Reference = ACHASOV 16A; PR D93 092001
Verifier code = DRUZHININ

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis coordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Vladimir P. Druzhinin

EMAIL: v.p.druzhinin@inp.nsk.su

March 20, 2017

Dear Colleague,

(1) Please check the results of your experiment carefully. They are marked.

(2) Please reply within one week.

(3) Please reply even if everything is correct.

(4) IMPORTANT!! Please tell WHICH papers you are verifying. We have lots of requests out.

(5) Feel free to make comments on our treatment of any of the results (not just yours) you see.

Thank you for helping us make the Review accurate and useful.

Sincerely,

Simon Eidelman
BINP, Budker Inst. of Nuclear Physics
Prospekt Lavrent'eva 11
RU-630090 Novosibirsk
Russian Federation

EMAIL: simon.eidelman@cern.ch

LIGHT UNFLAVORED MESONS ($S = C = B = 0$)

NODE=MXXX005

For $I = 1$ (π, b, ρ, a): $u\overline{d}$, $(u\overline{u}-d\overline{d})/\sqrt{2}$, $d\overline{u}$;
for $I = 0$ (η, η', h, h', ω, ϕ, f, f'): $c_1(u\overline{u} + d\overline{d}) + c_2(s\overline{s})$

NODE=MXXX005

NODE=M009

$\rho(770)$

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

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

NODE=M009233

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

NODE=M009G2
NODE=M009G2

VALUE (units 10^{-8})	EVTS	DOCUMENT ID		TECN	COMMENT
2.22 ±0.26 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.			
YOUR DATA 1.98 ±0.22 ±0.10		[1] ACHASOV	16A	SND	0.60-1.38 $e^+e^- \to \pi^0\gamma$
2.90 $^{+0.60}_{-0.55}$ ±0.18	18k	AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \pi^0\gamma$
2.37 ±0.53 ±0.33	36k	[2] ACHASOV	03	SND	0.60–0.97 $e^+e^- \to \pi^0\gamma$
3.61 ±0.74 ±0.49	10k	[3] DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.875±0.026		[4] BENAYOUN	10	RVUE	0.4–1.05 e^+e^-

YOUR NOTE

[1] From the VMD model with the prho(770), $\omega(782)$, $\phi(1020)$ resonances, and an additional resonance describing the total contribution of the $\rho(1450)$ and $\omega(1420)$ states. Supersedes ACHASOV 03.

NODE=M009G2;LINKAGE=B

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

NODE=M009G;LINKAGE=SH

[3] Recalculated by us from the cross section in the peak.

NODE=M009G2;LINKAGE=LP

[4] A simultaneous fit of $e^+e^- \to \pi^+\pi^-$, $\pi^+\pi^-\pi^0$, $\pi^0\gamma$, $\eta\gamma$ data.

NODE=M009G2;LINKAGE=BE

$\rho(770)$ BRANCHING RATIOS

NODE=M009235

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

NODE=M009R9
NODE=M009R9

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA 4.20±0.52		[1] ACHASOV	16A	SND	0.60–1.38 $e^+e^- \to \pi^0\gamma$
6.21 $^{+1.28}_{-1.18}$ ±0.39	18k	[2,3] AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \pi^0\gamma$
5.22±1.17±0.75	36k	[3,4] ACHASOV	03	SND	0.60–0.97 $e^+e^- \to \pi^0\gamma$
6.8 ±1.7		[5] BENAYOUN	96	RVUE	0.54-1.04 $e^+e^- \to \pi^0\gamma$
7.9 ±2.0		[3] DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$

YOUR NOTE

[1] Using B($\rho \to e^+e^-$) from PDG 15. Supersedes ACHASOV 03.

NODE=M009R9;LINKAGE=C

[2] Using B($\rho \to e^+e^-$) = $(4.67 \pm 0.09) \times 10^{-5}$.

NODE=M009R9;LINKAGE=AK

[3] Not independent of the corresponding $\Gamma(e^+e^-) \times \Gamma(\pi^0\gamma)/\Gamma^2_{\mathrm{total}}$.

NODE=M009R9;LINKAGE=BZ

[4] Using B($\rho \to e^+e^-$) = $(4.54 \pm 0.10) \times 10^{-5}$.

NODE=M009R9;LINKAGE=AS

[5] Reanalysis of DRUZHININ 84, DOLINSKY 89, and DOLINSKY 91 taking into account a triangle anomaly contribution.

