Reference = LEES 12F; PR D86 012008
Verifier code = BABAR

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis co-ordinator, 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

Fabio Anulli

EMAIL: anulli@slac.stanford.edu

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=M067

$\phi(1680)$

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

$\phi(1680)$ MASS

NODE=M067205

e^+e^- PRODUCTION

NODE=M067M1
NODE=M067M1

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1680±20 OUR ESTIMATE					→ UNCHECKED ←
1674±12± 6	6264	[1] LEES	14H	BABR	$e^+e^- \to K^0_S K^0_L \gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA 1733±10±10		[2] LEES	12F	BABR	10.6 $e^+e^- \to \phi\pi^+\pi^-\gamma$
1689± 7±10	4.8k	[3] SHEN	09	BELL	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
1709±20±43		[4] AUBERT	08S	BABR	10.6 $e^+e^- \to$ hadrons
1623±20	948	[5] AKHMETSHIN	03	CMD2	1.05–1.38 $e^+e^- \to K^0_L K^0_S$
∼ 1500		[6] ACHASOV	98H	RVUE	$e^+e^- \to \pi^+\pi^-\pi^0$, $\omega\pi^+\pi^-$, K^+K^-
∼ 1900		[7] ACHASOV	98H	RVUE	$e^+e^- \to K^0_S K^\pm\pi^\mp$
1700±20		[8] CLEGG	94	RVUE	$e^+e^- \to K^+K^-$, $K^0_S K\pi$
1657±27	367	BISELLO	91C	DM2	$e^+e^- \to K^0_S K^\pm\pi^\mp$
1655±17		[9] BISELLO	88B	DM2	$e^+e^- \to K^+K^-$
1680±10		[10] BUON	82	DM1	$e^+e^- \to$ hadrons
1677±12		[11] MANE	82	DM1	$e^+e^- \to K^0_S K\pi$

OCCUR=4

[1] Using a vector meson dominance model with contribution from $\phi(1020), \phi(1680)$ and higher mass excitations of $\rho(770)$ and $\omega(782)$. NODE=M067M1;LINKAGE=B

YOUR NOTE [2] Using events with $\pi\pi$ invariant mass less than 0.85 GeV. NODE=M067M1;LINKAGE=A

[3] From a fit with two incoherent Breit-Wigners. NODE=M067M1;LINKAGE=SH

[4] From the simultaneous fit to the $K\overline{K}^*(892)+$ c.c. and $\phi\eta$ data from AUBERT 08S using the results of AUBERT 07AK. NODE=M067M1;LINKAGE=AU

[5] From the combined fit of AKHMETSHIN 03 and MANE 81 also including ρ, ω, and ϕ. Neither isospin nor flavor structure known. NODE=M067M;LINKAGE=HK

[6] Using data from IVANOV 81, BARKOV 87, BISELLO 88B, DOLINSKY 91, and ANTONELLI 92. NODE=M067M1;LINKAGE=L1

[7] Using the data from BISELLO 91C. NODE=M067M1;LINKAGE=L4

[8] Using BISELLO 88B and MANE 82 data. NODE=M067M;LINKAGE=A

[9] From global fit including ρ, ω, ϕ and $\rho(1700)$ assume mass 1570 MeV and width 510 MeV for ρ radial excitation. NODE=M067M;LINKAGE=E

[10] From global fit of ρ, ω, ϕ and their radial excitations to channels $\omega\pi^+\pi^-$, K^+K^-, $K^0_S K^0_L$, $K^0_S K^\pm\pi^\mp$. Assume mass 1570 MeV and width 510 MeV for ρ radial excitations, mass 1570 and width 500 MeV for ω radial excitation. NODE=M067M;LINKAGE=C

[11] Fit to one channel only, neglecting interference with ω, $\rho(1700)$. NODE=M067M;LINKAGE=D

$\phi(1680)$ WIDTH

NODE=M067210

e^+e^- PRODUCTION

NODE=M067W1
NODE=M067W1

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
150±50 OUR ESTIMATE This is only an educated guess; the error given is larger than the error on the average of the published values.					→ UNCHECKED ←
165±38± 70	6264	[14] LEES	14H	BABR	$e^+e^- \to K^0_S K^0_L \gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA 300±15± 37		[15] LEES	12F	BABR	10.6 $e^+e^- \to \phi\pi^+\pi^-\gamma$
211±14± 19	4.8k	[16] SHEN	09	BELL	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
322±77±160		[17] AUBERT	08S	BABR	10.6 $e^+e^- \to$ hadrons
139±60	948	[18] AKHMETSHIN	03	CMD2	1.05–1.38 $e^+e^- \to K^0_L K^0_S$
300±60		[19] CLEGG	94	RVUE	$e^+e^- \to K^+K^-$, $K^0_S K\pi$

146 ± 55	367	BISELLO	91C	DM2	$e^+e^- \to K^0_S K^\pm \pi^\mp$	
207 ± 45		[20] BISELLO	88B	DM2	$e^+e^- \to K^+K^-$	
185 ± 22		[21] BUON	82	DM1	$e^+e^- \to$ hadrons	
102 ± 36		[22] MANE	82	DM1	$e^+e^- \to K^0_S K\pi$	

[14] Using a vector meson dominance model with contribution from $\phi(1020), \phi(1680)$ and higher mass excitations of $\rho(770)$ and $\omega(782)$.
NODE=M067W1;LINKAGE=B

YOUR NOTE

[15] Using events with $\pi\pi$ invariant mass less than 0.85 GeV.
NODE=M067W1;LINKAGE=A

