Reference = ABLIKIM 14L; PL B735 101
Verifier code = BES3

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Xiao-Rui Lyu

EMAIL: xiaorui@ucas.ac.cn

July 21, 2016

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Sincerely,

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

EMAIL: simon.eidelman@cern.ch

$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M053

$\psi(3770)$

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

DECAYS TO LIGHT HADRONS

NODE=M053250

$\Gamma(p\overline{p})/\Gamma_{total}$ **Γ_{75}/Γ**

NODE=M053R98
NODE=M053R98

	VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
YOUR DATA	$7.1^{+8.6}_{-2.9}$	684	[30] ABLIKIM	14L	BES3	$e^+e^- \to \psi(3770)$
YOUR DATA	310 ± 30	684	[31] ABLIKIM	14L	BES3	$e^+e^- \to \psi(3770)$

OCCUR=2

YOUR NOTE [30] Solution I of two equivalent solutions in a fit with a resonance interfering with continuum. NODE=M053R98;LINKAGE=A

YOUR NOTE [31] Solution II of two equivalent solutions in a fit with a resonance interfering with continuum. NODE=M053R98;LINKAGE=B

$\psi(3770)$ REFERENCES

NODE=M053

YOUR PAPER ABLIKIM 14L PL B735 101 M. Ablikim *et al.* (BES III Collab.) REFID=55903

Reference = ABLIKIM 15V; PL B749 414
Verifier code = BES3

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$c\bar{c}$ MESONS

NODE=MXXX025

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

$\psi(2S)$ PARTIAL WIDTHS

NODE=M071225

$\Gamma(e^+e^-)$ **Γ_6**

NODE=M071W1

NODE=M071W1

	VALUE (keV)	DOCUMENT ID		TECN	COMMENT
	2.30 ±0.06 OUR AVERAGE				
YOUR DATA	2.24 ±0.10 ±0.02	[1] ABLIKIM	15V	BES3	4.0–4.4 $e^+e^- \to \pi^+\pi^- J/\psi$
	2.338±0.037±0.096	ABLIKIM	08B	BES2	$e^+e^- \to$ hadrons
	2.330±0.036±0.110	ABLIKIM	06L	BES2	$e^+e^- \to$ hadrons
	2.44 ±0.21	[2] BAI	02B	BES2	e^+e^-
	2.14 ±0.21	ALEXANDER	89	RVUE	See Υ mini-review
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	2.0 ±0.3	BRANDELIK	79C	DASP	e^+e^-
	2.1 ±0.3	[3] LUTH	75	MRK1	e^+e^-

YOUR NOTE

[1] ABLIKIM 15V reports 2.213 ± 0.018 ± 0.099 keV from a measurement of $[\Gamma(\psi(2S) \to e^+e^-)] \times [B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)]$ assuming $B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) = (34.95 \pm 0.45) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) = (34.49 \pm 0.30) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M071W1;LINKAGE=A

[2] From a simultaneous fit to e^+e^-, $\mu^+\mu^-$, and hadronic channel, assuming $\Gamma_e = \Gamma_\mu = \Gamma_\tau/0.38847$.

NODE=M071W;LINKAGE=BB

[3] From a simultaneous fit to e^+e^-, $\mu^+\mu^-$, and hadronic channels assuming $\Gamma(e^+e^-) = \Gamma(\mu^+\mu^-)$.

NODE=M071W1;LINKAGE=F

$\psi(2S)$ REFERENCES

NODE=M071

YOUR PAPER

ABLIKIM	15V	PL B749 414	M. Ablikim *et al.*	(BES III Collab.)	REFID=56787
ABLIKIM	08B	PL B659 74	M. Ablikim *et al.*	(BES Collab.)	REFID=52129
ABLIKIM	06L	PRL 97 121801	M. Ablikim *et al.*	(BES Collab.)	REFID=51129
BAI	02B	PL B550 24	J.Z. Bai *et al.*	(BES Collab.)	REFID=49171
ALEXANDER	89	NP B320 45	J.P. Alexander *et al.*	(LBL, MICH, SLAC)	REFID=40345
BRANDELIK	79C	ZPHY C1 233	R. Brandelik *et al.*	(DASP Collab.)	REFID=22114
LUTH	75	PRL 35 1124	V. Luth *et al.*	(SLAC, LBL) JPC	REFID=22188

NODE=M176

$X(3872)$

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

First observed by CHOI 03 in $B \to K\pi^+\pi^- J/\psi(1S)$ decays as a narrow peak in the invariant mass distribution of the $\pi^+\pi^- J/\psi(1S)$ final state. Isovector hypothesis excluded by AUBERT 05B and CHOI 11.

NODE=M176

AAIJ 13Q perform a full five-dimensional amplitude analysis of the angular correlations between the decay products in $B^+ \to X(3872)K^+$ decays, where $X(3872) \to J/\psi\pi^+\pi^-$ and $J/\psi \to \mu^+\mu^-$, which unambiguously gives the $J^{PC} = 1^{++}$ assignment under the assumption that the $\pi^+\pi^-$ and J/ψ are in an S-wave. AAIJ 15AO extend this analysis with more data to limit D-wave contributions to $< 4\%$ at 95% CL.

See our note on "Developments in Heavy Quarkonium Spectroscopy".

$X(3872)$ PARTIAL WIDTHS

NODE=M176220

$\Gamma(e^+e^-)$ Γ_1

NODE=M176W1
NODE=M176W1

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA $<$ 4.3	90	[1] ABLIKIM	15V	BES3	4.0–4.4 $e^+e^- \to \pi^+\pi^- J/\psi$
$<$280	90	[2] YUAN	04	RVUE	$e^+e^- \to \pi^+\pi^- J/\psi$

YOUR NOTE

[1] ABLIKIM 15V reports this limit from the measurement of $\Gamma(X(3872) \to \pi^+\pi^- J/\psi(1S)) \times \Gamma(X(3872) \to e^+e^-)/\Gamma < 0.13$ eV using $\Gamma(X(3872) \to \pi^+\pi^- J/\psi(1S))/\Gamma = 3\%$. NODE=M176W1;LINKAGE=B

[2] Using BAI 98E data on $e^+e^- \to \pi^+\pi^-\ell^+\ell^-$. Assuming that $\Gamma(\pi^+\pi^- J/\psi)$ of $X(3872)$ is the same as that of $\psi(2S)$ (85.4 keV). NODE=M176W1;LINKAGE=A

$X(3872)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

NODE=M176230

$\Gamma(\pi^+\pi^- J/\psi(1S)) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_2\Gamma_1/\Gamma$

NODE=M176G1
NODE=M176G1

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA **< 0.13**	90	ABLIKIM	15V	BES3	4.0–4.4 $e^+e^- \to \pi^+\pi^- J/\psi$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<$ 6.2	90	[1,2] AUBERT	05D	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
$<$ 8.3	90	[2] DOBBS	05	CLE3	$e^+e^- \to \pi^+\pi^- J/\psi$
$<$10	90	[3] YUAN	04	RVUE	$e^+e^- \to \pi^+\pi^- J/\psi$

[1] Using $B(X(3872) \to J/\psi\pi^+\pi^-) \cdot B(J/\psi \to \mu^+\mu^-) \cdot \Gamma(X(3872) \to e^+e^-) < 0.37$ eV from AUBERT 05D and $B(J/\psi \to \mu^+\mu^-) = 0.0588 \pm 0.0010$ from the PDG 04. NODE=M176G1;LINKAGE=AU

[2] Assuming $X(3872)$ has $J^{PC} = 1^{--}$. NODE=M176G1;LINKAGE=DO

[3] Using BAI 98E data on $e^+e^- \to \pi^+\pi^-\ell^+\ell^-$. From theoretical calculation of the production cross section and using $B(J/\psi \to \mu^+\mu^-) = (5.88 \pm 0.10)\%$. NODE=M176G1;LINKAGE=A

$X(3872)$ REFERENCES

NODE=M176

	AAIJ	15AO	PR D92 011102	R. Aaij *et al.*	(LHCb Collab.)	REFID=56771
YOUR PAPER	ABLIKIM	15V	PL B749 414	M. Ablikim *et al.*	(BES III Collab.)	REFID=56787
	AAIJ	13Q	PRL 110 222001	R. Aaij *et al.*	(LHCb Collab.) JP	REFID=54985
	CHOI	11	PR D84 052004	S.-K. Choi *et al.*	(BELLE Collab.)	REFID=53934
	AUBERT	05B	PR D71 031501	B. Aubert *et al.*	(BABAR Collab.)	REFID=50498
	AUBERT	05D	PR D71 052001	B. Aubert *et al.*	(BABAR Collab.)	REFID=50509
	DOBBS	05	PRL 94 032004	S. Dobbs *et al.*	(CLEO Collab.)	REFID=50458
	PDG	04	PL B592 1	S. Eidelman *et al.*	(PDG Collab.)	REFID=49653
	YUAN	04	PL B579 74	C.Z. Yuan *et al.*		REFID=49677
	CHOI	03	PRL 91 262001	S.-K. Choi *et al.*	(BELLE Collab.)	REFID=49628
	BAI	98E	PR D57 3854	J.Z. Bai *et al.*	(BES Collab.)	REFID=46339

Reference = ABLIKIM 16B; PL B753 103
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M053

$\psi(3770)$

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

RADIATIVE DECAYS

NODE=M053240

$\Gamma(\gamma\chi_{c1})/\Gamma_{total}$ — **Γ_{99}/Γ**

NODE=M053R02
NODE=M053R02

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
	2.48±0.23 OUR AVERAGE					
YOUR DATA	1.9 ±0.4 ±0.6	202	[38] ABLIKIM	16B	BES3	$e^+e^- \to \psi(3770) \to \gamma +$ hadrons
	2.48±0.15±0.23	0.6k	ABLIKIM	15J	BES3	$e^+e^- \to \psi(3770) \to \gamma\gamma J/\psi$
	2.4 ±0.8 ±0.2		[39] ABLIKIM	14H	BES3	$e^+e^- \to \psi(3770) \to K^0_S K^\pm \pi^\mp$
	2.9 ±0.5 ±0.4		[40] BRIERE	06	CLEO	$e^+e^- \to \psi(3770) \to \gamma +$ hadrons, $\gamma\gamma J/\psi$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	3.9 ±1.4 ±0.6	54	[41] BRIERE	06	CLEO	$e^+e^- \to \psi(3770) \to \gamma +$ hadrons
	2.8 ±0.5 ±0.4	53	[37] COAN	06A	CLEO	$e^+e^- \to \psi(3770) \to \gamma\gamma J/\psi$

OCCUR=2

$\Gamma(\gamma\chi_{c0})/\Gamma_{total}$ — **Γ_{100}/Γ**

NODE=M053R01
NODE=M053R01

	VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
	7.0±0.6 OUR AVERAGE						
YOUR DATA	6.9±0.3±0.7		2.2K	[43] ABLIKIM	16B	BES3	$e^+e^- \to \psi(3770) \to \gamma +$ hadrons
	7.3±0.7±0.6		274	BRIERE	06	CLEO	$e^+e^- \to \psi(3770) \to \gamma +$ hadrons
	• • • We do not use the following data for averages, fits, limits, etc. • • •						
	< 44	90		[37] COAN	06A	CLEO	$e^+e^- \to \psi(3770) \to \gamma\gamma J/\psi$

[37] Using $\Gamma_{ee}(\psi(2S)) = (2.54 \pm 0.03 \pm 0.11)$ keV from ADAM 06 and taking $\sigma(e^+e^- \to D\overline{D})$ from HE 05 for $\sigma(e^+e^- \to \psi(3770))$. NODE=M053R0;LINKAGE=CO

YOUR NOTE [38] ABLIKIM 16B reports $(1.94 \pm 0.42 \pm 0.64) \times 10^{-3}$ from a measurement of $[\Gamma(\psi(3770) \to \gamma\chi_{c1})/\Gamma_{total}]$ / $[B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. NODE=M053R02;LINKAGE=A

[39] ABLIKIM 14H reports $[\Gamma(\psi(3770) \to \gamma\chi_{c1})/\Gamma_{total}] \times [B(\chi_{c1}(1P) \to K^0_S K^\pm \pi^\mp)] = (8.51 \pm 2.39 \pm 1.42) \times 10^{-6}$ which we divide by our best value $B(\chi_{c1}(1P) \to K^0_S K^\pm \pi^\mp) = 0.00356 \pm 0.00030$. Our first error is their experiment's error and our second error is the systematic error from using our best value. We have calculated the best value of $B(\chi_{c1}(1P) \to K^0_S K^\pm \pi^\mp)$ as 1/2 of $B(\chi_{c1}(1P) \to \overline{K}^0 K^+ \pi^- +$ c.c.$) = (7.1 \pm 0.6) \times 10^{-3}$. NODE=M053R02;LINKAGE=AB

[40] Averages the two measurements from COAN 06A and BRIERE 06. NODE=M053R02;LINKAGE=BI

[41] Uses $B(\psi(2S) \to \gamma\chi_{c1}) = 9.07 \pm 0.11 \pm 0.54$ % from ATHAR 04, $\psi(2S)$ mass and width from PDG 04, and $\Gamma_{ee}(\psi(2S)) = 2.54 \pm 0.03 \pm 0.11$ keV from ADAM 06. NODE=M053R02;LINKAGE=BR

YOUR NOTE [43] ABLIKIM 16B reports $(6.88 \pm 0.28 \pm 0.67) \times 10^{-3}$ from a measurement of $[\Gamma(\psi(3770) \to \gamma\chi_{c0})/\Gamma_{total}]$ / $[B(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. NODE=M053R01;LINKAGE=B

$\psi(3770)$ REFERENCES

NODE=M053

YOUR PAPER	ABLIKIM	16B	PL B753 103	M. Ablikim *et al.*	(BES III Collab.)	REFID=57126
	ABLIKIM	15J	PR D91 092009	M. Ablikim *et al.*	(BES III Collab.)	REFID=56775
	ABLIKIM	14H	PR D89 112005	M. Ablikim *et al.*	(BES III Collab.)	REFID=55899
	ADAM	06	PRL 96 082004	N.E. Adam *et al.*	(CLEO Collab.)	REFID=50989
	BRIERE	06	PR D74 031106	R.A. Briere *et al.*	(CLEO Collab.)	REFID=51149
	COAN	06A	PRL 96 182002	T.E. Coan *et al.*	(CLEO Collab.)	REFID=51155
	HE	05	PRL 95 121801	Q. He *et al.*	(CLEO Collab.)	REFID=50924
	Also		PRL 96 199903 (errat.)	Q. He *et al.*	(CLEO Collab.)	REFID=51211
	ATHAR	04	PR D70 112002	S.B. Athar *et al.*	(CLEO Collab.)	REFID=50331
	PDG	04	PL B592 1	S. Eidelman *et al.*	(PDG Collab.)	REFID=49653

Reference = ABLIKIM 12N; PR D86 092009
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M026

$\eta_c(1S)$

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

$\eta_c(1S)$ BRANCHING RATIOS

NODE=M026225

HADRONIC DECAYS

NODE=M026305

$\Gamma(K\overline{K}\eta)/\Gamma_{total}$ — **Γ_{29}/Γ**

NODE=M026R15

NODE=M026R15

	VALUE (units 10^{-2})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.0 ±0.5 ±0.2**		7	[1,2] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0 \gamma \eta K^+ K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •							
	<3.1	90		[3] BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c \gamma$

OCCUR=2

YOUR NOTE [1] ABLIKIM 12N quotes $B(\psi(2S) \to \pi^0 h_c) \cdot B(h_c \to \gamma \eta_c) \cdot B(\eta_c \to K^+ K^- \eta) = (2.11 \pm 1.01 \pm 0.32) \times 10^{-6}$ which we multiply by 2 to account for isospin symmetry.

NODE=M026R15;LINKAGE=AK

YOUR NOTE [2] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to K\overline{K}\eta)/\Gamma_{total}] \times [B(\psi(2S) \to \pi^0 h_c(1P))] \times [B(h_c(1P) \to \eta_c(1S)\gamma)] = (4.22 \pm 2.02 \pm 0.64) \times 10^{-6}$ which we divide by our best values $B(\psi(2S) \to \pi^0 h_c(1P)) = (8.6 \pm 1.3) \times 10^{-4}$, $B(h_c(1P) \to \eta_c(1S)\gamma) = (51 \pm 6) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=M026R15;LINKAGE=AM

[3] The quoted branching ratios use $B(J/\psi(1S) \to \gamma \eta_c(1S)) = 0.0127 \pm 0.0036$.