NODE=M009R9;LINKAGE=A

$\rho(770)$ REFERENCES

NODE=M009

YOUR PAPER

ACHASOV	16A	PR D93 092001	M.N. Achasov *et al.*	(SND Collab.)
PDG	15	RPP 2015 at pdg.lbl.gov		(PDG Collab.)
BENAYOUN	10	EPJ C65 211	M. Benayoun *et al.*	
AKHMETSHIN	05	PL B605 26	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
ACHASOV	03	PL B559 171	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
ACHASOV	00	EPJ C12 25	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)
BENAYOUN	96	ZPHY C72 221	M. Benayoun *et al.*	(IPNP, NOVO)
DOLINSKY	91	PRPL 202 99	S.I. Dolinsky *et al.*	(NOVO)
DOLINSKY	89	ZPHY C42 511	S.I. Dolinsky *et al.*	(NOVO)
DRUZHININ	84	PL 144B 136	V.P. Druzhinin *et al.*	(NOVO)

REFID=57513
REFID=56977;ERROR=2
REFID=53212
REFID=50330
REFID=49187
REFID=47417
REFID=45753
REFID=41369
REFID=41003
REFID=20561

NODE=M001

$\omega(782)$

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

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

NODE=M001225

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

NODE=M001G4
NODE=M001G4

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
6.37 ±0.09 OUR AVERAGE					
YOUR DATA 6.336±0.056±0.089		[1] ACHASOV	16A	SND	0.60–1.38 $e^+e^- \to \pi^0\gamma$
6.47 ±0.14 ±0.39	18k	AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \pi^0\gamma$
6.50 ±0.11 ±0.20	36k	[2] ACHASOV	03	SND	0.60–0.97 $e^+e^- \to \pi^0\gamma$
6.34 ±0.21 ±0.21	10k	[3] DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
6.80 ±0.13		[4] BENAYOUN	10	RVUE	0.4–1.05 e^+e^-

YOUR NOTE

[1] From the VMD model with the interfering $\rho(770)$, $\omega(782)$, $\phi(1020)$, and an additional resonance describing the total contribution of the $\rho(1450)$ and $\omega(1420)$ states. Supersedes ACHASOV 03.

NODE=M001G4;LINKAGE=A

[2] 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 $(-10.2 \pm 7.0)^\circ$.

NODE=M001G;LINKAGE=SH

[3] Recalculated by us from the cross section in the peak.

NODE=M001G4;LINKAGE=LP

[4] A simultaneous fit of $e^+e^- \to \pi^+\pi^-$, $\pi^+\pi^-\pi^0$, $\pi^0\gamma$, $\eta\gamma$ data.

NODE=M001G4;LINKAGE=BE

$\omega(782)$ BRANCHING RATIOS

NODE=M001220

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

NODE=M001R28
NODE=M001R28

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA 8.88±0.18		[1] ACHASOV	16A	SND	0.60–1.38 $e^+e^- \to \pi^0\gamma$
8.09±0.14		[2] AMBROSINO	08G	KLOE	$e^+e^- \to \pi^+\pi^-2\pi^0$, $2\pi^0\gamma$
9.06±0.20±0.57	18k	[3,4] AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \pi^0\gamma$
9.34±0.15±0.31	36k	[4] ACHASOV	03	SND	0.60–0.97 $e^+e^- \to \pi^0\gamma$
8.65±0.16±0.42	1.2M	[5,6] ACHASOV	03D	RVUE	0.44–2.00 $e^+e^- \to \pi^+\pi^-\pi^0$
8.39±0.24	9k	[7] BENAYOUN	96	RVUE	$e^+e^- \to \pi^0\gamma$
8.88±0.62	10k	[4] DOLINSKY	89	ND	$e^+e^- \to \pi^0\gamma$

YOUR NOTE

[1] Using B($\omega \to e^+e^-$) from PDG 15. Supersedes ACHASOV 03.

NODE=M001R28;LINKAGE=A

[2] Not independent of $\Gamma(\pi^0\gamma)$ / $\Gamma(\pi^+\pi^-\pi^0)$ from AMBROSINO 08G.

NODE=M001R28;LINKAGE=AM

[3] Using B($\omega \to e^+e^-$)= $(7.14 \pm 0.13) \times 10^{-5}$.

NODE=M001R;LINKAGE=AH

[4] Not independent of the corresponding $\Gamma(e^+e^-) \times \Gamma(\pi^0\gamma)/\Gamma^2_{\text{total}}$.

NODE=M001R;LINKAGE=VL

[5] Using ACHASOV 03, ACHASOV 03D and B($\omega \to \pi^+\pi^-$) = (1.70 ± 0.28)%.

NODE=M001R28;LINKAGE=VF

[6] Not independent of the corresponding $\Gamma(e^+e^-) \times \Gamma(\pi^+\pi^-\pi^0)/\Gamma^2_{\text{total}}$.

NODE=M001R28;LINKAGE=ZL

[7] Reanalysis of DRUZHININ 84, DOLINSKY 89, DOLINSKY 91 taking into account the triangle anomaly contributions.