[16] From a fit with two incoherent Breit-Wigners.
NODE=M067W1;LINKAGE=SH

[17] From the simultaneous fit to the $K\overline{K}^*(892)+$ c.c. and $\phi\eta$ data from AUBERT 08S using the results of AUBERT 07AK.
NODE=M067W1;LINKAGE=AU

[18] From the combined fit of AKHMETSHIN 03 and MANE 81 also including ρ, ω, and ϕ. Neither isospin nor flavor structure known.
NODE=M067W;LINKAGE=HK

[19] Using BISELLO 88B and MANE 82 data.
NODE=M067W;LINKAGE=A

[20] From global fit including ρ, ω, ϕ and $\rho(1700)$
NODE=M067W;LINKAGE=E

[21] From global fit of ρ, ω, ϕ and their radial excitations to channels $\omega\pi^+\pi^-$, K^+K^-, $K^0_S K^0_L$, $K^0_S K^\pm\pi^\mp$. Assume mass 1570 MeV and width 510 MeV for ρ radial excitations, mass 1570 and width 500 MeV for ω radial excitation.
NODE=M067W;LINKAGE=C

[22] Fit to one channel only, neglecting interference with ω, $\rho(1700)$.
NODE=M067W;LINKAGE=D

$\phi(1680)$ Γ(i)$\Gamma(e^+e^-)/\Gamma$(total)

NODE=M067220

This combination of a partial width with the partial width into e^+e^- and with the total width is obtained from the integrated cross section into channel (I) in e^+e^- annihilation. We list only data that have not been used to determine the partial width Γ(I) or the branching ratio Γ(I)/total.
NODE=M067220

$\Gamma(\phi\pi\pi) \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_7\Gamma_5/\Gamma$

NODE=M067G02

VALUE (10^{-2} keV)	DOCUMENT ID		TECN	COMMENT
YOUR DATA **$4.2\pm0.2\pm0.3$**	LEES	12F	BABR	10.6 $e^+e^- \to \phi\pi^+\pi^-\gamma$

NODE=M067G02

$\phi(1680)$ REFERENCES

NODE=M067

YOUR PAPER LEES	14H	PR D89 092002	J.P. Lees *et al.*	(BABAR Collab)	REFID=55940
LEES	12F	PR D86 012008	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54298
SHEN	09	PR D80 031101	C.P. Shen *et al.*	(BELLE Collab.)	REFID=53000
AUBERT	08S	PR D77 092002	B. Aubert *et al.*	(BABAR Collab.)	REFID=52242
AUBERT	07AK	PR D76 012008	B. Aubert *et al.*	(BABAR Collab.)	REFID=51908
AKHMETSHIN	03	PL B551 27	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)	REFID=49172
Also		PAN 65 1222	E.V. Anashkin, V.M. Aulchenko, R.R. Akhmetshin		REFID=48827
		Translated from YAF 65 1255.			
ACHASOV	98H	PR D57 4334	N.N. Achasov, A.A. Kozhevnikov		REFID=46323
CLEGG	94	ZPHY C62 455	A.B. Clegg, A. Donnachie	(LANC, MCHS)	REFID=44081
ANTONELLI	92	ZPHY C56 15	A. Antonelli *et al.*	(DM2 Collab.)	REFID=43168
BISELLO	91C	ZPHY C52 227	D. Bisello *et al.*	(DM2 Collab.)	REFID=41867
DOLINSKY	91	PRPL 202 99	S.I. Dolinsky *et al.*	(NOVO)	REFID=41369
BISELLO	88B	ZPHY C39 13	D. Bisello *et al.*	(PADO, CLER, FRAS+)	REFID=40581
BARKOV	87	JETPL 46 164	L.M. Barkov *et al.*	(NOVO)	REFID=40280
		Translated from ZETFP 46 132.			
BUON	82	PL 118B 221	J. Buon *et al.*	(LALO, MONP)	REFID=21494
MANE	82	PL 112B 178	F. Mane *et al.*	(LALO)	REFID=21590
IVANOV	81	PL 107B 297	P.M. Ivanov *et al.*	(NOVO)	REFID=20553
MANE	81	PL 99B 261	F. Mane *et al.*	(ORSAY)	REFID=21588

NODE=M103

$\phi(2170)$

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

Observed by AUBERT,BE 06D in the initial-state radiation process $e^+e^- \to \phi f_0(980)\gamma$.
NODE=M103

$\phi(2170)$ MASS

NODE=M103M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
2188 ± 10 OUR AVERAGE		Error includes scale factor of 1.8. See the ideogram below.			
$2200\pm 6\pm 5$	471	ABLIKIM	15H	BES3	$J/\psi \to \eta\phi\pi^+\pi^-$
YOUR DATA $2180\pm 8\pm 8$		[1,2] LEES	12F	BABR	10.6 $e^+e^- \to \phi\pi^+\pi^-\gamma$
$2186\pm10\pm 6$	52	ABLIKIM	08F	BES	$J/\psi \to \eta\phi f_0(980)$
$2125\pm22\pm10$	483	AUBERT	08S	BABR	10.6 $e^+e^- \to \phi\eta\gamma$