NODE=M026R15;LINKAGE=E

$\eta_c(1S)$ REFERENCES

NODE=M026

YOUR PAPER ABLIKIM 12N PR D86 092009 M. Ablikim *et al.* (BES III Collab.) REFID=54741

BALTRUSAIT... 86 PR D33 629 R.M. Baltrusaitis *et al.* (Mark III Collab.) REFID=22009

Reference = ABLIKIM 13B; PR D87 012002
Verifier code = BES3

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$c\bar{c}$ MESONS

NODE=MXXX025

NODE=M056

$\chi_{c0}(1P)$

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

$\chi_{c0}(1P)$ BRANCHING RATIOS

NODE=M056220

HADRONIC DECAYS

NODE=M056305

$\Gamma(K^+K^-\pi^+\pi^-\pi^0)/\Gamma_{total}$ — **Γ_{21}/Γ**

NODE=M056R85
NODE=M056R85

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**8.61±0.13±0.94**	9.0k	[1] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_c^0$

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_c^0\gamma) = (9.68 \pm 0.31)\%$. NODE=M056R85;LINKAGE=A

$\Gamma(K_S^0K^\pm\pi^\mp\pi^+\pi^-)/\Gamma_{total}$ — **Γ_{22}/Γ**

NODE=M056R86
NODE=M056R86

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**4.22±0.10±0.43**	2.7k	[1] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_c^0$

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_c^0\gamma) = (9.68 \pm 0.31)\%$. NODE=M056R86;LINKAGE=A

$\Gamma(\omega K^+K^-)/\Gamma_{total}$ — **Γ_{41}/Γ**

NODE=M056R87
NODE=M056R87

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.94±0.06±0.20**	1.4k	[1] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_c^0$

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_c^0\gamma) = (9.68 \pm 0.31)\%$. NODE=M056R87;LINKAGE=A

$\Gamma(\phi\pi^+\pi^-\pi^0)/\Gamma_{total}$ — **Γ_{54}/Γ**

NODE=M056R88
NODE=M056R88

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.18±0.07±0.13**	538	[1] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_c^0$

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_c^0\gamma) = (9.68 \pm 0.31)\%$. NODE=M056R88;LINKAGE=A

$\Gamma(\eta_c\pi^+\pi^-)/\Gamma_{total}$ — **Γ_{84}/Γ**

NODE=M056R89
NODE=M056R89

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$< 7 \times 10^{-4}$**	90	[1,2] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_c^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
YOUR DATA	$<41 \times 10^{-4}$	90	[1,3] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_c^0$

OCCUR=2

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_c^0\gamma) = (9.68 \pm 0.31)\%$. NODE=M056R89;LINKAGE=A

YOUR NOTE [2] From the $\eta_c \to K_S^0K^\pm\pi^\mp$ decays. NODE=M056R89;LINKAGE=B

YOUR NOTE [3] From the $\eta_c \to K^+K^-\pi^0$ decays. NODE=M056R89;LINKAGE=C

$\chi_{c0}(1P)$ REFERENCES

NODE=M056

YOUR PAPER ABLIKIM 13B PR D87 012002 M. Ablikim *et al.* (BES III Collab.) REFID=54877

NODE=M055

$\chi_{c1}(1P)$

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

See the Review on "$\psi(2S)$ and χ_c branching ratios" before the $\chi_{c0}(1P)$ Listings. NODE=M055

$\chi_{c1}(1P)$ BRANCHING RATIOS

NODE=M055225

HADRONIC DECAYS

NODE=M055305

$\Gamma(K^+K^-\pi^+\pi^-\pi^0)/\Gamma_{total}$ — **Γ_9/Γ**

NODE=M055R00
NODE=M055R00

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**11.46±0.12±1.29**	12k	[1] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c1}$

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_{c1}\gamma) = (9.2 \pm 0.4)\%$. NODE=M055R00;LINKAGE=A

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

NODE=M055R60
NODE=M055R60

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**7.52±0.11±0.79**	5.1k	[1] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c1}$

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_{c1}\gamma) = (9.2 \pm 0.4)\%$. NODE=M055R60;LINKAGE=A

$\Gamma(\phi\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{40}/Γ

NODE=M055R62
NODE=M055R62

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.75±0.06±0.08**	373	[1] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c1}$

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_{c1}\gamma) = (9.2 \pm 0.4)\%$. NODE=M055R62;LINKAGE=A

$\Gamma(\omega K^+K^-)/\Gamma_{total}$ — Γ_{42}/Γ

NODE=M055R61
NODE=M055R61

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.78±0.04±0.08**	628	[1] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c1}$

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_{c1}\gamma) = (9.2 \pm 0.4)\%$. NODE=M055R61;LINKAGE=A

$\Gamma(\eta_c\pi^+\pi^-)/\Gamma_{total}$ — Γ_{75}/Γ

NODE=M055R63
NODE=M055R63

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$<3.2 \times 10^{-3}$**	90	[1,2] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c1}$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
YOUR DATA	$<4.4 \times 10^{-3}$	90	[1,3] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c1}$

OCCUR=2

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_{c1}\gamma) = (9.2 \pm 0.4)\%$. NODE=M055R63;LINKAGE=A
YOUR NOTE [2] Using the $\eta_c \to K^0_S K^\pm \pi^\mp$ decays. NODE=M055R63;LINKAGE=B
YOUR NOTE [3] Using the $\eta_c \to K^+K^-\pi^0$ decays. NODE=M055R63;LINKAGE=C

$\chi_{c1}(1P)$ REFERENCES

NODE=M055

YOUR PAPER ABLIKIM 13B PR D87 012002 M. Ablikim *et al.* (BES III Collab.) REFID=54877

NODE=M057

$\chi_{c2}(1P)$

$I^G(J^{PC}) = 0^+(2^{++})$

See the Review on "$\psi(2S)$ and χ_c branching ratios" before the $\chi_{c0}(1P)$ Listings. NODE=M057

$\chi_{c2}(1P)$ BRANCHING RATIOS

NODE=M057225

HADRONIC DECAYS

NODE=M057305

$\Gamma(K^+K^-\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{15}/Γ

NODE=M057R00
NODE=M057R00

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**11.69±0.13±1.31**	11k	[1] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c2}$

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_{c2}\gamma) = (8.72 \pm 0.34)\%$. NODE=M057R00;LINKAGE=A

$\Gamma(K^0_S K^\pm \pi^\mp \pi^+ \pi^-)/\Gamma_{total}$ — Γ_{16}/Γ

NODE=M057R73
NODE=M057R73

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**7.30±0.11±0.75**	4.5k	[1] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c2}$

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_{c2}\gamma) = (8.72 \pm 0.34)\%$. NODE=M057R73;LINKAGE=A

$\Gamma(\omega K^+K^-)/\Gamma_{total}$ — Γ_{22}/Γ

NODE=M057R74
NODE=M057R74

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.73±0.04±0.08**	512	[1] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c2}$

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_{c2}\gamma) = (8.72 \pm 0.34)\%$. NODE=M057R74;LINKAGE=A

$\Gamma(\phi\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{43}/Γ

NODE=M057R75
NODE=M057R75

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.93±0.06±0.10**	408	[1] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c2}$

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_{c2}\gamma) = (8.72 \pm 0.34)\%$. NODE=M057R75;LINKAGE=A

$\Gamma(\eta_c(1S)\pi^+\pi^-)/\Gamma_{total}$ — Γ_{74}/Γ

NODE=M057R76
NODE=M057R76

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$<0.54 \times 10^{-2}$**	90	[1,2] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c2}$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA	$<1.2 \times 10^{-2}$	90	[1,3] ABLIKIM	13B	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c2}$

OCCUR=2

YOUR NOTE [1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \to \chi_{c2}\gamma) = (8.72 \pm 0.34)\%$. NODE=M057R76;LINKAGE=A

YOUR NOTE [2] From the $\eta_c \to K^0_S K^\pm \pi^\mp$ decays. NODE=M057R76;LINKAGE=B

YOUR NOTE [3] From the $\eta_c \to K^+ K^- \pi^0$ decays. NODE=M057R76;LINKAGE=C

$\chi_{c2}(1P)$ REFERENCES

NODE=M057

YOUR PAPER ABLIKIM 13B PR D87 012002 M. Ablikim *et al.* (BES III Collab.) REFID=54877

Reference = ABLIKIM 13N; PR D87 092009
Verifier code = BES3

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

Xiao-Rui Lyu

EMAIL: xiaorui@ucas.ac.cn

July 21, 2016

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
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Russian Federation

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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=M152

$f_0(1500)$

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

See also the mini-reviews on scalar mesons under $f_0(500)$ (see the index for the page number) and on non-$q\overline{q}$ candidates in PDG 06, Journal of Physics **G33** 1 (2006).

NODE=M152

$f_0(1500)$ MASS

NODE=M152M

NODE=M152M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
	1504± 6 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.			
YOUR DATA	1468^{+14+23}_{-15-74}	5.5k	[1] ABLIKIM	13N	BES3	$e^+e^- \to J/\psi \to \gamma\eta\eta$
	1466± 6± 20		ABLIKIM	06V	BES2	$e^+e^- \to J/\psi \to \gamma\pi^+\pi^-$
	1515±12		[2] BARBERIS	00A		450 $pp \to p_f\eta\eta p_s$
	1511± 9		[2,3] BARBERIS	00C		450 $pp \to p_f 4\pi p_s$
	1510± 8		[2] BARBERIS	00E		450 $pp \to p_f\eta\eta p_s$
	1522±25		BERTIN	98	OBLX	0.05–0.405 $\overline{n}p \to \pi^+\pi^+\pi^-$
	1449±20		[2] BERTIN	97C	OBLX	0.0 $\overline{p}p \to \pi^+\pi^-\pi^0$
	1515±20		ABELE	96B	CBAR	0.0 $\overline{p}p \to \pi^0 K^0_L K^0_L$
	1500±15		[4] AMSLER	95B	CBAR	0.0 $\overline{p}p \to 3\pi^0$
	1505±15		[5] AMSLER	95C	CBAR	0.0 $\overline{p}p \to \eta\eta\pi^0$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	1447±16± 13	163	[6,7] DOBBS	15		$J/\psi \to \gamma\pi^+\pi^-$
	1442± 9± 4	261	[6,7] DOBBS	15		$\psi(2S) \to \gamma\pi^+\pi^-$
	1486±10		[2] ANISOVICH	09	RVUE	0.0 $\overline{p}p$, πN
	1470±60	568	[8] KLEMPT	08	E791	$D^+_s \to \pi^-\pi^+\pi^+$
	1470^{+6+72}_{-7-255}		[9] UEHARA	08A	BELL	10.6 $e^+e^- \to e^+e^-\pi^0\pi^0$
	1495± 4		AMSLER	06	CBAR	0.9 $\overline{p}p \to K^+K^-\pi^0$
	1539±20	9.9k	AUBERT	06O	BABR	$B^+ \to K^+K^+K^-$
	1473± 5	80k	[10,11] UMAN	06	E835	5.2 $\overline{p}p \to \eta\eta\pi^0$
	1478± 6		VLADIMIRSK...	06	SPEC	40 $\pi^-p \to K^0_S K^0_S n$
	1493± 7		[10] BINON	05	GAMS	33 $\pi^-p \to \eta\eta n$
	1524±14	1400	[12] GARMASH	05	BELL	$B^+ \to K^+K^+K^-$
	1489^{+8}_{-4}		[13] ANISOVICH	03	RVUE	
	1490±30		[10] ABELE	01	CBAR	0.0 $\overline{p}d \to \pi^-4\pi^0 p$
	1497±10		[10] BARBERIS	99	OMEG	450 $pp \to p_s p_f K^+K^-$
	1502±10		[10] BARBERIS	99B	OMEG	450 $pp \to p_s p_f \pi^+\pi^-$
	1502±12± 10		[14] BARBERIS	99D	OMEG	450 $pp \to K^+K^-, \pi^+\pi^-$
	1530±45		[10] BELLAZZINI	99	GAM4	450 $pp \to pp\pi^0\pi^0$
	1505±18		[10] FRENCH	99		300 $pp \to p_f(K^+K^-)p_s$
	1447±27		[15] KAMINSKI	99	RVUE	$\pi\pi \to \pi\pi, K\overline{K}, \sigma\sigma$
	1580±80		[10] ALDE	98	GAM4	100 $\pi^-p \to \pi^0\pi^0 n$
	1499± 8		[2] ANISOVICH	98B	RVUE	Compilation
	∼ 1520		REYES	98	SPEC	800 $pp \to p_s p_f K^0_S K^0_S$
	1510±20		[2] BARBERIS	97B	OMEG	450 $pp \to pp2(\pi^+\pi^-)$
	∼ 1475		FRABETTI	97D	E687	$D^\pm_s \to \pi^\mp\pi^\pm\pi^\pm$
	∼ 1505		ABELE	96	CBAR	0.0 $\overline{p}p \to 5\pi^0$
	1500± 8		[2] ABELE	96C	RVUE	Compilation
	1460±20	120	[10] AMELIN	96B	VES	37 $\pi^-A \to \eta\eta\pi^-A$
	1500± 8		BUGG	96	RVUE	
	1500±10		[16] AMSLER	95D	CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\pi^0, \pi^0\eta\eta, \pi^0\pi^0\eta$
	1445± 5		[17] ANTINORI	95	OMEG	300,450 $pp \to pp2(\pi^+\pi^-)$

OCCUR=2

OCCUR=2

1497 ± 30		[10] ANTINORI	95	OMEG	300,450 $pp \to pp\pi^+\pi^-$	OCCUR=2
~ 1505		BUGG	95	MRK3	$J/\psi \to \gamma\pi^+\pi^-\pi^+\pi^-$	
1446 ± 5		[10] ABATZIS	94	OMEG	450 $pp \to pp2(\pi^+\pi^-)$	
1545 ± 25		[10] AMSLER	94E	CBAR	0.0 $\overline{p}p \to \pi^0\eta\eta'$	
1520 ± 25		[2,18] ANISOVICH	94	CBAR	0.0 $\overline{p}p \to 3\pi^0, \pi^0\eta\eta$	
1505 ± 20		[2,19] BUGG	94	RVUE	$\overline{p}p \to 3\pi^0$, $\eta\eta\pi^0$, $\eta\pi^0\pi^0$	
1560 ± 25		[10] AMSLER	92	CBAR	0.0 $\overline{p}p \to \pi^0\eta\eta$	
$1550 \pm 45 \pm 30$		[10] BELADIDZE	92C	VES	36 π^- Be $\to \pi^-\eta'\eta$ Be	
1449 ± 4		[10] ARMSTRONG	89E	OMEG	300 $pp \to pp2(\pi^+\pi^-)$	
1610 ± 20		[10] ALDE	88	GAM4	300 $\pi^- N \to \pi^- N 2\eta$	
~ 1525		ASTON	88D	LASS	11 $K^- p \to K^0_S K^0_S \Lambda$	
1570 ± 20	600	[10] ALDE	87	GAM4	100 $\pi^- p \to 4\pi^0 n$	
1575 ± 45		[20] ALDE	86D	GAM4	100 $\pi^- p \to 2\eta n$	
1568 ± 33		[10] BINON	84C	GAM2	38 $\pi^- p \to \eta\eta' n$	
1592 ± 25		[10] BINON	83	GAM2	38 $\pi^- p \to 2\eta n$	
1525 ± 5		[10] GRAY	83	DBC	0.0 $\overline{p}N \to 3\pi$	

YOUR NOTE

[1] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances. NODE=M152M;LINKAGE=C
[2] T-matrix pole. NODE=M152M;LINKAGE=PP
[3] Average between $\pi^+\pi^- 2\pi^0$ and $2(\pi^+\pi^-)$. NODE=M152M;LINKAGE=PC
[4] T-matrix pole, supersedes ANISOVICH 94. NODE=M152M;LINKAGE=D
[5] T-matrix pole, supersedes ANISOVICH 94 and AMSLER 92. NODE=M152M;LINKAGE=D1
[6] Using CLEO-c data but not authored by the CLEO Collaboration. NODE=M152M;LINKAGE=F
[7] From a fit to a Breit-Wigner line shape with fixed $\Gamma = 109$ MeV. NODE=M152M;LINKAGE=G
[8] Reanalysis of AITALA 01A data. This state could also be $f_0(1370)$. NODE=M152M;LINKAGE=KL
[9] Breit-Wigner mass. May also be the $f_0(1370)$. NODE=M152M;LINKAGE=UE
[10] Breit-Wigner mass. NODE=M152M;LINKAGE=E
[11] Statistical error only. NODE=M152M;LINKAGE=ST
[12] Breit-Wigner, solution 1, PWA ambiguous. NODE=M152M;LINKAGE=GA
[13] K-matrix pole from combined analysis of $\pi^- p \to \pi^0\pi^0 n$, $\pi^- p \to K\overline{K} n$, $\pi^+\pi^- \to \pi^+\pi^-$, $\overline{p}p \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$, $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, $K^0_S K^0_S \pi^0$, $K^+K^0_S\pi^-$ at rest, $\overline{p}n \to \pi^-\pi^-\pi^+$, $K^0_S K^-\pi^0$, $K^0_S K^0_S \pi^-$ at rest. NODE=M152M;LINKAGE=KM
[14] Supersedes BARBERIS 99 and BARBERIS 99B. NODE=M152M;LINKAGE=BD
[15] T-matrix pole on sheet $- - +$. NODE=M152M;LINKAGE=TK
[16] T-matrix pole. Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D. NODE=M152M;LINKAGE=AB
[17] Supersedes ABATZIS 94, ARMSTRONG 89E. Breit-Wigner mass. NODE=M152M;LINKAGE=B
[18] From a simultaneous analysis of the annihilations $\overline{p}p \to 3\pi^0, \pi^0\eta\eta$. NODE=M152M;LINKAGE=A
[19] Reanalysis of ANISOVICH 94 data. NODE=M152M;LINKAGE=C1
[20] From central value and spread of two solutions. Breit-Wigner mass. NODE=M152M;LINKAGE=AZ