NODE=M001R28;LINKAGE=A1

$\omega(782)$ REFERENCES

NODE=M001

YOUR PAPER ACHASOV	16A	PR D93 092001	M.N. Achasov *et al.*	(SND Collab.)	REFID=57513
PDG	15	RPP 2015 at pdg.lbl.gov		(PDG Collab.)	REFID=56977;ERROR=3
BENAYOUN	10	EPJ C65 211	M. Benayoun *et al.*		REFID=53212
AMBROSINO	08G	PL B669 223	F. Ambrosino *et al.*	(KLOE Collab.)	REFID=52573
AKHMETSHIN	05	PL B605 26	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=50330
ACHASOV	03	PL B559 171	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=49187
ACHASOV	03D	PR D68 052006	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=49577
ACHASOV	00	EPJ C12 25	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=47417
BENAYOUN	96	ZPHY C72 221	M. Benayoun *et al.*	(IPNP, NOVO)	REFID=45753
DOLINSKY	91	PRPL 202 99	S.I. Dolinsky *et al.*	(NOVO)	REFID=41369
DOLINSKY	89	ZPHY C42 511	S.I. Dolinsky *et al.*	(NOVO)	REFID=41003
DRUZHININ	84	PL 144B 136	V.P. Druzhinin *et al.*	(NOVO)	REFID=20561

NODE=M004

$\phi(1020)$

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

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

NODE=M004224

$\Gamma(\pi^0\gamma)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_7/\Gamma \times \Gamma_9/\Gamma$

NODE=M004G3
NODE=M004G3

VALUE (units 10^{-7})	EVTS	DOCUMENT ID		TECN	COMMENT
3.87±0.15 OUR AVERAGE					
YOUR DATA 4.04±0.09±0.19		[1] ACHASOV	16A	SND	0.60–1.38 $e^+e^- \to \pi^0\gamma$
3.75±0.11±0.29	18k	AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \pi^0\gamma$

$3.67 \pm 0.10^{+0.27}_{-0.25}$		[2] ACHASOV	00	SND	$e^+e^- \to \pi^0\gamma$		ERROR=4
• • • We do not use the following data for averages, fits, limits, etc. • • •							
4.29 ± 0.11		[3] BENAYOUN	10	RVUE	0.4–1.05 e^+e^-		

YOUR NOTE

[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

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

[2] 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

$\phi(1020)$ BRANCHING RATIOS

NODE=M004220

$\Gamma(\pi^0\gamma)/\Gamma_{total}$ Γ_7/Γ

NODE=M004R17

VALUE (units 10^{-3})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*	
1.31 ±0.13 OUR AVERAGE						NODE=M004R17
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 $e^+e^- \to \pi^0\gamma$	OCCUR=3
1.258 ±0.037 ±0.077	18k	[2,3] AKHMETSHIN	05	CMD2	0.60-1.38 $e^+e^- \to \pi^0\gamma$	ERROR=5
$1.226 \pm 0.036^{+0.096}_{-0.089}$		[4] ACHASOV	00	SND	$e^+e^- \to \pi^0\gamma$	
1.26 ±0.17		[5] BENAYOUN	96	RVUE	0.54-1.04 $e^+e^- \to \pi^0\gamma$	

YOUR NOTE

[1] Using $B(\phi \to e^+e^-)$ from PDG 15. Supersedes ACHASOV 00. — NODE=M004R17;LINKAGE=D

[5] Reanalysis of DRUZHININ 84, DOLINSKY 89, and DOLINSKY 91 taking into account a triangle anomaly contribution. — NODE=M004R;LINKAGE=TS

[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

$\phi(1020)$ REFERENCES

NODE=M004

YOUR PAPER

ACHASOV	16A	PR D93 092001	M.N. Achasov *et al.*	(SND Collab.)	REFID=57513
PDG	15	RPP 2015 at pdg.lbl.gov		(PDG Collab.)	REFID=56977;ERROR=6
BENAYOUN	10	EPJ C65 211	M. Benayoun *et al.*		REFID=53212
AKHMETSHIN	05	PL B605 26	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=50330
ACHASOV	00	EPJ C12 25	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=47417
BENAYOUN	96	ZPHY C72 221	M. Benayoun *et al.*	(IPNP, NOVO)	REFID=45753
DOLINSKY	91	PRPL 202 99	S.I. Dolinsky *et al.*	(NOVO)	REFID=41369
DOLINSKY	89	ZPHY C42 511	S.I. Dolinsky *et al.*	(NOVO)	REFID=41003
DRUZHININ	84	PL 144B 136	V.P. Druzhinin *et al.*	(NOVO)	REFID=20561
COSME	76	PL 63B 352	G. Cosme *et al.*	(ORSAY)	REFID=20529