NODE=M103M

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

$2079 \pm 13^{+79}_{-28}$	4.8k	[3] SHEN	09	BELL	10.6	$e^+e^- \to K^+K^-\pi^+\pi^-\gamma$	
2192 ± 14	116	[4] AUBERT	07AK	BABR	10.6	$e^+e^- \to K^+K^-\pi^+\pi^-\gamma$	
2169 ± 20	149	[4] AUBERT	07AK	BABR	10.6	$e^+e^- \to K^+K^-\pi^0\pi^0\gamma$	OCCUR=2
$2175 \pm 10 \pm 15$	201	[2,5] AUBERT,BE	06D	BABR	10.6	$e^+e^- \to K^+K^-\pi\pi\gamma$	

YOUR NOTE [1] Fit includes interference with the $\phi(1680)$. NODE=M103M;LINKAGE=A
YOUR NOTE [2] From the $\phi f_0(980)$ component. NODE=M103M;LINKAGE=AB
[3] From a fit with two incoherent Breit-Wigners. NODE=M103M;LINKAGE=SH
[4] From the K^+K^- $f_0(980)$ component. NODE=M103M;LINKAGE=AU
[5] Superseded by LEES 12F. NODE=M103M;LINKAGE=B

$\phi(2170)$ WIDTH

NODE=M103W

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
83 ± 12 OUR AVERAGE					
$104 \pm 15 \pm 15$	471	ABLIKIM	15H	BES3	$J/\psi \to \eta\phi\pi^+\pi^-$
YOUR DATA $77 \pm 15 \pm 10$		[6,7] LEES	12F	BABR	10.6 $e^+e^- \to \phi\pi^+\pi^-\gamma$
$65 \pm 23 \pm 17$	52	ABLIKIM	08F	BES	$J/\psi \to \eta\phi f_0(980)$
$61 \pm 50 \pm 13$	483	AUBERT	08S	BABR	10.6 $e^+e^- \to \phi\eta\gamma$

NODE=M103W

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

$192 \pm 23^{+25}_{-61}$	4.8k	[8] SHEN	09	BELL	10.6	$e^+e^- \to K^+K^-\pi^+\pi^-\gamma$	
71 ± 21	116	[9] AUBERT	07AK	BABR	10.6	$e^+e^- \to K^+K^-\pi^+\pi^-\gamma$	
102 ± 27	149	[9] AUBERT	07AK	BABR	10.6	$e^+e^- \to K^+K^-\pi^0\pi^0\gamma$	OCCUR=2
$58 \pm 16 \pm 20$	201	[7,10] AUBERT,BE	06D	BABR	10.6	$e^+e^- \to K^+K^-\pi\pi\gamma$	

YOUR NOTE [6] Fit includes interference with the $\phi(1680)$. NODE=M103W;LINKAGE=A
YOUR NOTE [7] From the $\phi f_0(980)$ component. NODE=M103W;LINKAGE=AB
[8] From a fit with two incoherent Breit-Wigners. NODE=M103W;LINKAGE=SH
[9] From the K^+K^- $f_0(980)$ component. NODE=M103W;LINKAGE=AU
[10] Superseded by LEES 12F. NODE=M103W;LINKAGE=B

$\phi(2170)$ Γ(i)$\Gamma(e^+e^-)/\Gamma$(total)

NODE=M103230

$\Gamma(\phi f_0(980)) \times \Gamma(e^+e^-)/\Gamma_{total}$ **$\Gamma_4\Gamma_1/\Gamma$**

NODE=M103G1

VALUE (eV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA **$2.3 \pm 0.3 \pm 0.3$**		[11,12] LEES	12F	BABR	10.6 $e^+e^- \to \phi\pi^+\pi^-\gamma$

NODE=M103G1

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

$2.5 \pm 0.8 \pm 0.4$	201	[12,13] AUBERT,BE	06D	BABR	10.6	$e^+e^- \to K^+K^-\pi\pi\gamma$

YOUR NOTE [11] From a fit with constructive interference with the $\phi(1680)$. In a fit with destructive interference, the value is larger by a factor of 12. NODE=M103G1;LINKAGE=A
YOUR NOTE [12] From the $\phi f_0(980)$ component. NODE=M103G1;LINKAGE=AB
[13] Superseded by LEES 12F. NODE=M103G1;LINKAGE=B

$\phi(2170)$ REFERENCES

NODE=M103

ABLIKIM	15H	PR D91 052017	M. Ablikim *et al.*	(BES III Collab.)	REFID=56773
YOUR PAPER LEES	12F	PR D86 012008	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54298
SHEN	09	PR D80 031101	C.P. Shen *et al.*	(BELLE Collab.)	REFID=53000
ABLIKIM	08F	PRL 100 102003	M. Ablikim *et al.*	(BES Collab.)	REFID=52154
AUBERT	08S	PR D77 092002	B. Aubert *et al.*	(BABAR Collab.)	REFID=52242
AUBERT	07AK	PR D76 012008	B. Aubert *et al.*	(BABAR Collab.)	REFID=51908
AUBERT,BE	06D	PR D74 091103	B. Aubert *et al.*	(BABAR Collab.)	REFID=51511

$c\bar{c}$ MESONS

NODE=MXXX025

NODE=M070

$J/\psi(1S)$

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

$J/\psi(1S)$ Γ(i)$\Gamma(e^+e^-)/\Gamma$(total)

NODE=M070225

This combination of a partial width with the partial width into e^+e^- and with the total width is obtained from the integrated cross section into channel$_I$ in the e^+e^- annihilation.