$f_0(1500)$ WIDTH

NODE=M152W

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
109 ± 7 OUR AVERAGE					
$136^{+41+28}_{-26-100}$	5.5k	[21] ABLIKIM	13N	BES3	$e^+e^- \to J/\psi \to \gamma\eta\eta$
$108^{+14}_{-11} \pm 25$		ABLIKIM	06V	BES2	$e^+e^- \to J/\psi \to \gamma\pi^+\pi^-$
110 ± 24		[22] BARBERIS	00A		450 $pp \to p_f \eta\eta p_s$
102 ± 18		[22,23] BARBERIS	00C		450 $pp \to p_f 4\pi p_s$
110 ± 16		[22] BARBERIS	00E		450 $pp \to p_f \eta\eta p_s$
108 ± 33		BERTIN	98	OBLX	0.05–0.405 $\overline{n}p \to \pi^+\pi^+\pi^-$
114 ± 30		[22] BERTIN	97C	OBLX	0.0 $\overline{p}p \to \pi^+\pi^-\pi^0$
105 ± 15		ABELE	96B	CBAR	0.0 $\overline{p}p \to \pi^0 K^0_L K^0_L$
120 ± 25		[24] AMSLER	95B	CBAR	0.0 $\overline{p}p \to 3\pi^0$
120 ± 30		[25] AMSLER	95C	CBAR	0.0 $\overline{p}p \to \eta\eta\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
114 ± 10		[22] ANISOVICH	09	RVUE	0.0 $\overline{p}p$, πN
90^{+2+50}_{-1-22}		[26] UEHARA	08A	BELL	10.6 $e^+e^- \to e^+e^-\pi^0\pi^0$
121 ± 8		AMSLER	06	CBAR	0.9 $\overline{p}p \to K^+K^-\pi^0$
257 ± 33	9.9k	AUBERT	06O	BABR	$B^+ \to K^+K^+K^-$
108 ± 9	80k	[27,28] UMAN	06	E835	5.2 $\overline{p}p \to \eta\eta\pi^0$
119 ± 10		VLADIMIRSK...	06	SPEC	40 $\pi^- p \to K^0_S K^0_S n$
90 ± 15		[27] BINON	05	GAMS	33 $\pi^- p \to \eta\eta n$

YOUR DATA

136± 23	1400	[29] GARMASH	05	BELL	$B^+ \to K^+ K^+ K^-$
102± 10		[30] ANISOVICH	03	RVUE	
140± 40		[27] ABELE	01	CBAR	0.0 $\overline{p} d \to \pi^- 4\pi^0 p$
104± 25		[27] BARBERIS	99	OMEG	450 $pp \to p_s p_f K^+ K^-$
131± 15		[27] BARBERIS	99B	OMEG	450 $pp \to p_s p_f \pi^+ \pi^-$
98± 18± 16		[31] BARBERIS	99D	OMEG	450 $pp \to K^+ K^-, \pi^+ \pi^-$
160± 50		[27] BELLAZZINI	99	GAM4	450 $pp \to pp\pi^0 \pi^0$
100± 33		[27] FRENCH	99		300 $pp \to p_f (K^+ K^-) p_s$
108± 46		[32] KAMINSKI	99	RVUE	$\pi\pi \to \pi\pi, K\overline{K}, \sigma\sigma$
280±100		[27] ALDE	98	GAM4	100 $\pi^- p \to \pi^0 \pi^0 n$
130± 20		[22] ANISOVICH	98B	RVUE	Compilation
120± 35		[22] BARBERIS	97B	OMEG	450 $pp \to pp2(\pi^+ \pi^-)$
∼ 100		FRABETTI	97D	E687	$D_s^\pm \to \pi^\mp \pi^\pm \pi^\pm$
∼ 169		ABELE	96	CBAR	0.0 $\overline{p} p \to 5\pi^0$
100± 30	120	[27] AMELIN	96B	VES	37 $\pi^- A \to \eta\eta\pi^- A$
132± 15		BUGG	96	RVUE	
154± 30		[33] AMSLER	95D	CBAR	0.0 $\overline{p} p \to \pi^0 \pi^0 \pi^0, \pi^0 \eta\eta, \pi^0 \pi^0 \eta$
65± 10		[34] ANTINORI	95	OMEG	300,450 $pp \to pp2(\pi^+ \pi^-)$
199± 30		[27] ANTINORI	95	OMEG	300,450 $pp \to pp\pi^+ \pi^-$
56± 12		[27] ABATZIS	94	OMEG	450 $pp \to pp2(\pi^+ \pi^-)$
100± 40		[27] AMSLER	94E	CBAR	0.0 $\overline{p} p \to \pi^0 \eta\eta'$
148^{+20}_{-25}		[22,35] ANISOVICH	94	CBAR	0.0 $\overline{p} p \to 3\pi^0, \pi^0 \eta\eta$
150± 20		[22,36] BUGG	94	RVUE	$\overline{p} p \to 3\pi^0, \eta\eta\pi^0, \eta\pi^0 \pi^0$
245± 50		[27] AMSLER	92	CBAR	0.0 $\overline{p} p \to \pi^0 \eta\eta$
153± 67± 50		[27] BELADIDZE	92C	VES	36 π^- Be $\to \pi^- \eta' \eta$ Be
78± 18		[27] ARMSTRONG	89E	OMEG	300 $pp \to pp2(\pi^+ \pi^-)$
170± 40		[27] ALDE	88	GAM4	300 $\pi^- N \to \pi^- N 2\eta$
150± 20	600	[27] ALDE	87	GAM4	100 $\pi^- p \to 4\pi^0 n$
265± 65		[37] ALDE	86D	GAM4	100 $\pi^- p \to 2\eta n$
260± 60		[27] BINON	84C	GAM2	38 $\pi^- p \to \eta\eta' n$
210± 40		[27] BINON	83	GAM2	38 $\pi^- p \to 2\eta n$
101± 13		[27] GRAY	83	DBC	0.0 $\overline{p} N \to 3\pi$

YOUR NOTE

[21] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances. NODE=M152W;LINKAGE=C

[22] T-matrix pole. NODE=M152W;LINKAGE=PP

[23] Average between $\pi^+ \pi^- 2\pi^0$ and $2(\pi^+ \pi^-)$. NODE=M152W;LINKAGE=PC

[24] T-matrix pole, supersedes ANISOVICH 94. NODE=M152W;LINKAGE=D

[25] T-matrix pole, supersedes ANISOVICH 94 and AMSLER 92. NODE=M152W;LINKAGE=D1

[26] Breit-Wigner width. May also be the $f_0(1370)$. NODE=M152W;LINKAGE=UE

[27] Breit-Wigner width. NODE=M152W;LINKAGE=E

[28] Statistical error only. NODE=M152W;LINKAGE=ST

[29] Breit-Wigner, solution 1, PWA ambiguous. NODE=M152W;LINKAGE=GA

[30] K-matrix pole from combined analysis of $\pi^- p \to \pi^0 \pi^0 n$, $\pi^- p \to K\overline{K} n$, $\pi^+ \pi^- \to \pi^+ \pi^-$, $\overline{p} p \to \pi^0 \pi^0 \pi^0$, $\pi^0 \eta\eta$, $\pi^0 \pi^0 \eta$, $\pi^+ \pi^- \pi^0$, $K^+ K^- \pi^0$, $K^0_S K^0_S \pi^0$, $K^+ K^0_S \pi^-$ at rest, $\overline{p} n \to \pi^- \pi^- \pi^+$, $K^0_S K^- \pi^0$, $K^0_S K^0_S \pi^-$ at rest. NODE=M152W;LINKAGE=KM

[31] Supersedes BARBERIS 99 and BARBERIS 99B. NODE=M152W;LINKAGE=BD

[32] T-matrix pole on sheet $- - +$. NODE=M152W;LINKAGE=TK

[33] T-matrix pole. Coupled-channel analysis of AMSLER 95B, AMSLER 95C, and AMSLER 94D. NODE=M152W;LINKAGE=AB

[34] Supersedes ABATZIS 94, ARMSTRONG 89E. Breit-Wigner mass. NODE=M152W;LINKAGE=B

[35] From a simultaneous analysis of the annihilations $\overline{p} p \to 3\pi^0, \pi^0 \eta\eta$. NODE=M152W;LINKAGE=A

[36] Reanalysis of ANISOVICH 94 data. NODE=M152W;LINKAGE=C1

[37] From central value and spread of two solutions. Breit-Wigner mass. NODE=M152W;LINKAGE=AZ

$f_0(1500)$ REFERENCES

NODE=M152

YOUR PAPER

DOBBS	15	PR D91 052006	S. Dobbs *et al.*	(NWES)	REFID=56805
ABLIKIM	13N	PR D87 092009	Ablikim M. *et al.*	(BES III Collab.)	REFID=55387
ANISOVICH	09	IJMP A24 2481	V.V. Anisovich, A.V. Sarantsev		REFID=52719
KLEMPT	08	EPJ C55 39	E. Klempt, M. Matveev, A.V. Sarantsev	(BONN+)	REFID=52286
UEHARA	08A	PR D78 052004	S. Uehara *et al.*	(BELLE Collab.)	REFID=52309
ABLIKIM	06V	PL B642 441	M. Ablikim *et al.*	(BES Collab.)	REFID=51507
AMSLER	06	PL B639 165	C. Amsler *et al.*	(CBAR Collab.)	REFID=51136
AUBERT	06O	PR D74 032003	B. Aubert *et al.*	(BABAR Collab.)	REFID=51141
PDG	06	JP G33 1	W.-M. Yao *et al.*	(PDG Collab.)	REFID=51004
UMAN	06	PR D73 052009	I. Uman *et al.*	(FNAL E835)	REFID=51063
VLADIMIRSK...	06	PAN 69 493	V.V. Vladimirsky *et al.*	(ITEP, Moscow)	REFID=51191
		Translated from YAF 69 515.			

BINON	05	PAN 68 960	F. Binon *et al.*		REFID=50780
		Translated from YAF 68 998.			
GARMASH	05	PR D71 092003	A. Garmash *et al.*	(BELLE Collab.)	REFID=50641
ANISOVICH	03	EPJ A16 229	V.V. Anisovich *et al.*		REFID=49401
ABELE	01	EPJ C19 667	A. Abele *et al.*	(Crystal Barrel Collab.)	REFID=48334
AITALA	01A	PRL 86 765	E.M. Aitala *et al.*	(FNAL E791 Collab.)	REFID=48004
BARBERIS	00A	PL B471 429	D. Barberis *et al.*	(WA 102 Collab.)	REFID=47957
BARBERIS	00C	PL B471 440	D. Barberis *et al.*	(WA 102 Collab.)	REFID=47959
BARBERIS	00E	PL B479 59	D. Barberis *et al.*	(WA 102 Collab.)	REFID=47961
BARBERIS	99	PL B453 305	D. Barberis *et al.*	(Omega Expt.)	REFID=46921
BARBERIS	99B	PL B453 316	D. Barberis *et al.*	(Omega Expt.)	REFID=46922
BARBERIS	99D	PL B462 462	D. Barberis *et al.*	(Omega Expt.)	REFID=47395
BELLAZZINI	99	PL B467 296	R. Bellazzini *et al.*		REFID=47400
FRENCH	99	PL B460 213	B. French *et al.*	(WA76 Collab.)	REFID=47491
KAMINSKI	99	EPJ C9 141	R. Kaminski, L. Lesniak, B. Loiseau	(CRAC, PARIN)	REFID=46927
ALDE	98	EPJ A3 361	D. Alde *et al.*	(GAM4 Collab.)	REFID=46605
Also		PAN 62 405	D. Alde *et al.*	(GAMS Collab.)	REFID=46914
		Translated from YAF 62 446.			
ANISOVICH	98B	SPU 41 419	V.V. Anisovich *et al.*		REFID=46331
		Translated from UFN 168 481.			
BERTIN	98	PR D57 55	A. Bertin *et al.*	(OBELIX Collab.)	REFID=45782
REYES	98	PRL 81 4079	M.A. Reyes *et al.*		REFID=46378
BARBERIS	97B	PL B413 217	D. Barberis *et al.*	(WA 102 Collab.)	REFID=45758
BERTIN	97C	PL B408 476	A. Bertin *et al.*	(OBELIX Collab.)	REFID=45701
FRABETTI	97D	PL B407 79	P.L. Frabetti *et al.*	(FNAL E687 Collab.)	REFID=45554
ABELE	96	PL B380 453	A. Abele *et al.*	(Crystal Barrel Collab.)	REFID=45011
ABELE	96B	PL B385 425	A. Abele *et al.*	(Crystal Barrel Collab.)	REFID=45038
ABELE	96C	NP A609 562	A. Abele *et al.*	(Crystal Barrel Collab.)	REFID=45076
AMELIN	96B	PAN 59 976	D.V. Amelin *et al.*	(SERP, TBIL)	REFID=44725
		Translated from YAF 59 1021.			
BUGG	96	NP B471 59	D.V. Bugg, A.V. Sarantsev, B.S. Zou	(LOQM, PNPI)	REFID=45094
AMSLER	95B	PL B342 433	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44377
AMSLER	95C	PL B353 571	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44440
AMSLER	95D	PL B355 425	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44441
ANTINORI	95	PL B353 589	F. Antinori *et al.*	(ATHU, BARI, BIRM+)	REFID=44437
BUGG	95	PL B353 378	D.V. Bugg *et al.*	(LOQM, PNPI, WASH)	REFID=44438
ABATZIS	94	PL B324 509	S. Abatzis *et al.*	(ATHU, BARI, BIRM+)	REFID=44090
AMSLER	94D	PL B333 277	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44093
AMSLER	94E	PL B340 259	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44080
ANISOVICH	94	PL B323 233	V.V. Anisovich *et al.*	(Crystal Barrel Collab.)	REFID=43659
BUGG	94	PR D50 4412	D.V. Bugg *et al.*	(LOQM)	REFID=44078
AMSLER	92	PL B291 347	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=43169
BELADIDZE	92C	SJNP 55 1535	G.M. Beladidze, S.I. Bityukov, G.V. Borisov	(SERP+)	REFID=43175
		Translated from YAF 55 2748.			
ARMSTRONG	89E	PL B228 536	T.A. Armstrong, M. Benayoun	(ATHU, BARI, BIRM+)	REFID=41011
ALDE	88	PL B201 160	D.M. Alde *et al.*	(SERP, BELG, LANL, LAPP+)	REFID=40283
ASTON	88D	NP B301 525	D. Aston *et al.*	(SLAC, NAGO, CINC, INUS)	REFID=40330
ALDE	87	PL B198 286	D.M. Alde *et al.*	(LANL, BRUX, SERP, LAPP)	REFID=40221
ALDE	86D	NP B269 485	D.M. Alde *et al.*	(BELG, LAPP, SERP, CERN+)	REFID=20765
BINON	84C	NC 80A 363	F.G. Binon *et al.*	(BELG, LAPP, SERP+)	REFID=21418
BINON	83	NC 78A 313	F.G. Binon *et al.*	(BELG, LAPP, SERP+)	REFID=20750
Also		SJNP 38 561	F.G. Binon *et al.*	(BELG, LAPP, SERP+)	REFID=20751
		Translated from YAF 38 934.			
GRAY	83	PR D27 307	L. Gray *et al.*	(SYRA)	REFID=21370

NODE=M013

$f'_2(1525)$

$I^G(J^{PC}) = 0^+(2^{++})$

$f'_2(1525)$ MASS

NODE=M013205

PRODUCED IN e^+e^- ANNIHILATION AND PARTICLE DECAYS

NODE=M013M3

NODE=M013M3

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.					
$1521.9^{+1.8}_{-1.5}$ OUR AVERAGE Error includes scale factor of 1.1.					
$1522.2 \pm 2.8^{+5.3}_{-2.0}$		AAIJ	13AN	LHCB	$\overline{B}^0_s \to J/\psi K^+ K^-$
YOUR DATA $1513 \pm 5 {}^{+4}_{-10}$	5.5k	[5] ABLIKIM	13N	BES3	$e^+e^- \to J/\psi \to \gamma\eta\eta$
$1525.3^{+1.2}_{-1.4} {}^{+3.7}_{-2.1}$		UEHARA	13	BELL	$\gamma\gamma \to K^0_S K^0_S$
1521 ± 5		ABLIKIM	05	BES2	$J/\psi \to \phi K^+ K^-$
$1518 \pm 1 \pm 3$		ABE	04	BELL	10.6 $e^+e^- \to e^+e^- K^+ K^-$
$1519 \pm 2 {}^{+15}_{-5}$		BAI	03G	BES	$J/\psi \to \gamma K \overline{K}$
1523 ± 6	331	[6] ACCIARRI	01H	L3	91, 183–209 $e^+e^- \to e^+e^- K^0_S K^0_S$
$1535 \pm 5 \pm 4$		ABREU	96C	DLPH	$Z^0 \to K^+ K^- + X$
$1516 \pm 5 {}^{+9}_{-15}$		BAI	96C	BES	$J/\psi \to \gamma K^+ K^-$
1531.6 ± 10.0		AUGUSTIN	88	DM2	$J/\psi \to \gamma K^+ K^-$
1515 ± 5		[7] FALVARD	88	DM2	$J/\psi \to \phi K^+ K^-$
$1525 \pm 10 \pm 10$		BALTRUSAIT...	87	MRK3	$J/\psi \to \gamma K^+ K^-$

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

1532 ± 3 ± 6	644	[8,9] DOBBS	15		$J/\psi \to \gamma K^+ K^-$	
1557 ± 9 ± 3	113	[8,9] DOBBS	15		$\psi(2S) \to \gamma K^+ K^-$	OCCUR=2
1523 ± 5	870	[10] SCHEGELSKY	06A	RVUE	$\gamma\gamma \to K^0_S K^0_S$	
1496 ± 2		[11] FALVARD	88	DM2	$J/\psi \to \phi K^+ K^-$	OCCUR=2

YOUR NOTE

[5] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances. NODE=M013M3;LINKAGE=A

[6] Supersedes ACCIARRI 95J. NODE=M013M;LINKAGE=HA

[7] From an analysis ignoring interference with $f_0(1710)$. NODE=M013M;LINKAGE=F1

[8] Using CLEO-c data but not authored by the CLEO Collaboration. NODE=M013M3;LINKAGE=B

[9] From a fit to a Breit-Wigner line shape with fixed $\Gamma = 73$ MeV. NODE=M013M3;LINKAGE=C

[10] From analysis of L3 data at 91 and 183–209 GeV. NODE=M013M3;LINKAGE=SC

[11] From an analysis including interference with $f_0(1710)$. NODE=M013M;LINKAGE=F2

$f'_2(1525)$ WIDTH

NODE=M013210

PRODUCED IN e^+e^- ANNIHILATION AND PARTICLE DECAYS

NODE=M013W3

NODE=M013W3

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT

The data in this block is included in the average printed for a previous datablock.

