et al.*	(NEAS)	REFID=20504
GOUNARIS	68	PRL 21 244	G.J. Gounaris, J.J. Sakurai		REFID=48054
LINDSEY	66	PR 147 913	J.S. Lindsey, G. Smith	(LRL)	REFID=20481
LONDON	66	PR 143 1034	G.W. London *et al.*	(BNL, SYRA) IGJPC	REFID=11774
BADIER	65B	PL 17 337	J. Badier *et al.*	(EPOL, SACL, AMST)	REFID=20253
LINDSEY	65	PRL 15 221	J.S. Lindsey, G.A. Smith	(LRL)	REFID=20478
LINDSEY 65 data included in LINDSEY 66.					
SCHLEIN	63	PRL 10 368	P.E. Schlein *et al.*	(UCLA) IGJP	REFID=20474