NODE=M070225

$\Gamma(K^*(892)^0\overline{K}_2^*(1430)^0 + \text{c.c.}) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_{21}\Gamma_5/\Gamma$

NODE=M070G02
NODE=M070G02

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **25.8±1.4±0.6**	710	[1,2,3] LEES	12F	BABR	10.6 $e^+e^- \to \pi^+\pi^- K^+K^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
33 ±4 ±1	317	[2,4] AUBERT	07AK	BABR	10.6 $e^+e^- \to \pi^+\pi^- K^+K^-\gamma$

YOUR NOTE [1] LEES 12F reports $[\Gamma(J/\psi(1S) \to K^*(892)^0\overline{K}_2^*(1430)^0 + \text{c.c.}) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\text{total}}] \times [B(K_2^*(1430) \to K\pi)] = 12.89 \pm 0.54 \pm 0.41$ eV which we divide by our best value $B(K_2^*(1430) \to K\pi) = (49.9 \pm 1.2) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M070G02;LINKAGE=A

YOUR NOTE [2] Dividing by 2/3 to take into account that $B(K^{*0} \to K^+\pi^-) = 2/3\ B(K^{*0} \to K\pi)$. NODE=M070G02;LINKAGE=AE

YOUR NOTE [3] The $K_2^*(1430)$ cannot be distinguished from the $K_0^*(1430)$. NODE=M070G02;LINKAGE=B

[4] Superseded by LEES 12F. AUBERT 07AK reports $[\Gamma(J/\psi(1S) \to K^*(892)^0\overline{K}_2^*(1430)^0 + \text{c.c.}) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\text{total}}] \times [B(K_2^*(1430) \to K\pi)] = 16.4 \pm 1.1 \pm 1.4$ eV which we divide by our best value $B(K_2^*(1430) \to K\pi) = (49.9 \pm 1.2) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M070G02;LINKAGE=UB

$\Gamma(\phi K^+K^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_{47}\Gamma_5/\Gamma$

NODE=M070G09
NODE=M070G09

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **4.61±0.62±0.05**	163	[1] LEES	12F	BABR	10.6 $e^+e^- \to K^+K^-K^+K^-\gamma$

YOUR NOTE [1] LEES 12F reports $[\Gamma(J/\psi(1S) \to \phi K^+K^-) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\text{total}}] \times [B(\phi(1020) \to K^+K^-)] = 2.26 \pm 0.26 \pm 0.16$ eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M070G09;LINKAGE=A

$\Gamma(\phi\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_{55}\Gamma_5/\Gamma$

NODE=M070G14
NODE=M070G14

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
4.49±0.35 OUR AVERAGE					
YOUR DATA 4.47±0.49±0.04	181	[1] LEES	12F	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
4.52±0.48±0.04	254±23	[2] SHEN	09	BELL	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
5.3 ±0.7 ±0.1	103	[3] AUBERT,BE	06D	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$

YOUR NOTE [1] LEES 12F reports $[\Gamma(J/\psi(1S) \to \phi\pi^+\pi^-) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\text{total}}] \times [B(\phi(1020) \to K^+K^-)] = 2.19 \pm 0.23 \pm 0.07$ eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M070G14;LINKAGE=B

[2] SHEN 09 reports $4.50 \pm 0.41 \pm 0.26$ eV from a measurement of $[\Gamma(J/\psi(1S) \to \phi\pi^+\pi^-) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\text{total}}] \times [B(\phi(1020) \to K^+K^-)]$ assuming $B(\phi(1020) \to K^+K^-) = (49.2 \pm 0.6) \times 10^{-2}$, which we rescale to our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M070G14;LINKAGE=SH

[3] Superseded by LEES 12F. AUBERT,BE 06D reports $[\Gamma(J/\psi(1S) \to \phi\pi^+\pi^-) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\text{total}}] \times [B(\phi(1020) \to K^+K^-)] = 2.61 \pm 0.30 \pm 0.18$ eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M070G14;LINKAGE=AU

$\Gamma(\phi\pi^0\pi^0) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_{56}\Gamma_5/\Gamma$

NODE=M070G15
NODE=M070G15

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **2.78±0.57±0.03**	45	[1] LEES	12F	BABR	10.6 $e^+e^- \to K^+K^-\pi^0\pi^0\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3.14±0.88±0.03	23	[2] AUBERT,BE	06D	BABR	10.6 $e^+e^- \to K^+K^-\pi^0\pi^0\gamma$

YOUR NOTE [1] LEES 12F reports $[\Gamma(J/\psi(1S) \to \phi\pi^0\pi^0) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\text{total}}] \times [B(\phi(1020) \to K^+K^-)] = 1.36 \pm 0.27 \pm 0.07$ eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M070G15;LINKAGE=A

[2] Superseded by LEES 12F. AUBERT,BE 06D reports $[\Gamma(J/\psi(1S) \to \phi\pi^0\pi^0) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\rm total}] \times [B(\phi(1020) \to K^+K^-)] = 1.54 \pm 0.40 \pm 0.16$ eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M070G15;LINKAGE=AU

$\Gamma(\phi f_0(980) \to \phi\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{\rm total}$ $\Gamma_{66}\Gamma_5/\Gamma$

NODE=M070G05
NODE=M070G05

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
1.44±0.19 OUR AVERAGE					
YOUR DATA 1.41±0.25±0.01	57 ± 9	[1] LEES	12F	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$
1.48±0.27±0.09	60±11	[2] SHEN	09	BELL	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.02±0.24±0.01	20 ± 5	[3] AUBERT	07AK	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$

YOUR NOTE [1] LEES 12F reports $[\Gamma(J/\psi(1S) \to \phi f_0(980) \to \phi\pi^+\pi^-) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\rm total}] \times [B(\phi(1020) \to K^+K^-)] = 0.69 \pm 0.11 \pm 0.05$ eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M070G05;LINKAGE=A

[2] Multiplied by 2/3 to take into account the $\phi\pi^+\pi^-$ mode only. Using $B(\phi \to K^+K^-) = (49.2 \pm 0.6)\%$.