$81.4^{+2.4}_{-2.0}$ OUR AVERAGE

84 ± 6 $^{+10}_{-5}$		AAIJ	13AN	LHCB	$\overline{B}^0_s \to J/\psi K^+ K^-$	
75 $^{+12}_{-10}$ $^{+16}_{-8}$	5.5k	[21] ABLIKIM	13N	BES3	$e^+e^- \to J/\psi \to \gamma\eta\eta$	
82.9 $^{+2.1}_{-2.2}$ $^{+3.3}_{-2.0}$		UEHARA	13	BELL	$\gamma\gamma \to K^0_S K^0_S$	
77 ±15		ABLIKIM	05	BES2	$J/\psi \to \phi K^+ K^-$	
82 ± 2 ± 3		ABE	04	BELL	10.6 $e^+e^- \to e^+e^- K^+ K^-$	
75 ± 4 $^{+15}_{-5}$		BAI	03G	BES	$J/\psi \to \gamma K \overline{K}$	
100 ±15	331	[22] ACCIARRI	01H	L3	91, 183–209 $e^+e^- \to e^+e^- K^0_S K^0_S$	
60 ±20 ±19		ABREU	96C	DLPH	$Z^0 \to K^+ K^- + X$	
60 ±23 $^{+13}_{-20}$		BAI	96C	BES	$J/\psi \to \gamma K^+ K^-$	
103 ±30		AUGUSTIN	88	DM2	$J/\psi \to \gamma K^+ K^-$	
62 ±10		[23] FALVARD	88	DM2	$J/\psi \to \phi K^+ K^-$	
85 ±35		BALTRUSAIT...	87	MRK3	$J/\psi \to \gamma K^+ K^-$	

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

104 ±10	870	[24] SCHEGELSKY	06A	RVUE	$\gamma\gamma \to K^0_S K^0_S$	
100 ± 3		[25] FALVARD	88	DM2	$J/\psi \to \phi K^+ K^-$	OCCUR=2

YOUR NOTE

[21] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances. NODE=M013W3;LINKAGE=A

[22] Supersedes ACCIARRI 95J. NODE=M013W;LINKAGE=HA

[23] From an analysis ignoring interference with $f_0(1710)$. NODE=M013W;LINKAGE=F1

[24] From analysis of L3 data at 91 and 183–209 GeV. NODE=M013W3;LINKAGE=SC

[25] From an analysis including interference with $f_0(1710)$. NODE=M013W;LINKAGE=F2

$f'_2(1525)$ REFERENCES

NODE=M013

YOUR PAPER

DOBBS	15	PR D91 052006	S. Dobbs *et al.*	(NWES)	REFID=56805
AAIJ	13AN	PR D87 072004	R. Aaij *et al.*	(LHCb Collab.)	REFID=55137
ABLIKIM	13N	PR D87 092009	Ablikim M. *et al.*	(BES III Collab.)	REFID=55387
UEHARA	13	PTEP 2013 123C01	S. Uehara *et al.*	(BELLE Collab.)	REFID=55592
SCHEGELSKY	06A	EPJ A27 207	V.A. Schegelsky *et al.*		REFID=51185
ABLIKIM	05	PL B607 243	M. Ablikim *et al.*	(BES Collab.)	REFID=50450
ABE	04	EPJ C32 323	K. Abe *et al.*	(BELLE Collab.)	REFID=49650
BAI	03G	PR D68 052003	J.Z. Bai *et al.*	(BES Collab.)	REFID=49580
ACCIARRI	01H	PL B501 173	M. Acciarri *et al.*	(L3 Collab.)	REFID=48321
ABREU	96C	PL B379 309	P. Abreu *et al.*	(DELPHI Collab.)	REFID=44671
BAI	96C	PRL 77 3959	J.Z. Bai *et al.*	(BES Collab.)	REFID=45169
ACCIARRI	95J	PL B363 118	M. Acciarri *et al.*	(L3 Collab.)	REFID=44615
AUGUSTIN	88	PRL 60 2238	J.E. Augustin *et al.*	(DM2 Collab.)	REFID=40574
FALVARD	88	PR D38 2706	A. Falvard *et al.*	(CLER, FRAS, LALO+)	REFID=40576
BALTRUSAIT...	87	PR D35 2077	R.M. Baltrusaitis *et al.*	(Mark III Collab.)	REFID=40010

NODE=M068

$f_0(1710)$

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

See our mini-review in the 2004 edition of this *Review*, Physics Letters **B592** 1 (2004). See also the mini-review on scalar mesons under $f_0(500)$ (see the index for the page number). NODE=M068

$f_0(1710)$ MASS

NODE=M068M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT	
						NODE=M068M
1723^{+6}_{-5} OUR AVERAGE		Error includes scale factor of 1.6. See the ideogram below.				
YOUR DATA $1759 \pm 6 \; ^{+14}_{-25}$	5.5k	[1] ABLIKIM	13N	BES3	$e^+e^- \to J/\psi \to \gamma\eta\eta$	
$1750^{+6}_{-7} \; ^{+29}_{-18}$		UEHARA	13	BELL	$\gamma\gamma \to K^0_S K^0_S$	
$1701 \pm 5 \; ^{+9}_{-2}$	4k	[2] CHEKANOV	08	ZEUS	$ep \to K^0_S K^0_S X$	
$1765^{+4}_{-3} \pm 13$		ABLIKIM	06V	BES2	$e^+e^- \to J/\psi \to \gamma\pi^+\pi^-$	
$1760 \pm 15 \; ^{+15}_{-10}$		[3] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+K^-$	
1738 ± 30		ABLIKIM	04E	BES2	$J/\psi \to \omega K^+K^-$	
$1740 \pm 4 \; ^{+10}_{-25}$		[4] BAI	03G	BES	$J/\psi \to \gamma K\overline{K}$	
1740^{+30}_{-25}		[4] BAI	00A	BES	$J/\psi \to \gamma(\pi^+\pi^-\pi^+\pi^-)$	
1698 ± 18		[5] BARBERIS	00E		$450\ pp \to p_f \eta\eta p_s$	
$1710 \pm 12 \quad \pm 11$		[6] BARBERIS	99D	OMEG	$450\ pp \to K^+K^-, \pi^+\pi^-$	
1710 ± 25		[7] FRENCH	99		$300\ pp \to p_f(K^+K^-)p_s$	
1707 ± 10		[8] AUGUSTIN	88	DM2	$J/\psi \to \gamma K^+K^-, K^0_S K^0_S$	
1698 ± 15		[8] AUGUSTIN	87	DM2	$J/\psi \to \gamma\pi^+\pi^-$	
$1720 \pm 10 \quad \pm 10$		[9] BALTRUSAIT...	87	MRK3	$J/\psi \to \gamma K^+K^-$	
1742 ± 15		[8] WILLIAMS	84	MPSF	$200\ \pi^- N \to 2K^0_S X$	
1670 ± 50		BLOOM	83	CBAL	$J/\psi \to \gamma 2\eta$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$1744 \pm 7 \quad \pm 5$	381	[10,11] DOBBS	15		$J/\psi \to \gamma\pi^+\pi^-$	
$1705 \pm 11 \quad \pm 5$	237	[10,11] DOBBS	15		$\psi(2S) \to \gamma\pi^+\pi^-$	OCCUR=2
$1706 \pm 4 \quad \pm 5$	1.0k	[10,11] DOBBS	15		$J/\psi \to \gamma K^+K^-$	OCCUR=3
$1690 \pm 8 \quad \pm 3$	349	[10,11] DOBBS	15		$\psi(2S) \to \gamma K^+K^-$	OCCUR=4
1750 ± 13		AMSLER	06	CBAR	$1.64\ \bar{p}p \to K^+K^-\pi^0$	
1747 ± 5	80k	[12,13] UMAN	06	E835	$5.2\ \bar{p}p \to \eta\eta\pi^0$	
1776 ± 15		VLADIMIRSK...	06	SPEC	$40\ \pi^- p \to K^0_S K^0_S n$	
1790^{+40}_{-30}		[3] ABLIKIM	05	BES2	$J/\psi \to \phi\pi^+\pi^-$	
1670 ± 20		[12] BINON	05	GAMS	$33\ \pi^- p \to \eta\eta n$	
1726 ± 7	74	[13] CHEKANOV	04	ZEUS	$ep \to K^0_S K^0_S X$	
$1732 + 15$		[14] ANISOVICH	03	RVUE		
1682 ± 16		TIKHOMIROV	03	SPEC	$40.0\ \pi^- C \to K^0_S K^0_S K^0_L X$	
1670 ± 26	3.6k	[4,15] NICHITIU	02	OBLX		
1770 ± 12		[16,17] ANISOVICH	99B	SPEC	$0.6\text{–}1.2\ p\bar{p} \to \eta\eta\pi^0$	
1730 ± 15		[4] BARBERIS	99	OMEG	$450\ pp \to p_s p_f K^+K^-$	
1750 ± 20		[4] BARBERIS	99B	OMEG	$450\ pp \to p_s p_f \pi^+\pi^-$	
1750 ± 30		[18] ANISOVICH	98B	RVUE	Compilation	
1720 ± 39		BAI	98H	BES	$J/\psi \to \gamma\pi^0\pi^0$	
1775 ± 1.5	57	[19] BARKOV	98		$\pi^- p \to K^0_S K^0_S n$	
1690 ± 11		[20] ABREU	96C	DLPH	$Z^0 \to K^+K^- + X$	
$1696 \pm 5 \; ^{+9}_{-34}$		[9] BAI	96C	BES	$J/\psi \to \gamma K^+K^-$	
$1781 \pm 8 \; ^{+10}_{-31}$		[4] BAI	96C	BES	$J/\psi \to \gamma K^+K^-$	OCCUR=2
1768 ± 14		BALOSHIN	95	SPEC	$40\ \pi^- C \to K^0_S K^0_S X$	
1750 ± 15		[21] BUGG	95	MRK3	$J/\psi \to \gamma\pi^+\pi^-\pi^+\pi^-$	
1620 ± 16		[9] BUGG	95	MRK3	$J/\psi \to \gamma\pi^+\pi^-\pi^+\pi^-$	OCCUR=2
1748 ± 10		[8] ARMSTRONG	93C	E760	$\bar{p}p \to \pi^0\eta\eta \to 6\gamma$	
~ 1750		BREAKSTONE	93	SFM	$pp \to pp\pi^+\pi^-\pi^+\pi^-$	
1744 ± 15		[22] ALDE	92D	GAM2	$38\ \pi^- p \to \eta\eta n$	
1713 ± 10		[23] ARMSTRONG	89D	OMEG	$300\ pp \to ppK^+K^-$	

1706±10	[23] ARMSTRONG	89D	OMEG	300 $pp \to pp K^0_S K^0_S$	OCCUR=2
1700±15	[9] BOLONKIN	88	SPEC	40 $\pi^- p \to K^0_S K^0_S n$	
1720±60	[4] BOLONKIN	88	SPEC	40 $\pi^- p \to K^0_S K^0_S n$	OCCUR=2
1638±10	[24] FALVARD	88	DM2	$J/\psi \to \phi K^+ K^-$, $K^0_S K^0_S$	
1690± 4	[25] FALVARD	88	DM2	$J/\psi \to \phi K^+ K^-$, $K^0_S K^0_S$	OCCUR=2
1755± 8	[26] ALDE	86C	GAM2	38 $\pi^- p \to n 2\eta$	
1730^{+2}_{-10}	[27] LONGACRE	86	RVUE	22 $\pi^- p \to n 2K^0_S$	
1650±50	BURKE	82	MRK2	$J/\psi \to \gamma 2\rho$	
1640±50	[28,29] EDWARDS	82D	CBAL	$J/\psi \to \gamma 2\eta$	
1730±10 ±20	[30] ETKIN	82C	MPS	23 $\pi^- p \to n 2K^0_S$	

YOUR NOTE

[1] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances. NODE=M068M;LINKAGE=D

[2] In the SU(3) based model with a specific interference pattern of the $f_2(1270)$, $a^0_2(1320)$, and $f'_2(1525)$ mesons incoherently added to the $f_0(1710)$ and non-resonant background. NODE=M068M;LINKAGE=HE

[3] This state may be different from $f_0(1710)$, see CLOSE 05. NODE=M068M;LINKAGE=AB

[4] $J^P = 0^+$. NODE=M068M;LINKAGE=A8

[5] T-matrix pole. NODE=M068M;LINKAGE=TP

[6] Supersedes BARBERIS 99 and BARBERIS 99B. NODE=M068M;LINKAGE=BD

[7] $J^P = 0^+$, supersedes by ARMSTRONG 89D. NODE=M068M;LINKAGE=C3

[8] No J^{PC} determination. NODE=M068M;LINKAGE=A1

[9] $J^P = 2^+$. NODE=M068M;LINKAGE=A3

[10] Using CLEO-c data but not authored by the CLEO Collaboration. NODE=M068M;LINKAGE=F

[11] From a fit to a Breit-Wigner line shape with fixed $\Gamma = 135$ MeV. NODE=M068M;LINKAGE=G

[12] Breit-Wigner mass. NODE=M068M;LINKAGE=BW

[13] Systematic errors not estimated. NODE=M068M;LINKAGE=CH

[14] K-matrix pole, assuming $J^P = 0^+$, from combined analysis of $\pi^- p \to \pi^0 \pi^0 n$, $\pi^- p \to K \overline{K} n$, $\pi^+ \pi^- \to \pi^+ \pi^-$, $\overline{p} p \to \pi^0 \pi^0 \pi^0$, $\pi^0 \eta \eta$, $\pi^0 \pi^0 \eta$, $\pi^+ \pi^- \pi^0$, $K^+ K^- \pi^0$, $K^0_S K^0_S \pi^0$, $K^+ K^0_S \pi^-$ at rest, $\overline{p} n \to \pi^- \pi^- \pi^+$, $K^0_S K^- \pi^0$, $K^0_S K^0_S \pi^-$ at rest. NODE=M068M;LINKAGE=KM

[15] Decaying to $f_0(1370)\pi\pi$. NODE=M068M;LINKAGE=NC

[16] $J^P = 0^+$. NODE=M068M;LINKAGE=AV

[17] Not seen by AMSLER 02. NODE=M068M;LINKAGE=NS

[18] T-matrix pole, assuming $J^P = 0^+$ NODE=M068M;LINKAGE=AN

[19] No J^{PC} determination. NODE=M068M;LINKAGE=4A

[20] No J^{PC} determination, width not determined. NODE=M068M;LINKAGE=A4

[21] From a fit to the 0^+ partial wave. NODE=M068M;LINKAGE=Q0

[22] ALDE 92D combines all the GAMS-2000 data. NODE=M068M;LINKAGE=AA

[23] $J^P = 2^+$, superseded by FRENCH 99. NODE=M068M;LINKAGE=C

[24] From an analysis ignoring interference with $f'_2(1525)$. NODE=M068M;LINKAGE=A

[25] From an analysis including interference with $f'_2(1525)$. NODE=M068M;LINKAGE=B

[26] Superseded by ALDE 92D. NODE=M068M;LINKAGE=BB

[27] Uses MRK3 data. From a partial-wave analysis of data using a K-matrix formalism with 5 poles, but assuming spin 2. Fit with constrained inelasticity. NODE=M068M;LINKAGE=A9

[28] $J^P = 2^+$ preferred. NODE=M068M;LINKAGE=B2

[29] From fit neglecting nearby $f'_2(1525)$. Replaced by BLOOM 83. NODE=M068M;LINKAGE=E

[30] Superseded by LONGACRE 86. NODE=M068M;LINKAGE=B1

$f_0(1710)$ WIDTH

NODE=M068W

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
139 ± 8 OUR AVERAGE		Error includes scale factor of 1.1.			
YOUR DATA					
172 ± 10 $^{+32}_{-16}$	5.5k	[1] ABLIKIM	13N	BES3	$e^+ e^- \to J/\psi \to \gamma\eta\eta$
139 $^{+11}_{-12}$ $^{+96}_{-50}$		UEHARA	13	BELL	$\gamma\gamma \to K^0_S K^0_S$
100 ± 24 $^{+7}_{-22}$	4k	[2] CHEKANOV	08	ZEUS	$ep \to K^0_S K^0_S X$
145 ± 8 ±69		ABLIKIM	06V	BES2	$e^+ e^- \to J/\psi \to \gamma\pi^+\pi^-$
125 ± 25 $^{+10}_{-15}$		[3] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+ K^-$
125 ± 20		ABLIKIM	04E	BES2	$J/\psi \to \omega K^+ K^-$
166 $^{+5}_{-8}$ $^{+15}_{-10}$		[4] BAI	03G	BES	$J/\psi \to \gamma K \overline{K}$
120 $^{+50}_{-40}$		[4] BAI	00A	BES	$J/\psi \to \gamma(\pi^+\pi^-\pi^+\pi^-)$
120 ± 26		[5] BARBERIS	00E		450 $pp \to p_f \eta\eta p_s$