NODE=M070G05;LINKAGE=SH

[3] Superseded by LEES 12F. AUBERT 07AK reports $[\Gamma(J/\psi(1S) \to \phi f_0(980) \to \phi\pi^+\pi^-) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\rm total}] \times [B(\phi(1020) \to K^+K^-) = 0.50 \pm 0.11 \pm 0.04$ eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M070G05;LINKAGE=UB

$\Gamma(\phi f_0(980) \to \phi\pi^0\pi^0) \times \Gamma(e^+e^-)/\Gamma_{\rm total}$ $\Gamma_{67}\Gamma_5/\Gamma$

NODE=M070G06
NODE=M070G06

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **0.98±0.27±0.01**	16 ± 4	[1] LEES	12F	BABR	10.6 $e^+e^- \to \pi^0\pi^0K^+K^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.96±0.40±0.01	7.0 ± 2.8	[2] AUBERT	07AK	BABR	10.6 $e^+e^- \to \pi^0\pi^0K^+K^-\gamma$

YOUR NOTE [1] LEES 12F reports $[\Gamma(J/\psi(1S) \to \phi f_0(980) \to \phi\pi^0\pi^0) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\rm total}] \times [B(\phi(1020) \to K^+K^-)] = 0.48 \pm 0.12 \pm 0.05$ eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M070G06;LINKAGE=A

[2] Superseded by LEES 12F. AUBERT 07AK reports $[\Gamma(J/\psi(1S) \to \phi f_0(980) \to \phi\pi^0\pi^0) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\rm total}] \times [B(\phi(1020) \to K^+K^-)] = 0.47 \pm 0.19 \pm 0.05$ eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M070G06;LINKAGE=UB

$\Gamma(K^*(892)^0\overline{K}^*(892)^0) \times \Gamma(e^+e^-)/\Gamma_{\rm total}$ $\Gamma_{15}\Gamma_5/\Gamma$

NODE=M070G01
NODE=M070G01

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **1.28±0.34±0.07**	47±12	[1] LEES	12F	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.28±0.40±0.11	25 ± 8	[1,2] AUBERT	07AK	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$

YOUR NOTE [1] Dividing by $(2/3)^2$ to take twice into account that $B(K^{*0} \to K^+\pi^-) = 2/3\ B(K^{*0} \to K\pi)$.

NODE=M070G01;LINKAGE=AE

[2] Superseded by LEES 12F.

NODE=M070G01;LINKAGE=A

$\Gamma(\phi f_2(1270)) \times \Gamma(e^+e^-)/\Gamma_{\rm total}$ $\Gamma_{48}\Gamma_5/\Gamma$

NODE=M070G07
NODE=M070G07

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **$1.79 \pm 0.32^{+0.02}_{-0.06}$**	61 ± 10	[1,2,3] LEES	12F	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$4.08 \pm 0.73^{+0.04}_{-0.14}$	44 ± 7	[2,4] AUBERT	07AK	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$

YOUR NOTE [1] LEES 12F reports $[\Gamma(J/\psi(1S) \to \phi f_2(1270)) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\rm total}] \times [B(f_2(1270) \to \pi\pi)] = 1.51 \pm 0.25 \pm 0.10$ eV which we divide by our best value $B(f_2(1270) \to \pi\pi) = (84.2^{+2.9}_{-0.9}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M070G07;LINKAGE=A

YOUR NOTE [2] Using $B(\phi \to K^+K^-) = (48.9 \pm 0.5)\%$.

NODE=M070G07;LINKAGE=AE

YOUR NOTE [3] Using $\pi^+\pi^-$ invariant mass between 1.1 and 1.5 GeV. May include other sources such as $f_0(1370)$.

NODE=M070G07;LINKAGE=B

[4] Superseded by LEES 12F. AUBERT 07AK reports $[\Gamma(J/\psi(1S) \to \phi f_2(1270)) \times \Gamma(J/\psi(1S) \to e^+e^-)/\Gamma_{\rm total}] \times [B(f_2(1270) \to \pi\pi)] = 3.44 \pm 0.55 \pm 0.28$ eV which we divide by our best value $B(f_2(1270) \to \pi\pi) = (84.2^{+2.9}_{-0.9}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M070G07;LINKAGE=UB

$\Gamma(\pi^+\pi^-K^+K^-) \times \Gamma(e^+e^-)/\Gamma_{\rm total}$ $\Gamma_{111}\Gamma_5/\Gamma$

NODE=M070G12
NODE=M070G12

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **37.94±0.81±1.10**	3.1k	LEES	12F	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
36.3 ±1.3 ±2.1	1.5k	[1] AUBERT	07AK	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$
33.6 ±2.7 ±2.7	233	[2] AUBERT	05D	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$

OCCUR=2

[1] Superseded by LEES 12F.

NODE=M070G12;LINKAGE=B

[2] Superseded by AUBERT 07AK.

NODE=M070G12;LINKAGE=AU

$\Gamma(\pi^0\pi^0K^+K^-) \times \Gamma(e^+e^-)/\Gamma_{\rm total}$ $\Gamma_{116}\Gamma_5/\Gamma$

NODE=M070G04
NODE=M070G04

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **11.75±0.81±0.90**	388	LEES	12F	BABR	10.6 $e^+e^- \to \pi^0\pi^0K^+K^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
13.6 ±1.1 ±1.3	203	[1] AUBERT	07AK	BABR	10.6 $e^+e^- \to \pi^0\pi^0K^+K^-\gamma$

[1] Superseded by LEES 12F.

NODE=M070G04;LINKAGE=A

$\Gamma(2(K^+K^-)) \times \Gamma(e^+e^-)/\Gamma_{\rm total}$ $\Gamma_{146}\Gamma_5/\Gamma$

NODE=M070G13
NODE=M070G13

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **4.00±0.33±0.29**	287 ± 24	LEES	12F	BABR	10.6 $e^+e^- \to 2(K^+K^-)\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4.11±0.39±0.30	156 ± 15	[1] AUBERT	07AK	BABR	10.6 $e^+e^- \to 2(K^+K^-)\gamma$
4.0 ±0.7 ±0.6	38	[2] AUBERT	05D	BABR	10.6 $e^+e^- \to 2(K^+K^-)\gamma$

[1] Superseded by LEES 12F.

NODE=M070G13;LINKAGE=A

[2] Superseded by AUBERT 07AK.

NODE=M070G13;LINKAGE=AU

$J/\psi(1S)$ BRANCHING RATIOS

NODE=M070230

HADRONIC DECAYS

NODE=M070305

$\Gamma(\phi K\overline{K})/\Gamma_{\rm total}$ Γ_{44}/Γ

NODE=M070R36
NODE=M070R36

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
17.7± 1.6 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below.					
YOUR DATA 16.6± 1.9±1.2	163 ± 19	LEES	12F	BABR	10.6 $e^+e^- \to 2(K^+K^-)\gamma$
21.4± 0.4±2.2		ABLIKIM	05	BES2	$J/\psi \to \phi\pi^+\pi^-$
48 $^{+20}_{-16}$ ±6	$9.0^{+3.7}_{-3.0}$	[1,2] HUANG	03	BELL	$B^+ \to (\phi K^+K^-)\,K^+$
14.6± 0.8±2.1		[3] FALVARD	88	DM2	$J/\psi \to$ hadrons
18 ± 8	14	FELDMAN	77	MRK1	e^+e^-

[1] We have multiplied K^+K^- measurement by 2 to obtain $K\overline{K}$.

NODE=M070R36;LINKAGE=AA

[2] Using $B(B^+ \to J/\psi K^+) = (1.01 \pm 0.05) \times 10^{-3}$.

NODE=M070R36;LINKAGE=CC

[3] Addition of ϕK^+K^- and $\phi K^0\overline{K}^0$ branching ratios.

NODE=M070R36;LINKAGE=A

$\Gamma(\phi\pi^+\pi^-)/\Gamma_{\rm total}$ Γ_{55}/Γ

NODE=M070R34
NODE=M070R34

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
0.87±0.09 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.					
YOUR DATA 0.81±0.08±0.03	181	LEES	12F	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
1.09±0.02±0.13		ABLIKIM	05	BES2	$J/\psi \to \phi\pi^+\pi^-$
0.78±0.03±0.12		FALVARD	88	DM2	$J/\psi \to$ hadrons
2.1 ±0.9	23	FELDMAN	77	MRK1	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.96±0.13	103	[1] AUBERT,BE	06D	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$

[1] Superseded by LEES 12F. Derived by us. AUBERT,BE 06D measures $\Gamma(J/\psi \to e^+e^-) \times B(J/\psi \to \phi\pi^+\pi^-) \times B(\phi \to K^+K^-) = (2.61 \pm 0.30 \pm 0.18)$ eV

NODE=M070R34;LINKAGE=AU

STABLE HADRONS

NODE=M070307

$\Gamma(2(K^+K^-))/\Gamma_{total}$ Γ_{146}/Γ

NODE=M070R19
NODE=M070R19

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
0.74±0.07 OUR AVERAGE					
YOUR DATA $0.72\pm0.06\pm0.05$	287 ± 24	LEES	12F	BABR	10.6 $e^+e^-\to 2(K^+K^-)\gamma$
$1.4\ ^{+0.5}_{-0.4}\pm0.2$	$11.0^{+4.3}_{-3.5}$	[1] HUANG	03	BELL	$B^+\to 2(K^+K^-)\ K^+$
0.7 ± 0.3		VANNUCCI	77	MRK1	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.74\pm0.09\pm0.02$	156 ± 15	[2] AUBERT	07AK	BABR	10.6 $e^+e^-\to 2(K^+K^-)\gamma$
$0.72\pm0.17\pm0.02$	38	[3] AUBERT	05D	BABR	10.6 $e^+e^-\to 2(K^+K^-)\gamma$

[1] Using $B(B^+\to J/\psi K^+) = (1.01\pm0.05)\times10^{-3}$. NODE=M070R19;LINKAGE=CC

[2] Superseded by LEES 12F. AUBERT 07AK reports $[\Gamma(J/\psi(1S)\to 2(K^+K^-))/\Gamma_{total}]\times[\Gamma(J/\psi(1S)\to e^+e^-)] = (4.11\pm0.39\pm0.30)\times10^{-3}$ keV which we divide by our best value $\Gamma(J/\psi(1S)\to e^+e^-) = 5.55\pm0.14\pm0.02$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M070R19;LINKAGE=BE