126 ± 16 ±18			[6] BARBERIS	99D	OMEG	450 $pp \to K^+K^-, \pi^+\pi^-$		
105 ± 34			[7] FRENCH	99		300 $pp \to p_f(K^+K^-)p_s$		
166.4 ± 33.2			[8] AUGUSTIN	88	DM2	$J/\psi \to \gamma K^+K^-, K^0_S K^0_S$		
136 ± 28			[8] AUGUSTIN	87	DM2	$J/\psi \to \gamma\pi^+\pi^-$		
130 ± 20			[9] BALTRUSAIT..	87	MRK3	$J/\psi \to \gamma K^+K^-$		
57 ± 38			[10] WILLIAMS	84	MPSF	200 $\pi^- N \to 2K^0_S X$		
160 ± 80			BLOOM	83	CBAL	$J/\psi \to \gamma 2\eta$		
• • • We do not use the following data for averages, fits, limits, etc. • • •								
148 $^{+40}_{-30}$			AMSLER	06	CBAR	1.64 $\bar{p}p \to K^+K^-\pi^0$		
188 ± 13		80k	[3,11] UMAN	06	E835	5.2 $\bar{p}p \to \eta\eta\pi^0$		
250 ± 30			VLADIMIRSK...	06	SPEC	40 $\pi^- p \to K^0_S K^0_S n$		
270 $^{+60}_{-30}$			[12] ABLIKIM	05	BES2	$J/\psi \to \phi\pi^+\pi^-$		
260 ± 50			[3] BINON	05	GAMS	33 $\pi^- p \to \eta\eta n$		
38 $^{+20}_{-14}$		74	[11] CHEKANOV	04	ZEUS	$ep \to K^0_S K^0_S X$		
144 ± 30			[13,14] ANISOVICH	03	RVUE			
320 $^{+50}_{-20}$			[14,15] ANISOVICH	03	RVUE		OCCUR=2	
102 ± 26			TIKHOMIROV	03	SPEC	40.0 π^- C $\to K^0_S K^0_S K^0_L$ X		
267 ± 44		3651	[4,16] NICHITIU	02	OBLX			
220 ± 40			[17,18] ANISOVICH	99B	SPEC	0.6–1.2 $p\bar{p} \to \eta\eta\pi^0$		
100 ± 25			[4] BARBERIS	99	OMEG	450 $pp \to p_s p_f K^+K^-$		
160 ± 30			[4] BARBERIS	99B	OMEG	450 $pp \to p_s p_f \pi^+\pi^-$		
250 ±140			[19] ANISOVICH	98B	RVUE	Compilation		
30 ± 7		57	[20] BARKOV	98		$\pi^- p \to K^0_S K^0_S n$		
103 ± 18	$^{+30}_{-11}$		[9] BAI	96C	BES	$J/\psi \to \gamma K^+K^-$		
85 ± 24	$^{+22}_{-19}$		[4] BAI	96C	BES	$J/\psi \to \gamma K^+K^-$	OCCUR=2	
56 ± 19			BALOSHIN	95	SPEC	40 π^- C $\to K^0_S K^0_S$ X		
160 ± 40			[21] BUGG	95	MRK3	$J/\psi \to \gamma\pi^+\pi^-\pi^+\pi^-$		
160 $^{+60}_{-20}$			[9] BUGG	95	MRK3	$J/\psi \to \gamma\pi^+\pi^-\pi^+\pi^-$	OCCUR=2	
264 ± 25			[8] ARMSTRONG	93C	E760	$\bar{p}p \to \pi^0\eta\eta \to 6\gamma$		
200 to 300			BREAKSTONE	93	SFM	$pp \to pp\pi^+\pi^-\pi^+\pi^-$		
< 80 90% CL			[22] ALDE	92D	GAM2	38 $\pi^- p \to \eta\eta N^*$		
181 ± 30			[23] ARMSTRONG	89D	OMEG	300 $pp \to ppK^+K^-$		
104 ± 30			[23] ARMSTRONG	89D	OMEG	300 $pp \to ppK^0_S K^0_S$	OCCUR=2	
30 ± 20			[9] BOLONKIN	88	SPEC	40 $\pi^- p \to K^0_S K^0_S n$		
350 ±150			[4] BOLONKIN	88	SPEC	40 $\pi^- p \to K^0_S K^0_S n$	OCCUR=2	
148 ± 17			[24] FALVARD	88	DM2	$J/\psi \to \phi K^+K^-, K^0_S K^0_S$		
184 ± 6			[25] FALVARD	88	DM2	$J/\psi \to \phi K^+K^-, K^0_S K^0_S$	OCCUR=2	
122 $^{+74}_{-15}$			[26] LONGACRE	86	RVUE	22 $\pi^- p \to n2K^0_S$		
200 ±100			BURKE	82	MRK2	$J/\psi \to \gamma 2\rho$		
220 $^{+100}_{-70}$			[27,28] EDWARDS	82D	CBAL	$J/\psi \to \gamma 2\eta$		
200 $^{+156}_{-9}$			[29] ETKIN	82B	MPS	23 $\pi^- p \to n2K^0_S$		

YOUR NOTE

[1] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances. NODE=M068W;LINKAGE=F

[2] In the SU(3) based model with a specific interference pattern of the $f_2(1270)$, $a^0_2(1320)$, and $f'_2(1525)$ mesons incoherently added to the $f_0(1710)$ and non-resonant background. NODE=M068W;LINKAGE=HE

[3] Breit-Wigner width. NODE=M068W;LINKAGE=BW

[4] $J^P = 0^+$. NODE=M068W;LINKAGE=A8

[5] T-matrix pole. NODE=M068W;LINKAGE=TP

[6] Supersedes BARBERIS 99 and BARBERIS 99B. NODE=M068W;LINKAGE=BD

[7] $J^P = 0^+$, supersedes by ARMSTRONG 89D. NODE=M068W;LINKAGE=C3

[8] No J^{PC} determination. NODE=M068W;LINKAGE=A1

[9] $J^P = 2^+$. NODE=M068W;LINKAGE=A3

[10] No J^{PC} determination. NODE=M068M;LINKAGE=WI

[11] Systematic errors not estimated. NODE=M068W;LINKAGE=CH

[12] This state may be different from $f_0(1710)$, see CLOSE 05. NODE=M068W;LINKAGE=AB

[13] (Solution I) NODE=M068W;LINKAGE=K1

[14] K-matrix pole, assuming $J^P = 0^+$, from combined analysis of $\pi^- p \to \pi^0 \pi^0 n$, $\pi^- p \to K \overline{K} n$, $\pi^+ \pi^- \to \pi^+ \pi^-$, $\overline{p} p \to \pi^0 \pi^0 \pi^0$, $\pi^0 \eta \eta$, $\pi^0 \pi^0 \eta$, $\pi^+ \pi^- \pi^0$, $K^+ K^- \pi^0$, $K^0_S K^0_S \pi^0$, $K^+ K^0_S \pi^-$ at rest, $\overline{p} n \to \pi^- \pi^- \pi^+$, $K^0_S K^- \pi^0$, $K^0_S K^0_S \pi^-$ at rest. NODE=M068W;LINKAGE=KM

[15] (Solution I) NODE=M068W;LINKAGE=K2

[16] Decaying to $f_0(1370) \pi \pi$. NODE=M068W;LINKAGE=NC

[17] $J^P = 0^+$. NODE=M068W;LINKAGE=AV

[18] Not seen by AMSLER 02. NODE=M068W;LINKAGE=NS

[19] T-matrix pole, assuming $J^P = 0^+$ NODE=M068W;LINKAGE=AN

[20] No J^{PC} determination. NODE=M068W;LINKAGE=4A

[21] From a fit to the 0^+ partial wave. NODE=M068W;LINKAGE=Q0

[22] ALDE 92D combines all the GAMS-2000 data. NODE=M068W;LINKAGE=AA

[23] $J^P = 2^+$, (0^+ excluded). NODE=M068W;LINKAGE=B

[24] From an analysis ignoring interference with $f'_2(1525)$. NODE=M068W;LINKAGE=C

[25] From an analysis including interference with $f'_2(1525)$. NODE=M068W;LINKAGE=D

[26] Uses MRK3 data. From a partial-wave analysis of data using a K-matrix formalism with 5 poles, but assuming spin 2. Fit with constrained inelasticity. NODE=M068W;LINKAGE=A9

[27] $J^P = 2^+$ preferred. NODE=M068W;LINKAGE=B2

[28] From fit neglecting nearby $f'_2(1525)$. Replaced by BLOOM 83. NODE=M068W;LINKAGE=E

[29] From an amplitude analysis of the $K^0_S K^0_S$ system, superseded by LONGACRE 86. NODE=M068W;LINKAGE=A

$f_0(1710)$ REFERENCES

NODE=M068

	DOBBS	15	PR D91 052006	S. Dobbs *et al.*	(NWES)	REFID=56805
YOUR PAPER	ABLIKIM	13N	PR D87 092009	Ablikim M. *et al.*	(BES III Collab.)	REFID=55387
	UEHARA	13	PTEP 2013 123C01	S. Uehara *et al.*	(BELLE Collab.)	REFID=55592
	CHEKANOV	08	PRL 101 112003	S. Chekanov *et al.*	(ZEUS Collab.)	REFID=52275
	ABLIKIM	06V	PL B642 441	M. Ablikim *et al.*	(BES Collab.)	REFID=51507
	AMSLER	06	PL B639 165	C. Amsler *et al.*	(CBAR Collab.)	REFID=51136
	UMAN	06	PR D73 052009	I. Uman *et al.*	(FNAL E835)	REFID=51063
	VLADIMIRSK...	06	PAN 69 493	V.V. Vladimirsky *et al.*	(ITEP, Moscow)	REFID=51191
			Translated from YAF 69 515.			
	ABLIKIM	05	PL B607 243	M. Ablikim *et al.*	(BES Collab.)	REFID=50450
	ABLIKIM	05Q	PR D72 092002	M. Ablikim *et al.*	(BES Collab.)	REFID=50958
	BINON	05	PAN 68 960	F. Binon *et al.*		REFID=50780
			Translated from YAF 68 998.			
	CLOSE	05	PR D71 094022	F.E. Close, Q. Zhao		REFID=50788
	ABLIKIM	04E	PL B603 138	M. Ablikim *et al.*	(BES Collab.)	REFID=50174
	CHEKANOV	04	PL B578 33	S. Chekanov *et al.*	(ZEUS Collab.)	REFID=49672
	PDG	04	PL B592 1	S. Eidelman *et al.*	(PDG Collab.)	REFID=49653
	ANISOVICH	03	EPJ A16 229	V.V. Anisovich *et al.*		REFID=49401
	BAI	03G	PR D68 052003	J.Z. Bai *et al.*	(BES Collab.)	REFID=49580
	TIKHOMIROV	03	PAN 66 828	G.D. Tikhomirov *et al.*		REFID=49423
			Translated from YAF 66 860.			
	AMSLER	02	EPJ C23 29	C. Amsler *et al.*		REFID=48580
	NICHITIU	02	PL B545 261	F. Nichitiu *et al.*	(OBELIX Collab.)	REFID=48848
	BAI	00A	PL B472 207	J.Z. Bai *et al.*	(BES Collab.)	REFID=47426
	BARBERIS	00E	PL B479 59	D. Barberis *et al.*	(WA 102 Collab.)	REFID=47961
	ANISOVICH	99B	PL B449 154	A.V. Anisovich *et al.*		REFID=46886
	BARBERIS	99	PL B453 305	D. Barberis *et al.*	(Omega Expt.)	REFID=46921
	BARBERIS	99B	PL B453 316	D. Barberis *et al.*	(Omega Expt.)	REFID=46922
	BARBERIS	99D	PL B462 462	D. Barberis *et al.*	(Omega Expt.)	REFID=47395
	FRENCH	99	PL B460 213	B. French *et al.*	(WA76 Collab.)	REFID=47491
	ANISOVICH	98B	SPU 41 419	V.V. Anisovich *et al.*		REFID=46331
			Translated from UFN 168 481.			
	BAI	98H	PRL 81 1179	J.Z. Bai *et al.*	(BES Collab.)	REFID=46342
	BARKOV	98	JETPL 68 764	B.P. Barkov *et al.*		REFID=46616
	ABREU	96C	PL B379 309	P. Abreu *et al.*	(DELPHI Collab.)	REFID=44671
	BAI	96C	PRL 77 3959	J.Z. Bai *et al.*	(BES Collab.)	REFID=45169
	BALOSHIN	95	PAN 58 46	O.N. Baloshin *et al.*	(ITEP)	REFID=44621
			Translated from YAF 58 50.			
	BUGG	95	PL B353 378	D.V. Bugg *et al.*	(LOQM, PNPI, WASH)	REFID=44438
	ARMSTRONG	93C	PL B307 394	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)	REFID=43587
	BREAKSTONE	93	ZPHY C58 251	A.M. Breakstone *et al.*	(IOWA, CERN, DORT+)	REFID=43312
	ALDE	92D	PL B284 457	D.M. Alde *et al.*	(GAM2 Collab.)	REFID=41591
	Also		SJNP 54 451	D.M. Alde *et al.*	(GAM2 Collab.)	REFID=44696
			Translated from YAF 54 745.			
	ARMSTRONG	89D	PL B227 186	T.A. Armstrong, M. Benayoun	(ATHU, BARI, BIRM+)	REFID=41010
	AUGUSTIN	88	PRL 60 2238	J.E. Augustin *et al.*	(DM2 Collab.)	REFID=40574
	BOLONKIN	88	NP B309 426	B.V. Bolonkin *et al.*	(ITEP, SERP)	REFID=40580
	FALVARD	88	PR D38 2706	A. Falvard *et al.*	(CLER, FRAS, LALO+)	REFID=40576
	AUGUSTIN	87	ZPHY C36 369	J.E. Augustin *et al.*	(LALO, CLER, FRAS+)	REFID=40268
	BALTRUSAIT...	87	PR D35 2077	R.M. Baltrusaitis *et al.*	(Mark III Collab.)	REFID=40010
	ALDE	86C	PL B182 105	D.M. Alde *et al.*	(SERP, BELG, LANL, LAPP)	REFID=21694
	LONGACRE	86	PL B177 223	R.S. Longacre *et al.*	(BNL, BRAN, CUNY+)	REFID=20768
	WILLIAMS	84	PR D30 877	E.G.H. Williams *et al.*	(VAND, NDAM, TUFTS+)	REFID=21693
	BLOOM	83	ARNS 33 143	E.D. Bloom, C. Peck	(SLAC, CIT)	REFID=21682
	BURKE	82	PRL 49 632	D.L. Burke *et al.*	(LBL, SLAC)	REFID=21676
	EDWARDS	82D	PRL 48 458	C. Edwards *et al.*	(CIT, HARV, PRIN+)	REFID=21677
	ETKIN	82B	PR D25 1786	A. Etkin *et al.*	(BNL, CUNY, TUFTS, VAND)	REFID=20390
	ETKIN	82C	PR D25 2446	A. Etkin *et al.*	(BNL, CUNY, TUFTS, VAND)	REFID=20391

NODE=M038

$f_2(1810)$

$I^G(J^{PC}) = 0^+(2^{++})$

OMITTED FROM SUMMARY TABLE

Needs confirmation. NODE=M038

$f_2(1810)$ MASS

NODE=M038M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1815±12 OUR AVERAGE		Error includes scale factor of 1.4. See the ideogram below.			
YOUR DATA 1822^{+29+66}_{-24-57}	5.5k	[1] ABLIKIM	13N	BES3	$e^+e^- \to J/\psi \to \gamma\eta\eta$
$1737 \pm 9^{+198}_{-65}$		[2] UEHARA	10A	BELL	10.6 $e^+e^- \to e^+e^-\eta\eta$
1800±30	40	ALDE	88D	GAM4	300 $\pi^- p \to \pi^- p 4\pi^0$
1806±10	1600	ALDE	87	GAM4	100 $\pi^- p \to 4\pi^0 n$
1870±40		[3] ALDE	86D	GAM4	100 $\pi^- p \to \eta\eta n$
1857^{+35}_{-24}		[4] COSTA...	80	OMEG	10 $\pi^- p \to K^+K^- n$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1858^{+18}_{-71}		[5] LONGACRE	86	RVUE	Compilation
1799±15		[6] CASON	82	STRC	8 $\pi^+ p \to \Delta^{++}\pi^0\pi^0$

YOUR NOTE

[1] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances. NODE=M038M;LINKAGE=B

[2] Breit-Wigner mass. NODE=M038M;LINKAGE=UE

[3] Seen in only one solution. NODE=M038M;LINKAGE=F

[4] Error increased by spread of two solutions. Included in LONGACRE 86 global analysis. NODE=M038M;LINKAGE=A

[5] From a partial-wave analysis of data using a K-matrix formalism with 5 poles. Includes compilation of several other experiments. NODE=M038M;LINKAGE=L

[6] From an amplitude analysis of the reaction $\pi^+\pi^- \to 2\pi^0$. The resonance in the $2\pi^0$ final state is not confirmed by PROKOSHKIN 97. NODE=M038M;LINKAGE=P1

$f_2(1810)$ WIDTH

NODE=M038W

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
197± 22 OUR AVERAGE		Error includes scale factor of 1.5. See the ideogram below.			
YOUR DATA $229^{+52+88}_{-42-155}$	5.5k	[7] ABLIKIM	13N	BES3	$e^+e^- \to J/\psi \to \gamma\eta\eta$
$228^{+21+234}_{-20-153}$		[8] UEHARA	10A	BELL	10.6 $e^+e^- \to e^+e^-\eta\eta$
160± 30	40	ALDE	88D	GAM4	300 $\pi^- p \to \pi^- p 4\pi^0$
190± 20	1600	ALDE	87	GAM4	100 $\pi^- p \to 4\pi^0 n$
250± 30		[9] ALDE	86D	GAM4	100 $\pi^- p \to \eta\eta n$
185^{+102}_{-139}		[10] COSTA...	80	OMEG	10 $\pi^- p \to K^+K^- n$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
388^{+15}_{-21}		[11] LONGACRE	86	RVUE	Compilation
280^{+42}_{-35}		[12] CASON	82	STRC	8 $\pi^+ p \to \Delta^{++}\pi^0\pi^0$

YOUR NOTE

[7] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances. NODE=M038W;LINKAGE=B

[8] Breit-Wigner width. NODE=M038W;LINKAGE=UE

[9] Seen in only one solution. NODE=M038W;LINKAGE=F

[10] Error increased by spread of two solutions. Included in LONGACRE 86 global analysis. NODE=M038W;LINKAGE=A