[3] Superseded by AUBERT 07AK. AUBERT 05D reports $[\Gamma(J/\psi(1S)\to 2(K^+K^-))/\Gamma_{total}]\times[\Gamma(J/\psi(1S)\to e^+e^-)] = (4.0\pm0.7\pm0.6)\times10^{-3}$ keV which we divide by our best value $\Gamma(J/\psi(1S)\to e^+e^-) = 5.55\pm0.14\pm0.02$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M070R19;LINKAGE=AU

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER LEES	12F	PR D86 012008	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54298
SHEN	09	PR D80 031101	C.P. Shen *et al.*	(BELLE Collab.)	REFID=53000
AUBERT	07AK	PR D76 012008	B. Aubert *et al.*	(BABAR Collab.)	REFID=51908
AUBERT,BE	06D	PR D74 091103	B. Aubert *et al.*	(BABAR Collab.)	REFID=51511
ABLIKIM	05	PL B607 243	M. Ablikim *et al.*	(BES Collab.)	REFID=50450
AUBERT	05D	PR D71 052001	B. Aubert *et al.*	(BABAR Collab.)	REFID=50509
HUANG	03	PRL 91 241802	H.-C. Huang *et al.*	(BELLE Collab.)	REFID=49621
FALVARD	88	PR D38 2706	A. Falvard *et al.*	(CLER, FRAS, LALO+)	REFID=40576
FELDMAN	77	PRPL 33C 285	G.J. Feldman, M.L. Perl	(LBL, SLAC)	REFID=22062
VANNUCCI	77	PR D15 1814	F. Vannucci *et al.*	(SLAC, LBL)	REFID=22063

NODE=M071

$\psi(2S)$

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

See the Review on "$\psi(2S)$ and χ_c branching ratios" before the $\chi_{c0}(1P)$ Listings. NODE=M071

$\psi(2S)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(total)$

NODE=M071230

This combination of a partial width with the partial width into e^+e^- and with the total width is obtained from the integrated cross section into channel(i) in the e^+e^- annihilation. We list only data that have not been used to determine the partial width $\Gamma(i)$ or the branching ratio $\Gamma(i)$/total. NODE=M071230

$\Gamma(\pi^0\pi^0K^+K^-)\times\Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{69}\Gamma_6/\Gamma$

NODE=M071G08
NODE=M071G08

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **0.60±0.31±0.03**	17	LEES	12F	BABR	10.6 $e^+e^-\to\pi^0\pi^0K^+K^-\gamma$

$\Gamma(\pi^+\pi^-K^+K^-)\times\Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{70}\Gamma_6/\Gamma$

NODE=M071G12
NODE=M071G12

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **1.92±0.30±0.06**	133	LEES	12F	BABR	10.6 $e^+e^-\to\pi^+\pi^-K^+K^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2.56\pm0.42\pm0.16$	85	[1] AUBERT	07AK	BABR	10.6 $e^+e^-\to\pi^+\pi^-K^+K^-\gamma$

[1] Superseded by LEES 12F. NODE=M071G12;LINKAGE=A

$\Gamma(\phi f_0(980)\to\pi^+\pi^-)\times\Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{112}\Gamma_6/\Gamma$

NODE=M071G13
NODE=M071G13

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **0.347±0.129±0.003**	12	[1] LEES	12F	BABR	10.6 $e^+e^-\to\pi^+\pi^-K^+K^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.347\pm0.168\pm0.003$	6 ± 3	[2] AUBERT	07AK	BABR	10.6 $e^+e^-\to\pi^+\pi^-K^+K^-\gamma$

YOUR NOTE [1] LEES 12F reports $[\Gamma(\psi(2S) \to \phi f_0(980) \to \pi^+\pi^-) \times \Gamma(\psi(2S) \to e^+e^-)/\Gamma_{total}] \times [B(\phi(1020) \to K^+K^-)] = 0.17 \pm 0.06 \pm 0.02$ eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M071G13;LINKAGE=A

[2] Superseded by LEES 12F. AUBERT 07AK reports $[\Gamma(\psi(2S) \to \phi f_0(980) \to \pi^+\pi^-) \times \Gamma(\psi(2S) \to e^+e^-)/\Gamma_{total}] \times [B(\phi(1020) \to K^+K^-)] = 0.17 \pm 0.08 \pm 0.02$ eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M071G13;LINKAGE=AU

$\Gamma(2(K^+K^-)) \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{113}\Gamma_6/\Gamma$

NODE=M071G07
NODE=M071G07

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **0.22±0.10±0.02**	13	LEES	12F	BABR	10.6 $e^+e^- \to K^+K^-K^+K^-\gamma$

$\Gamma(\phi\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{111}\Gamma_6/\Gamma$

NODE=M071G10
NODE=M071G10

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **0.55±0.19±0.01**	19	[1] LEES	12F	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.57±0.23±0.01	10	[2] AUBERT,BE	06D	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$

YOUR NOTE [1] LEES 12F reports $[\Gamma(\psi(2S) \to \phi\pi^+\pi^-) \times \Gamma(\psi(2S) \to e^+e^-)/\Gamma_{total}] \times [B(\phi(1020) \to K^+K^-)] = 0.27 \pm 0.09 \pm 0.02$ eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M071G10;LINKAGE=A

[2] Superseded by LEES 12F. AUBERT,BE 06D reports $[\Gamma(\psi(2S) \to \phi\pi^+\pi^-) \times \Gamma(\psi(2S) \to e^+e^-)/\Gamma_{total}] \times [B(\phi(1020) \to K^+K^-)] = 0.28 \pm 0.11 \pm 0.02$ eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = (49.0 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M071G10;LINKAGE=AU