[11] From a partial-wave analysis of data using a K-matrix formalism with 5 poles. Includes compilation of several other experiments. NODE=M038W;LINKAGE=L

[12] From an amplitude analysis of the reaction $\pi^+\pi^- \to 2\pi^0$. The resonance in the $2\pi^0$ final state is not confirmed by PROKOSHKIN 97. NODE=M038W;LINKAGE=P1

$f_2(1810)$ BRANCHING RATIOS

NODE=M038220

$\Gamma(\eta\eta)/\Gamma_{total}$ — Γ_2/Γ

NODE=M038R3

VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA **seen**	ABLIKIM	13N	BES3	PWA of $J/\psi \to \gamma\eta\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.008^{+0.028}_{-0.003}$	[16] LONGACRE	86	RVUE	Compilation

NODE=M038R3

[16] From a partial-wave analysis of data using a K-matrix formalism with 5 poles. Includes compilation of several other experiments. NODE=M038R3;LINKAGE=L

$f_2(1810)$ REFERENCES

NODE=M038

YOUR PAPER

ABLIKIM	13N	PR D87 092009	Ablikim M. *et al.*	(BES III Collab.)	REFID=55387
UEHARA	10A	PR D82 114031	S. Uehara *et al.*	(BELLE Collab.)	REFID=53641
PROKOSHKIN	97	SPD 42 117	Y.D. Prokoshkin *et al.*	(SERP)	REFID=45386
		Translated from DANS 353 323.			
ALDE	88D	SJNP 47 810	D.M. Alde *et al.*	(SERP, BELG, LANL, LAPP+)	REFID=44652
		Translated from YAF 47 1273.			
ALDE	87	PL B198 286	D.M. Alde *et al.*	(LANL, BRUX, SERP, LAPP)	REFID=40221
ALDE	86D	NP B269 485	D.M. Alde *et al.*	(BELG, LAPP, SERP, CERN+)	REFID=20765
LONGACRE	86	PL B177 223	R.S. Longacre *et al.*	(BNL, BRAN, CUNY+)	REFID=20768
CASON	82	PRL 48 1316	N.M. Cason *et al.*	(NDAM, ANL)	REFID=20746
COSTA...	80	NP B175 402	G. Costa de Beauregard *et al.*	(BARI, BONN+)	REFID=20737

NODE=M168

$f_0(2100)$

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

OMITTED FROM SUMMARY TABLE

Needs confirmation. NODE=M168

$f_0(2100)$ MASS

NODE=M168M

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2101± 7 OUR AVERAGE					
YOUR DATA					
$2081 \pm 13^{+24}_{-36}$	5.5k	[1] ABLIKIM	13N	BES3	$e^+e^- \to J/\psi \to \gamma\eta\eta$
2102 ± 13		[2] ANISOVICH	00J	SPEC	$2.0\ \overline{p}p \to \eta\pi^0\pi^0$, $\pi^0\pi^0$, $\eta\eta$, $\eta\eta'$, $\pi^+\pi^-$
2090 ± 30		BAI	00A	BES	$J/\psi \to \gamma(\pi^+\pi^-\pi^+\pi^-)$
2105 ± 10		ANISOVICH	99K	SPEC	0.6–$1.94\ \overline{p}p \to \eta\eta$, $\eta\eta'$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2090 \pm 10 \pm 6$	529	[3,4] DOBBS	15		$J/\psi \to \gamma\pi^+\pi^-$
$2099 \pm 17 \pm 8$	283	[3,4] DOBBS	15		$\psi(2S) \to \gamma\pi^+\pi^-$
2105 ± 8	80k	[5] UMAN	06	E835	$5.2\ \overline{p}p \to \eta\eta\pi^0$
~ 2104		BUGG	95		$J/\psi \to \gamma\pi^+\pi^-\pi^+\pi^-$
~ 2122		HASAN	94	RVUE	$\overline{p}p \to \pi\pi$

NODE=M168M

NODE=M168M

OCCUR=2

YOUR NOTE

[1] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances. NODE=M168M;LINKAGE=A

[2] Includes the data of ANISOVICH 00B indicating to exotic decay pattern. NODE=M168M;LINKAGE=AN

[3] Using CLEO-c data but not authored by the CLEO Collaboration. NODE=M168M;LINKAGE=B

[4] From a fit to a Breit-Wigner line shape with fixed $\Gamma = 209$ MeV. NODE=M168M;LINKAGE=C

[5] Statistical error only. NODE=M168M;LINKAGE=ST

$f_0(2100)$ WIDTH

NODE=M168W

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
224^{+23}_{-21} OUR AVERAGE	Error includes scale factor of 1.3. See the ideogram below.				
YOUR DATA					
273^{+27+70}_{-24-23}	5.5k	[6] ABLIKIM	13N	BES3	$e^+e^- \to J/\psi \to \gamma\eta\eta$
211 ± 29		[7] ANISOVICH	00J	SPEC	$2.0\ \overline{p}p \to \eta\pi^0\pi^0$, $\pi^0\pi^0$, $\eta\eta$, $\eta\eta'$, $\pi^+\pi^-$
330 ± 100		BAI	00A	BES	$J/\psi \to \gamma(\pi^+\pi^-\pi^+\pi^-)$
200 ± 25		ANISOVICH	99K	SPEC	0.6–$1.94\ \overline{p}p \to \eta\eta$, $\eta\eta'$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
236 ± 14	80k	[8] UMAN	06	E835	$5.2\ \overline{p}p \to \eta\eta\pi^0$
~ 203		BUGG	95		$J/\psi \to \gamma\pi^+\pi^-\pi^+\pi^-$
~ 273		HASAN	94	RVUE	$\overline{p}p \to \pi\pi$

NODE=M168W

NODE=M168W

YOUR NOTE

[6] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances. NODE=M168W;LINKAGE=A

[7] Includes the data of ANISOVICH 00B indicating to exotic decay pattern. NODE=M168W;LINKAGE=AN

[8] Statistical error only. NODE=M168W;LINKAGE=ST

$f_0(2100)$ REFERENCES

NODE=M168

	DOBBS	15	PR D91 052006	S. Dobbs *et al.*	(NWES)	REFID=56805
YOUR PAPER	ABLIKIM	13N	PR D87 092009	Ablikim M. *et al.*	(BES III Collab.)	REFID=55387
	UMAN	06	PR D73 052009	I. Uman *et al.*	(FNAL E835)	REFID=51063
	ANISOVICH	00B	NP A662 319	A.V. Anisovich *et al.*		REFID=47942
	ANISOVICH	00J	PL B491 47	A.V. Anisovich *et al.*		REFID=47950
	BAI	00A	PL B472 207	J.Z. Bai *et al.*	(BES Collab.)	REFID=47426
	ANISOVICH	99K	PL B468 309	A.V. Anisovich *et al.*		REFID=47472
	BUGG	95	PL B353 378	D.V. Bugg *et al.*	(LOQM, PNPI, WASH)	REFID=44438
	HASAN	94	PL B334 215	A. Hasan, D.V. Bugg	(LOQM)	REFID=44103

NODE=M108

$f_2(2340)$

$I^G(J^{PC}) = 0^+(2^{++})$

$f_2(2340)$ MASS

NODE=M108M

NODE=M108M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
2345^{+50}_{-40} OUR AVERAGE					
YOUR DATA $2362^{+31}_{-30}{}^{+140}_{-63}$	5.5k	[1] ABLIKIM	13N	BES3	$e^+e^- \to J/\psi \to \gamma\eta\eta$
2339 ± 55		[2] ETKIN	88	MPS	$22\ \pi^- p \to \phi\phi n$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2350 ± 7	80k	[3] UMAN	06	E835	$5.2\ \bar{p}p \to \eta\eta\pi^0$
2392 ± 10		BOOTH	86	OMEG	$85\ \pi^-$ Be $\to 2\phi$Be
2360 ± 20		LINDENBAUM	84	RVUE	

YOUR NOTE

[1] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances. NODE=M108M;LINKAGE=A

[2] Includes data of ETKIN 85. The percentage of the resonance going into $\phi\phi$ 2^{++} S_2, D_2, and D_0 is 37 ± 19, 4^{+12}_{-4}, and 59^{+21}_{-19}, respectively. NODE=M108M;LINKAGE=C

[3] Statistical error only. NODE=M108M;LINKAGE=ST

$f_2(2340)$ WIDTH

NODE=M108W

NODE=M108W

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
322^{+70}_{-60} OUR AVERAGE					
YOUR DATA $334^{+62}_{-54}{}^{+165}_{-100}$	5.5k	[4] ABLIKIM	13N	BES3	$e^+e^- \to J/\psi \to \gamma\eta\eta$
319^{+81}_{-69}		[5] ETKIN	88	MPS	$22\ \pi^- p \to \phi\phi n$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
218 ± 16	80k	[6] UMAN	06	E835	$5.2\ \bar{p}p \to \eta\eta\pi^0$
198 ± 50		BOOTH	86	OMEG	$85\ \pi^-$ Be $\to 2\phi$Be
150^{+150}_{-50}		LINDENBAUM	84	RVUE	

YOUR NOTE

[4] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances. NODE=M108W;LINKAGE=A

[5] Includes data of ETKIN 85. NODE=M108W;LINKAGE=C

[6] Statistical error only. NODE=M108W;LINKAGE=ST

$f_2(2340)$ REFERENCES

NODE=M108

YOUR PAPER	ABLIKIM	13N	PR D87 092009	Ablikim M. *et al.*	(BES III Collab.)	REFID=55387
	UMAN	06	PR D73 052009	I. Uman *et al.*	(FNAL E835)	REFID=51063
	ETKIN	88	PL B201 568	A. Etkin *et al.*	(BNL, CUNY)	REFID=40285
	BOOTH	86	NP B273 677	P.S.L. Booth *et al.*	(LIVP, GLAS, CERN)	REFID=21870
	ETKIN	85	PL 165B 217	A. Etkin *et al.*	(BNL, CUNY)	REFID=21871
	LINDENBAUM	84	CNPP 13 285	S.J. Lindenbaum	(CUNY)	REFID=21869

$c\bar{c}$ MESONS

NODE=MXXX025

NODE=M070

$J/\psi(1S)$

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

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

NODE=M070230

RADIATIVE DECAYS

NODE=M070310

$\Gamma(\gamma f_0(1710) \to \gamma\eta\eta)/\Gamma_{total}$ **Γ_{171}/Γ**

NODE=M070S84
NODE=M070S84

	VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$2.35^{+0.13+1.24}_{-0.11-0.74}$	5.5k	[1] ABLIKIM	13N	BES3	$J/\psi \to \gamma\eta\eta$

YOUR NOTE [1] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances.

NODE=M070S84;LINKAGE=A

$\Gamma(\gamma f'_2(1525) \to \gamma\eta\eta)/\Gamma_{total}$ **Γ_{177}/Γ**

NODE=M070S86
NODE=M070S86

	VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$3.42^{+0.43+1.37}_{-0.51-1.30}$	5.5k	[1] ABLIKIM	13N	BES3	$J/\psi \to \gamma\eta\eta$

YOUR NOTE [1] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances.

NODE=M070S86;LINKAGE=A

$\Gamma(\gamma f_2(1810) \to \gamma\eta\eta)/\Gamma_{total}$ **Γ_{181}/Γ**

NODE=M070S87
NODE=M070S87

	VALUE (units 10^{-5})	EVTS	DOCUMENT ID		COMMENT
YOUR DATA	$5.40^{+0.60+3.42}_{-0.67-2.35}$	5.5k	[1] ABLIKIM	13N	$J/\psi \to \gamma\eta\eta$

YOUR NOTE [1] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances.

NODE=M070S87;LINKAGE=A

$\Gamma(\gamma f_0(2100) \to \gamma\eta\eta)/\Gamma_{total}$ **Γ_{197}/Γ**

NODE=M070S85
NODE=M070S85

	VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$1.13^{+0.09+0.64}_{-0.10-0.28}$	5.5k	[1] ABLIKIM	13N	BES3	$J/\psi \to \gamma\eta\eta$

YOUR NOTE [1] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances.

NODE=M070S85;LINKAGE=A

$\Gamma(\gamma f_2(2340) \to \gamma\eta\eta)/\Gamma_{total}$ **Γ_{205}/Γ**

NODE=M070S88
NODE=M070S88

	VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$5.60^{+0.62+2.37}_{-0.65-2.07}$	5.5k	[1] ABLIKIM	13N	BES3	$J/\psi \to \gamma\eta\eta$

YOUR NOTE [1] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances.

NODE=M070S88;LINKAGE=A

$\Gamma(\gamma f_0(1500) \to \gamma\eta\eta)/\Gamma_{total}$ **Γ_{207}/Γ**

NODE=M070S83
NODE=M070S83

	VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$1.65^{+0.26+0.51}_{-0.31-1.40}$	5.5k	[1] ABLIKIM	13N	BES3	$J/\psi \to \gamma\eta\eta$

YOUR NOTE [1] From partial wave analysis including all possible combinations of 0^{++}, 2^{++}, and 4^{++} resonances.

NODE=M070S83;LINKAGE=A

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER ABLIKIM 13N PR D87 092009 Ablikim M. *et al.* (BES III Collab.)

REFID=55387

Reference = ABLIKIM 14K; PR D89 071101
Verifier code = BES3

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Xiao-Rui Lyu

EMAIL: xiaorui@ucas.ac.cn

July 21, 2016

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Russian Federation

EMAIL: simon.eidelman@cern.ch

$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M070

$J/\psi(1S)$

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

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

NODE=M070230

WEAK DECAYS

NODE=M070320

$\Gamma(\overline{D}^0\overline{K}^{*0}+\text{c.c.})/\Gamma_{\text{total}}$ **Γ_{219}/Γ**

NODE=M070S93
NODE=M070S93

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$<2.5\times10^{-6}$	90	ABLIKIM	14K	BES3	$e^+e^-\to J/\psi$

$\Gamma(D_s^-\rho^++\text{c.c.})/\Gamma_{\text{total}}$ **Γ_{221}/Γ**

NODE=M070S92
NODE=M070S92

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$<1.3\times10^{-5}$	90	ABLIKIM	14K	BES3	$e^+e^-\to J/\psi$

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER ABLIKIM 14K PR D89 071101 M. Ablikim *et al.* (BES III Collab.) REFID=55902

Reference = ABLIKIM 14J; PR D89 074030
Verifier code = BES3

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STRANGE MESONS
($S = \pm 1$, $C = B = 0$)

$K^+ = u\bar{s}$, $K^0 = d\bar{s}$, $\overline{K}^0 = \bar{d}s$, $K^- = \bar{u}s$, similarly for K^*'s

NODE=MXXX020

NODE=MXXX020

NODE=M019

$K_0^*(1430)$

$I(J^P) = \frac{1}{2}(0^+)$

See our minireview in the 1994 edition and in this edition under the $f_0(500)$.

NODE=M019

$K_0^*(1430)$ BRANCHING RATIOS

NODE=M019220

$\Gamma(K\eta'(958))/\Gamma_{total}$ — **Γ_3/Γ**

NODE=M019R00
NODE=M019R00

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**seen**	ABLIKIM	14J	BES3	$\psi(2S) \to \gamma K^+ K^- \eta'(958)$

$K_0^*(1430)$ REFERENCES

NODE=M019

YOUR PAPER ABLIKIM 14J PR D89 074030 M. Ablikim *et al.* (BES III Collab.) REFID=55901

$c\bar{c}$ MESONS

NODE=MXXX025

NODE=M055

$\chi_{c1}(1P)$

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

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

NODE=M055

$\chi_{c1}(1P)$ BRANCHING RATIOS

NODE=M055225

HADRONIC DECAYS

NODE=M055305

$\Gamma(K^+K^-\eta'(958))/\Gamma_{total}$ — **Γ_{27}/Γ**

NODE=M055R64
NODE=M055R64

	VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**8.75±0.87**	310	[1] ABLIKIM	14J	BES3	$\psi(2S) \to \gamma K^+ K^- \eta'(958)$

YOUR NOTE [1] Derived using B($\psi(2S) \to \gamma\chi_{c1}$) = (9.2 ± 0.4)%. Uncertainty includes both statistical and systematic contributions combined in quadrature. NODE=M055R64;LINKAGE=A

$\Gamma(K_0^*(1430)^+K^- + \text{c.c.})/\Gamma_{total}$ — **Γ_{28}/Γ**

NODE=M055R65
NODE=M055R65

	VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$\mathbf{6.41 \pm 0.57^{+2.09}_{-2.71}}$	[1] ABLIKIM	14J	BES3	$\psi(2S) \to \gamma K^+ K^- \eta'(958)$

YOUR NOTE [1] Normalized to B($\chi_{c1} \to K^+K^-\eta'(958)$) branching fraction. NODE=M055R65;LINKAGE=A

$\Gamma(f_0(980)\eta'(958))/\Gamma_{total}$ — **Γ_{29}/Γ**

NODE=M055R66
NODE=M055R66

	VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$\mathbf{1.65 \pm 0.47^{+1.32}_{-0.56}}$	[1] ABLIKIM	14J	BES3	$\psi(2S) \to \gamma K^+ K^- \eta'(958)$

YOUR NOTE [1] Normalized to B($\chi_{c1} \to K^+K^-\eta'(958)$) branching fraction. NODE=M055R66;LINKAGE=A

$\Gamma(f_0(1710)\eta'(958))/\Gamma_{total}$ — **Γ_{30}/Γ**

NODE=M055R67
NODE=M055R67

	VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$\mathbf{0.71 \pm 0.22^{+0.68}_{-0.48}}$	[1] ABLIKIM	14J	BES3	$\psi(2S) \to \gamma K^+ K^- \eta'(958)$

YOUR NOTE [1] Normalized to B($\chi_{c1} \to K^+K^-\eta'(958)$) branching fraction. NODE=M055R67;LINKAGE=A

$\Gamma(f_2'(1525)\eta'(958))/\Gamma_{total}$ — Γ_{31}/Γ

NODE=M055R68
NODE=M055R68

	VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$\mathbf{0.92 \pm 0.23^{+0.55}_{-0.51}}$	[1] ABLIKIM	14J	BES3	$\psi(2S) \to \gamma K^+ K^- \eta'(958)$

YOUR NOTE [1] Normalized to $B(\chi_{c1} \to K^+ K^- \eta'(958))$ branching fraction. NODE=M055R68;LINKAGE=A

$\chi_{c1}(1P)$ REFERENCES

NODE=M055

YOUR PAPER ABLIKIM 14J PR D89 074030 M. Ablikim *et al.* (BES III Collab.) REFID=55901

NODE=M057

$\chi_{c2}(1P)$

$I^G(J^{PC}) = 0^+(2^{++})$

See the Review on "$\psi(2S)$ and χ_c branching ratios" before the $\chi_{c0}(1P)$ Listings. NODE=M057

$\chi_{c2}(1P)$ BRANCHING RATIOS

NODE=M057225

HADRONIC DECAYS

NODE=M057305

$\Gamma(K^+ K^- \eta'(958))/\Gamma_{total}$ — Γ_{34}/Γ

NODE=M057R78
NODE=M057R78

	VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	$\mathbf{1.94 \pm 0.34}$	107	[1] ABLIKIM	14J	BES3	$\psi(2S) \to \gamma K^+ K^- \eta'(958)$

YOUR NOTE [1] Derived using $B(\psi(2S) \to \gamma\chi_{c2}) = (8.72 \pm 0.34)\%$. Uncertainty includes both statistical and systematic contributions combined in quadrature. NODE=M057R78;LINKAGE=A

$\chi_{c2}(1P)$ REFERENCES

NODE=M057

YOUR PAPER ABLIKIM 14J PR D89 074030 M. Ablikim *et al.* (BES III Collab.) REFID=55901

Reference = ABLIKIM 14I; PR D89 092008
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M070

$J/\psi(1S)$

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

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

NODE=M070230

DALITZ DECAYS

NODE=M070330

$\Gamma(\pi^0 e^+ e^-)/\Gamma_{total}$ — **Γ_{210}/Γ**

NODE=M070S89
NODE=M070S89

	VALUE (units 10^{-7})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**7.56±1.32±0.50**	39	ABLIKIM	14I	BES3	$J/\psi \to \pi^0 e^+ e^-$

$\Gamma(\eta e^+ e^-)/\Gamma_{total}$ — **Γ_{211}/Γ**

NODE=M070S90
NODE=M070S90

	VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.16±0.07±0.06**	320	[1] ABLIKIM	14I	BES3	$J/\psi \to \eta e^+ e^-$

YOUR NOTE [1] Using both $\eta \to \gamma\gamma$ and $\eta \to \pi^+\pi^-\pi^0$ decays.

NODE=M070S90;LINKAGE=A

$\Gamma(\eta'(958) e^+ e^-)/\Gamma_{total}$ — **Γ_{212}/Γ**

NODE=M070S91
NODE=M070S91

	VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**5.81±0.16±0.31**	1.4k	[1] ABLIKIM	14I	BES3	$J/\psi \to \eta' e^+ e^-$

YOUR NOTE [1] Using both $\eta' \to \gamma\pi^+\pi^-$ and $\eta' \to \pi^+\pi^-\eta$ decays.

NODE=M070S91;LINKAGE=A

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER ABLIKIM 14I PR D89 092008 M. Ablikim *et al.* (BES III Collab.)

REFID=55900

Reference = ABLIKIM 14G; PR D89 112006
Verifier code = BES3

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Xiao-Rui Lyu

EMAIL: xiaorui@ucas.ac.cn

July 21, 2016

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Prospekt Lavrent'eva 11
RU-630090 Novosibirsk
Russian Federation

EMAIL: simon.eidelman@cern.ch

$c\overline{c}$ MESONS

NODE=MXXX025

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

$\psi(2S)$ BRANCHING RATIOS

NODE=M071235

HADRONIC DECAYS

NODE=M071310

$\Gamma(\omega K^+ K^-)/\Gamma_{total}$ **Γ_{87}/Γ**

NODE=M071R78
NODE=M071R78

	VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
	1.62±0.11 OUR AVERAGE		Error includes scale factor of 1.1.			
YOUR DATA	1.56±0.04±0.11	2.8k	ABLIKIM	14G	BES3	$\psi(2S) \to K^+ K^- \pi^+ \pi^- \pi^0$
	2.38±0.37±0.29	78	ABLIKIM	06G	BES2	$\psi(2S) \to K^+ K^- \pi^+ \pi^- \pi^0$
	1.9 ±0.3 ±0.3	76.8	BRIERE	05	CLEO	$e^+ e^- \to \psi(2S) \to K^+ K^- \pi^+ \pi^- \pi^0$
	1.5 ±0.3 ±0.2	23	[1] BAI	03B	BES	$\psi(2S) \to K^+ K^- \pi^+ \pi^- \pi^0$

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

NODE=M071R78;LINKAGE=B3

$\psi(2S)$ REFERENCES

NODE=M071

YOUR PAPER	ABLIKIM	14G	PR D89 112006	M. Ablikim *et al.*	(BES III Collab.)	REFID=55898
	ABLIKIM	06G	PR D73 052004	M. Ablikim *et al.*	(BES Collab.)	REFID=51048
	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

Reference = ABLIKIM 14O; PR D90 032007
Verifier code = BES3

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$c\bar{c}$ MESONS

NODE=MXXX025

NODE=M053

$\psi(3770)$

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

DECAYS TO LIGHT HADRONS

NODE=M053250

$\Gamma(p\bar{p}\pi^0)/\Gamma_{total}$ **Γ_{76}/Γ**

NODE=M053R09

NODE=M053R09

	VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**< 0.4**	90	[32] ABLIKIM	14O	BES3	Sol. I, $e^+e^- \to \psi(3770)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
YOUR DATA	$59\ ^{+3}_{-2} \pm 5$		[32] ABLIKIM	14O	BES3	Sol. II, $e^+e^- \to \psi(3770)$
	<12	90	[24] ABLIKIM	07B	BES2	$e^+e^- \to \psi(3770)$

OCCUR=2

[24] Assuming that interference effects between resonance and continuum can be neglected and using $\sigma^{obs}(e^+e^- \to \psi(3770)) = 7.15 \pm 0.38$ nb.

NODE=M053R10;LINKAGE=AK

YOUR NOTE [32] Solution I or II of two equivalent solutions in a fit with a resonance interfering with continuum. Calculated by the authors using $\sigma(e^+e^- \to \psi(3770) \to \text{hadrons}) = 6.36 \pm 0.08^{+0.41}_{-0.30}$ nb from BESSON 10.

NODE=M053R09;LINKAGE=A

$\psi(3770)$ REFERENCES

NODE=M053

YOUR PAPER ABLIKIM 14O PR D90 032007 M. Ablikim *et al.* (BES III Collab.) REFID=55906

BESSON 10 PRL 104 159901 (errat.) D. Besson *et al.* (CLEO Collab.) REFID=53245

ABLIKIM 07B PL B650 111 M. Ablikim *et al.* (BES Collab.) REFID=51704

Reference = ABLIKIM 14N; PR D90 052009
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M070

$J/\psi(1S)$

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

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

NODE=M070230

STABLE HADRONS

NODE=M070307

$\Gamma(p\overline{p}a_0(980) \rightarrow p\overline{p}\pi^0\eta)/\Gamma_{total}$ **Γ_{116}/Γ**

NODE=M070S94

NODE=M070S94

	VALUE (units 10^{-5})	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA	**6.8±1.2±1.3**	ABLIKIM	14N	BES3	$e^+e^- \rightarrow J/\psi$

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER ABLIKIM 14N PR D90 052009 M. Ablikim *et al.* (BES III Collab.) REFID=55905

Reference = ABLIKIM 14Q; PR D90 092002
Verifier code = BES3

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NODE=MXXX025

NODE=M070

$J/\psi(1S)$

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

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

NODE=M070230

CHARGE CONJUGATION (C), PARITY (P), LEPTON FAMILY NUMBER (LF) VIOLATING MODES

NODE=M070315

$\Gamma(\gamma\gamma)/\Gamma_{total}$ — **Γ_{222}/Γ**

NODE=M070R80
NODE=M070R80

	VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**< 2.7**	90	ABLIKIM	14Q	BES3	$\psi(2S) \to \pi^+\pi^- J/\psi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	< 50	90	ADAMS	08	CLEO	$\psi(2S) \to \pi^+\pi^- J/\psi$
	<1600	90	[1] WICHT	08	BELL	$B^\pm \to K^\pm\gamma\gamma$
	< 220	90	ABLIKIM	07J	BES2	$\psi(2S) \to J/\psi\pi^+\pi^-$
	<5000	90	BARTEL	77	CNTR	e^+e^-

[1] WICHT 08 reports $[\Gamma(J/\psi(1S) \to \gamma\gamma)/\Gamma_{total}] \times [B(B^+ \to J/\psi(1S)K^+)] < 0.16 \times 10^{-6}$ which we divide by our best value $B(B^+ \to J/\psi(1S)K^+) = 1.026 \times 10^{-3}$.

NODE=M070R80;LINKAGE=WI

$\Gamma(\gamma\phi)/\Gamma_{total}$ — **Γ_{223}/Γ**

NODE=M070S95
NODE=M070S95

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$<1.4 \times 10^{-6}$**	90	ABLIKIM	14Q	BES3	$\psi(2S) \to \pi^+\pi^- J/\psi$

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER	ABLIKIM	14Q	PR D90 092002	M. Ablikim *et al.*	(BES III Collab.)	REFID=56238
	ADAMS	08	PRL 101 101801	G.S. Adams *et al.*	(CLEO Collab.)	REFID=52261
	WICHT	08	PL B662 323	J. Wicht *et al.*	(BELLE Collab.)	REFID=52204
	ABLIKIM	07J	PR D76 117101	M. Ablikim *et al.*	(BES Collab.)	REFID=52072
	BARTEL	77	PL 66B 489	W. Bartel *et al.*	(DESY, HEIDP)	REFID=22058

Reference = ABLIKIM 14R; PR D90 112014
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M070

$J/\psi(1S)$

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

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

NODE=M070230

WEAK DECAYS

NODE=M070320

$\Gamma(D_s^- e^+ \nu_e + \text{c.c.})/\Gamma_{\text{total}}$ — **Γ_{215}/Γ**

NODE=M070S55
NODE=M070S55

	VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**< 1.3**	90	ABLIKIM	14R	BES3	$e^+ e^- \to J/\psi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	<36	90	[1] ABLIKIM	06M	BES2	$e^+ e^- \to J/\psi$

[1] Using $B(D_s^- \to \phi\pi^-) = 4.4 \pm 0.5$ %.

NODE=M070S55;LINKAGE=AB

$\Gamma(D_s^{*-} e^+ \nu_e + \text{c.c.})/\Gamma_{\text{total}}$ — **Γ_{216}/Γ**

NODE=M070B13
NODE=M070B13

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$<1.8 \times 10^{-6}$**	90	ABLIKIM	14R	BES3	$e^+ e^- \to J/\psi$

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER ABLIKIM 14R PR D90 112014 M. Ablikim *et al.* (BES III Collab.) REFID=56388
ABLIKIM 06M PL B639 418 M. Ablikim *et al.* (BES Collab.) REFID=51130

Reference = ABLIKIM 15B; PR D91 031101
Verifier code = BES3

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CHARMED MESONS
($C = \pm 1$)

NODE=MXXX035

$D^+ = c\overline{d}$, $D^0 = c\overline{u}$, $\overline{D}^0 = \overline{c}u$, $D^- = \overline{c}d$, similarly for D^*'s

NODE=MXXX035

NODE=M061

$D^*(2007)^0$

$I(J^P) = \frac{1}{2}(1^-)$
I, J, P need confirmation.

J consistent with 1, value 0 ruled out (NGUYEN 77).

NODE=M061

$D^*(2007)^0$ BRANCHING RATIOS

NODE=M061225

$\Gamma(D^0\pi^0)/\Gamma(D^0\gamma)$ — **Γ_1/Γ_2**

NODE=M061R3
NODE=M061R3

	VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
	1.85±0.07 OUR AVERAGE					
YOUR DATA	1.90±0.07±0.05	4.9k	ABLIKIM	15B	BES3	10.6 $e^+e^- \to$ hadrons
	1.74±0.02±0.13		AUBERT,BE	05G	BABR	10.6 $e^+e^- \to$ hadrons

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

NODE=M061R2
NODE=M061R2

	VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA	0.655±0.008±0.005	3.2k	[5] ABLIKIM	15B	BES3	$e^+e^- \to$ hadrons
	0.635±0.003±0.017	69k	[5] AUBERT,BE	05G	BABR	10.6 $e^+e^- \to$ hadrons
	0.596±0.035±0.028	858	[6] ALBRECHT	95F	ARG	$e^+e^- \to$ hadrons
	0.636±0.023±0.033	1097	[6] BUTLER	92	CLE2	$e^+e^- \to$ hadrons

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

NODE=M061R1
NODE=M061R1

	VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
	0.381±0.029 OUR AVERAGE					
	0.404±0.035±0.028	456	[6] ALBRECHT	95F	ARG	$e^+e^- \to$ hadrons
	0.364±0.023±0.033	621	[6] BUTLER	92	CLE2	$e^+e^- \to$ hadrons
	0.37 ±0.08 ±0.08		ADLER	88D	MRK3	e^+e^-
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA	0.345±0.008±0.005	1.8k	[5] ABLIKIM	15B	BES3	$e^+e^- \to$ hadrons
	0.365±0.003±0.017	68k	[5] AUBERT,BE	05G	BABR	10.6 $e^+e^- \to$ hadrons
	0.47 ±0.23		LOW	87	HRS	29 GeV e^+e^-
	0.53 ±0.13		BARTEL	85G	JADE	e^+e^-, hadrons
	0.47 ±0.12		COLES	82	MRK2	e^+e^-
	0.45 ±0.15		GOLDHABER	77	MRK1	e^+e^-

YOUR NOTE

[5] Derived from the ratio $\Gamma(D^0\pi^0)$ / $\Gamma(D^0\gamma)$ assuming that the branching fractions of $D^{*0} \to D^0\pi^0$ and $D^{*0} \to D^0\gamma$ decays sum to 100%

NODE=M061R;LINKAGE=AU

[6] The BUTLER 92 and ALBRECHT 95F branching ratios are not independent, they have been constrained by the authors to sum to 100%.

NODE=M061R;LINKAGE=A

$D^*(2007)^0$ REFERENCES

NODE=M061

YOUR PAPER

ABLIKIM	15B	PR D91 031101	M. Ablikim *et al.*	(BES III Collab.)	REFID=56375
AUBERT,BE	05G	PR D72 091101	B. Aubert *et al.*	(BABAR Collab.)	REFID=50942
ALBRECHT	95F	ZPHY C66 63	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=44374
BUTLER	92	PRL 69 2041	F. Butler *et al.*	(CLEO Collab.)	REFID=43170
ADLER	88D	PL B208 152	J. Adler *et al.*	(Mark III Collab.)	REFID=40579
LOW	87	PL B183 232	E.H. Low *et al.*	(HRS Collab.)	REFID=40017
BARTEL	85G	PL 161B 197	W. Bartel *et al.*	(JADE Collab.)	REFID=22880
COLES	82	PR D26 2190	M.W. Coles *et al.*	(LBL, SLAC)	REFID=22866
GOLDHABER	77	PL 69B 503	G. Goldhaber *et al.*	(Mark I Collab.)	REFID=11434
NGUYEN	77	PRL 39 262	H.K. Nguyen *et al.*	(LBL, SLAC) J	REFID=11543

Reference = ABLIKIM 15; PR D91 032002
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M193

$X(4140)$

$I^G(J^{PC}) = 0^+(?^{?+})$

Seen by AALTONEN 09AH, ABAZOV 14A, CHATRCHYAN 14M in $B^+ \to X K^+$, $X \to J/\psi\phi$, and by ABAZOV 15M separately in both prompt (4.7 σ) and non-prompt (5.6 σ) production in $p\overline{p} \to J/\psi\phi +$ anything. Not seen by SHEN 10 in $\gamma\gamma \to J/\psi\phi$, AAIJ 12AA in $B^+ \to J/\psi\phi K^+$, and ABLIKIM 15 in $e^+e^- \to \gamma J/\psi\phi$ at $\sqrt{s}$ = 4.23, 4.26, 4.36 GeV. NODE=M193

$X(4140)$ BRANCHING RATIOS

NODE=M193225

$\Gamma(J/\psi\phi)/\Gamma_{total}$ **Γ_1/Γ**

NODE=M193R01

NODE=M193R01

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
seen	1.9k	[1] ABAZOV	15M	D0	$p\overline{p} \to J/\psi\phi +$ anything
seen	52	[2] ABAZOV	14A	D0	$B^+ \to J/\psi\phi K^+$
seen	0.3k	[3] CHATRCHYAN	14M	CMS	$B^+ \to J/\psi\phi K^+$
seen	14	[4] AALTONEN	09AH	CDF	$B^+ \to J/\psi\phi K^+$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA not seen		[5] ABLIKIM	15	BES3	$e^+e^- \to \gamma\phi J/\psi$
not seen		[6] AAIJ	12AA	LHCB	$pp \to B^+ X$ at 7 TeV

[1] Statistical significance of more than 6 σ. NODE=M193R01;LINKAGE=D

[2] ABAZOV 14A reports $B(B^+ \to X(4140) K^+ \to J/\psi\phi K^+)/B(B^+ \to J/\psi\phi K^+)$ = (19 ± 7 ± 4)% with 3.1 σ signficance. NODE=M193R01;LINKAGE=A