$\psi(2S)$ BRANCHING RATIOS

NODE=M071235

HADRONIC DECAYS

NODE=M071310

$\Gamma(\pi^+\pi^-K^+K^-)/\Gamma_{total}$ Γ_{70}/Γ

NODE=M071R24
NODE=M071R24

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
7.3±0.5 OUR AVERAGE					
YOUR DATA 8.1±1.3±0.3	133	LEES	12F	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$
7.1±0.3±0.4	817.2	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to K^+K^-\pi^+\pi^-$
16 ±4		[1] TANENBAUM	78	MRK1	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
10.9±1.9±0.2	85	[2] AUBERT	07AK	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$

[1] Assuming entirely strong decay. NODE=M071R24;LINKAGE=K

[2] Superseded by LEES 12F. AUBERT 07AK reports $[\Gamma(\psi(2S) \to \pi^+\pi^-K^+K^-)/\Gamma_{total}] \times [\Gamma(\psi(2S) \to e^+e^-)] = (2.56 \pm 0.42 \pm 0.16) \times 10^{-3}$ keV which we divide by our best value $\Gamma(\psi(2S) \to e^+e^-) = 2.34 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M071R24;LINKAGE=BE

$\Gamma(\phi\pi^+\pi^-)/\Gamma_{total}$ Γ_{111}/Γ

NODE=M071R80
NODE=M071R80

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.18±0.26 OUR AVERAGE Error includes scale factor of 1.5. See the ideogram below.					
YOUR DATA 2.3 ±0.8 ±0.1	19 ± 6	LEES	12F	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$
0.9 ±0.2 ±0.1	47.6	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to K^+K^-\pi^+\pi^-$
1.5 ±0.2 ±0.2	51.5±8.3	[1] BAI	03B	BES	$\psi(2S) \to K^+K^-\pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.44±0.96±0.04	10 ± 4	[2,3] AUBERT	07AK	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$

[1] Normalized to $B(\psi(2S) \to J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$. NODE=M071R80;LINKAGE=B3

[2] Superseded by LEES 12F. AUBERT 07AK reports $[\Gamma(\psi(2S) \to \phi\pi^+\pi^-)/\Gamma_{total}] \times [\Gamma(\psi(2S) \to e^+e^-)] = (0.57 \pm 0.22 \pm 0.04) \times 10^{-3}$ keV which we divide by our best value $\Gamma(\psi(2S) \to e^+e^-) = 2.34 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M071R80;LINKAGE=BE

[3] Using B($\phi \to K^+K^-$) = (49.3 ± 0.6)%.

NODE=M071R80;LINKAGE=UB

$\Gamma(\phi f_0(980) \to \pi^+\pi^-)/\Gamma_{total}$ Γ_{112}/Γ

NODE=M071R83
NODE=M071R83

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.75±0.33 OUR AVERAGE	Error includes scale factor of 1.6.				
YOUR DATA 1.5 ±0.5 ±0.1	12 ± 4	LEES	12F	BABR	10.6 $e^+e^- \to \pi^+\pi^- K^+K^-\gamma$
0.6 ±0.2 ±0.1	18.4 ± 6.4	[1] BAI	03B	BES	$\psi(2S) \to K^+K^-\pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.45±0.70±0.02	6 ± 3	[2,3] AUBERT	07AK	BABR	10.6 $e^+e^- \to \pi^+\pi^- K^+K^-\gamma$

[1] Normalized to B($\psi(2S) \to J/\psi\pi^+\pi^-$) = 0.305 ± 0.016.

NODE=M071R83;LINKAGE=B3

[2] Superseded by LEES 12F. AUBERT 07AK reports [$\Gamma(\psi(2S) \to \phi f_0(980) \to \pi^+\pi^-)/\Gamma_{total}$] × [$\Gamma(\psi(2S) \to e^+e^-)$] = (0.34 ± 0.16 ± 0.04) × 10^{-3} keV which we divide by our best value $\Gamma(\psi(2S) \to e^+e^-)$ = 2.34 ± 0.04 keV. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M071R83;LINKAGE=BE

[3] Using B($\phi \to K^+K^-$) = (49.3 ± 0.6)%.

NODE=M071R83;LINKAGE=UB

$\Gamma(2(K^+K^-))/\Gamma_{total}$ Γ_{113}/Γ

NODE=M071S12
NODE=M071S12

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.63±0.13 OUR AVERAGE					
YOUR DATA 0.9 ±0.4 ±0.1	13	LEES	12F	BABR	10.6 $e^+e^- \to 2(K^+K^-)\gamma$
0.6 ±0.1 ±0.1	59.2	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to 2(K^+K^-)$

$\psi(2S)$ REFERENCES

NODE=M071

YOUR PAPER	LEES	12F	PR D86 012008	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54298
	AUBERT	07AK	PR D76 012008	B. Aubert *et al.*	(BABAR Collab.)	REFID=51908
	AUBERT,BE	06D	PR D74 091103	B. Aubert *et al.*	(BABAR Collab.)	REFID=51511
	BRIERE	05	PRL 95 062001	R.A. Briere *et al.*	(CLEO Collab.)	REFID=50785
	BAI	03B	PR D67 052002	J.Z. Bai *et al.*	(BES Collab.)	REFID=49186
	TANENBAUM	78	PR D17 1731	W.M. Tanenbaum *et al.*	(SLAC, LBL)	REFID=22112