[3] From a fit assuming an S-wave relativistic Breit-Wigner shape above a three-body phase-space non-resonant component with statistical significance of more than 5 σ. NODE=M193R01;LINKAGE=C

[4] Statistical significance of 3.8 σ. NODE=M193R01;LINKAGE=AA

YOUR NOTE [5] Reported $\sigma(e^+e^- \to \gamma X(4140))\cdot B(X(4140) \to J/\psi\phi) < 0.35$, 0.28, and 0.33 pb at 4.23, 4.26, and 4.36 GeV, respectively, at 90% CL. NODE=M193R01;LINKAGE=B

[6] Reported $B(B^+ \to X(4140) K^+)\cdot B(X(4140) \to J/\psi\phi)/B(B^+ \to J/\psi\phi K^+) < 0.07$ at 90% CL. NODE=M193R01;LINKAGE=AI

$X(4140)$ REFERENCES

NODE=M193

ABAZOV	15M	PRL 115 232001	V.M. Abazov *et al.*	(D0 Collab.)	REFID=56957
YOUR PAPER ABLIKIM	15	PR D91 032002	M. Ablikim *et al.*	(BES III Collab.)	REFID=56368
ABAZOV	14A	PR D89 012004	V.M. Abazov *et al.*	(D0 Collab.)	REFID=55650
CHATRCHYAN	14M	PL B734 261	S. Chatrchyan *et al.*	(CMS Collab.)	REFID=55753
AAIJ	12AA	PR D85 091103	R. Aaij *et al.*	(LHCb Collab.)	REFID=54263
SHEN	10	PRL 104 112004	C.P. Shen *et al.*	(BELLE Collab.)	REFID=53235
AALTONEN	09AH	PRL 102 242002	T. Aaltonen *et al.*	(CDF Collab.)	REFID=52968

Reference = ABLIKIM 15H; PR D91 052017
Verifier code = BES3

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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=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

NODE=M103M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
	2189±11 OUR AVERAGE		Error includes scale factor of 1.8. See the ideogram below.			
YOUR DATA	2200± 6± 5	471	ABLIKIM	15H	BES3	$J/\psi \to \eta\phi\pi^+\pi^-$
	2186±10± 6	52	ABLIKIM	08F	BES	$J/\psi \to \eta\phi f_0(980)$
	2125±22±10	483	AUBERT	08S	BABR	10.6 $e^+e^- \to \phi\eta\gamma$
	2175±10±15	201	[1] AUBERT,BE	06D	BABR	10.6 $e^+e^- \to K^+K^-\pi\pi\gamma$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	$2079\pm13^{+79}_{-28}$	4.8k	[2] SHEN	09	BELL	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
	2192±14	116	[3] AUBERT	07AK	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
	2169±20	149	[3] AUBERT	07AK	BABR	10.6 $e^+e^- \to K^+K^-\pi^0\pi^0\gamma$

OCCUR=2

[1] From the $\phi f_0(980)$ component.
[2] From a fit with two incoherent Breit-Wigners.
[3] From the $K^+K^- f_0(980)$ component.

NODE=M103M;LINKAGE=AB
NODE=M103M;LINKAGE=SH
NODE=M103M;LINKAGE=AU

$\phi(2170)$ WIDTH

NODE=M103W

NODE=M103W

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
	79±14 OUR AVERAGE					
YOUR DATA	104±15±15	471	ABLIKIM	15H	BES3	$J/\psi \to \eta\phi\pi^+\pi^-$
	65±23±17	52	ABLIKIM	08F	BES	$J/\psi \to \eta\phi f_0(980)$
	61±50±13	483	AUBERT	08S	BABR	10.6 $e^+e^- \to \phi\eta\gamma$
	58±16±20	201	[4] AUBERT,BE	06D	BABR	10.6 $e^+e^- \to K^+K^-\pi\pi\gamma$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	$192\pm23^{+25}_{-61}$	4.8k	[5] SHEN	09	BELL	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
	71±21	116	[6] AUBERT	07AK	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
	102±27	149	[6] AUBERT	07AK	BABR	10.6 $e^+e^- \to K^+K^-\pi^0\pi^0\gamma$

OCCUR=2

[4] From the $\phi f_0(980)$ component.
[5] From a fit with two incoherent Breit-Wigners.
[6] From the $K^+K^- f_0(980)$ component.

NODE=M103W;LINKAGE=AB
NODE=M103W;LINKAGE=SH
NODE=M103W;LINKAGE=AU

$\phi(2170)$ REFERENCES

NODE=M103

YOUR PAPER	ABLIKIM	15H	PR D91 052017	M. Ablikim *et al.*	(BES III Collab.)
	SHEN	09	PR D80 031101	C.P. Shen *et al.*	(BELLE Collab.)
	ABLIKIM	08F	PRL 100 102003	M. Ablikim *et al.*	(BES Collab.)
	AUBERT	08S	PR D77 092002	B. Aubert *et al.*	(BABAR Collab.)
	AUBERT	07AK	PR D76 012008	B. Aubert *et al.*	(BABAR Collab.)
	AUBERT,BE	06D	PR D74 091103	B. Aubert *et al.*	(BABAR Collab.)

REFID=56773
REFID=53000
REFID=52154
REFID=52242
REFID=51908
REFID=51511

$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M070

$J/\psi(1S)$

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

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

NODE=M070230

HADRONIC DECAYS

NODE=M070305

$\Gamma(\phi f_1(1285))/\Gamma_{total}$ — **Γ_{65}/Γ**

NODE=M070S6
NODE=M070S6

	VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
	2.6±0.5 OUR AVERAGE					
YOUR DATA	3.4±1.8±1.5	1.1k	[1] ABLIKIM	15H	BES3	$e^+e^- \to J/\psi \to \phi\eta\pi^+\pi^-$
	3.2±0.6±0.4		JOUSSET	90	DM2	$J/\psi \to \phi 2(\pi^+\pi^-)$
	2.1±0.5±0.4	25	[2] JOUSSET	90	DM2	$J/\psi \to \phi\eta\pi^+\pi^-$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	0.6±0.2±0.1	16	BECKER	87	MRK3	$J/\psi \to \phi K\overline{K}\pi$

OCCUR=2

YOUR NOTE

[1] ABLIKIM 15H reports $[\Gamma(J/\psi(1S) \to \phi f_1(1285))/\Gamma_{total}] \times [B(f_1(1285) \to \eta\pi^+\pi^-)] = (1.20 \pm 0.6 \pm 0.14) \times 10^{-4}$ which we divide by our best value $B(f_1(1285) \to \eta\pi^+\pi^-) = (35 \pm 15) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M070S6;LINKAGE=A

[2] We attribute to the $f_1(1285)$ the signal observed in the $\pi^+\pi^-\eta$ invariant mass distribution at 1297 MeV.

NODE=M070S6;LINKAGE=Q

$\Gamma(\phi\eta(1405) \to \phi\eta\pi^+\pi^-)/\Gamma_{total}$ — **Γ_{78}/Γ**

NODE=M070S23
NODE=M070S23

	VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**2.01±0.58±0.82**		172	[1] ABLIKIM	15H	BES3	$e^+e^- \to J/\psi \to \phi\eta\pi^+\pi^-$
	• • • We do not use the following data for averages, fits, limits, etc. • • •						
	< 17	90		[2] FALVARD	88	DM2	$J/\psi \to$ hadrons

YOUR NOTE

[1] With 3.6 σ significance.

NODE=M070S23;LINKAGE=B

[2] Includes unknown branching fraction $\eta(1405) \to \eta\pi\pi$.

NODE=M070S23;LINKAGE=A

$\Gamma(\phi X(1835) \to \phi\eta\pi^+\pi^-)/\Gamma_{total}$ — **Γ_{81}/Γ**

NODE=M070B10
NODE=M070B10

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$<2.8 \times 10^{-4}$**	90	ABLIKIM	15H	BES3	$e^+e^- \to J/\psi \to \phi\eta\pi^+\pi^-$

$\Gamma(\phi X(1870) \to \phi\eta\pi^+\pi^-)/\Gamma_{total}$ — **Γ_{82}/Γ**

NODE=M070B11
NODE=M070B11

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$<6.13 \times 10^{-5}$**	90	ABLIKIM	15H	BES3	$e^+e^- \to J/\psi \to \phi\eta\pi^+\pi^-$

$\Gamma(\eta\phi(2170) \to \eta\phi f_0(980) \to \eta\phi\pi^+\pi^-)/\Gamma_{total}$ — **Γ_{83}/Γ**

NODE=M070B12
NODE=M070B12

	VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.20±0.14±0.37**	471	ABLIKIM	15H	BES3	$e^+e^- \to J/\psi \to \phi\eta\pi^+\pi^-$

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER

ABLIKIM	15H	PR D91 052017	M. Ablikim *et al.*	(BES III Collab.)	REFID=56773
JOUSSET	90	PR D41 1389	J. Jousset *et al.*	(DM2 Collab.)	REFID=41349
FALVARD	88	PR D38 2706	A. Falvard *et al.*	(CLER, FRAS, LALO+)	REFID=40576
BECKER	87	PRL 59 186	J.J. Becker *et al.*	(Mark III Collab.)	REFID=40015

Reference = ABLIKIM 15I; PR D91 092006
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M056

$\chi_{c0}(1P)$

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

$\chi_{c0}(1P)$ BRANCHING RATIOS

NODE=M056220

HADRONIC DECAYS

NODE=M056305

$\Gamma(K^-\Lambda\overline{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}$ — **Γ_{81}/Γ**

NODE=M056R92
NODE=M056R92

	VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.90±0.34±0.05**	57	[1] ABLIKIM	15I	BES3	$\psi(2S) \to \gamma K^-\Lambda\overline{\Xi}^+ +$ c.c.

YOUR NOTE [1] ABLIKIM 15I reports $[\Gamma(\chi_{c0}(1P) \to K^-\Lambda\overline{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))] = (1.90 \pm 0.30 \pm 0.16) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M056R92;LINKAGE=A

$\chi_{c0}(1P)$ REFERENCES

NODE=M056

YOUR PAPER ABLIKIM 15I PR D91 092006 M. Ablikim *et al.* (BES III Collab.)

REFID=56774
NODE=M055

$\chi_{c1}(1P)$

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

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

NODE=M055

$\chi_{c1}(1P)$ BRANCHING RATIOS

NODE=M055225

HADRONIC DECAYS

NODE=M055305

$\Gamma(K^-\Lambda\overline{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}$ — **Γ_{70}/Γ**

NODE=M055R71
NODE=M055R71

	VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.38±0.24±0.05**	49	[1] ABLIKIM	15I	BES3	$\psi(2S) \to \gamma K^-\Lambda\overline{\Xi}^+ +$ c.c.

YOUR NOTE [1] ABLIKIM 15I reports $[\Gamma(\chi_{c1}(1P) \to K^-\Lambda\overline{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))] = (1.32 \pm 0.20 \pm 0.12) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R71;LINKAGE=A

$\chi_{c1}(1P)$ REFERENCES

NODE=M055

YOUR PAPER ABLIKIM 15I PR D91 092006 M. Ablikim *et al.* (BES III Collab.)

REFID=56774
NODE=M057

$\chi_{c2}(1P)$

$I^G(J^{PC}) = 0^+(2^{++})$

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

NODE=M057

$\chi_{c2}(1P)$ BRANCHING RATIOS

NODE=M057225

HADRONIC DECAYS

NODE=M057305

$\Gamma(K^-\Lambda\overline{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}$ — **Γ_{69}/Γ**

NODE=M057R81
NODE=M057R81

	VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.84±0.33±0.06**	51	[1] ABLIKIM	15I	BES3	$\psi(2S) \to \gamma K^-\Lambda\overline{\Xi}^+ +$ c.c.

YOUR NOTE [1] ABLIKIM 15I reports $[\Gamma(\chi_{c2}(1P) \to K^-\Lambda\overline{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))] = (1.68 \pm 0.26 \pm 0.15) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M057R81;LINKAGE=A

$\chi_{c2}(1P)$ REFERENCES

NODE=M057

YOUR PAPER ABLIKIM 15I PR D91 092006 M. Ablikim *et al.* (BES III Collab.) REFID=56774

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

$\psi(2S)$ BRANCHING RATIOS

NODE=M071235

HADRONIC DECAYS

NODE=M071310

$\Gamma(K^- \Lambda \overline{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}$ **Γ_{36}/Γ** NODE=M071S82 NODE=M071S82

	VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**3.86±0.27±0.32**	236	ABLIKIM	15I	BES3	$e^+e^- \to \psi(2S) \to K^- \Lambda \overline{\Xi}^+ + \text{c.c.}$

$\Gamma(\Xi(1690)^- \overline{\Xi}^+ \to K^- \Lambda \overline{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}$ **Γ_{37}/Γ** NODE=M071S83 NODE=M071S83

	VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**5.21±1.48±0.57**	74	ABLIKIM	15I	BES3	$e^+e^- \to \psi(2S) \to K^- \Lambda \overline{\Xi}^+ + \text{c.c.}$

$\Gamma(\Xi(1820)^- \overline{\Xi}^+ \to K^- \Lambda \overline{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}$ **Γ_{38}/Γ** NODE=M071S84 NODE=M071S84

	VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**12.03±2.94±1.22**	136	ABLIKIM	15I	BES3	$e^+e^- \to \psi(2S) \to K^- \Lambda \overline{\Xi}^+ + \text{c.c.}$

$\Gamma(K^- \Sigma^0 \overline{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}$ **Γ_{39}/Γ** NODE=M071S85 NODE=M071S85

	VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**3.67±0.33±0.28**	142	ABLIKIM	15I	BES3	$e^+e^- \to \psi(2S) \to K^- \Sigma^0 \overline{\Xi}^+ + \text{c.c.}$

$\psi(2S)$ REFERENCES

NODE=M071

YOUR PAPER ABLIKIM 15I PR D91 092006 M. Ablikim *et al.* (BES III Collab.) REFID=56774

Reference = ABLIKIM 15J; PR D91 092009
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M053

$\psi(3770)$

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

RADIATIVE DECAYS

NODE=M053240

$\Gamma(\gamma\chi_{c2})/\Gamma_{total}$ — **Γ_{98}/Γ**

NODE=M053R03
NODE=M053R03

	VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<0.64**	90	[35] ABLIKIM	15J	BES3	$e^+e^- \to \psi(3770) \to \gamma\gamma J/\psi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	<2.0	90	[36] BRIERE	06	CLEO	$e^+e^- \to \psi(3770) \to \gamma +$ hadrons
	<0.9	90	[37] COAN	06A	CLEO	$e^+e^- \to \psi(3770) \to \gamma\gamma J/\psi$

$\Gamma(\gamma\chi_{c1})/\Gamma_{total}$ — **Γ_{99}/Γ**

NODE=M053R02
NODE=M053R02

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
	2.48±0.23 OUR AVERAGE					
	1.9 ±0.4 ±0.6	202	[38] ABLIKIM	16B	BES3	$e^+e^- \to \psi(3770) \to \gamma +$ hadrons
YOUR DATA	2.48±0.15±0.23	0.6k	ABLIKIM	15J	BES3	$e^+e^- \to \psi(3770) \to \gamma\gamma J/\psi$
	2.4 ±0.8 ±0.2		[39] ABLIKIM	14H	BES3	$e^+e^- \to \psi(3770) \to K^0_S K^\pm \pi^\mp$
	2.9 ±0.5 ±0.4		[40] BRIERE	06	CLEO	$e^+e^- \to \psi(3770) \to \gamma +$ hadrons, $\gamma\gamma J/\psi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	3.9 ±1.4 ±0.6	54	[41] BRIERE	06	CLEO	$e^+e^- \to \psi(3770) \to \gamma +$ hadrons
	2.8 ±0.5 ±0.4	53	[37] COAN	06A	CLEO	$e^+e^- \to \psi(3770) \to \gamma\gamma J/\psi$

OCCUR=2

YOUR NOTE

[35] This limit is equivalent to $(0.25 \pm 0.21 \pm 0.18) \times 10^{-3}$ branching fraction value. NODE=M053R03;LINKAGE=A

[36] Uses $B(\psi(2S) \to \gamma\chi_{c2}) = 9.22 \pm 0.11 \pm 0.46$ % from ATHAR 04, $\psi(2S)$ mass and width from PDG 04, and $\Gamma_{ee}(\psi(2S)) = 2.54 \pm 0.03 \pm 0.11$ keV from ADAM 06. NODE=M053R03;LINKAGE=BR

[37] Using $\Gamma_{ee}(\psi(2S)) = (2.54 \pm 0.03 \pm 0.11)$ keV from ADAM 06 and taking $\sigma(e^+e^- \to D\overline{D})$ from HE 05 for $\sigma(e^+e^- \to \psi(3770))$. NODE=M053R0;LINKAGE=CO

[38] ABLIKIM 16B reports $(1.94 \pm 0.42 \pm 0.64) \times 10^{-3}$ from a measurement of $[\Gamma(\psi(3770) \to \gamma\chi_{c1})/\Gamma_{total}]$ / $[B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. NODE=M053R02;LINKAGE=A

[39] ABLIKIM 14H reports $[\Gamma(\psi(3770) \to \gamma\chi_{c1})/\Gamma_{total}] \times [B(\chi_{c1}(1P) \to K^0_S K^\pm \pi^\mp)] = (8.51 \pm 2.39 \pm 1.42) \times 10^{-6}$ which we divide by our best value $B(\chi_{c1}(1P) \to K^0_S K^\pm \pi^\mp) = 0.00356 \pm 0.00030$. Our first error is their experiment's error and our second error is the systematic error from using our best value. We have calculated the best value of $B(\chi_{c1}(1P) \to K^0_S K^\pm \pi^\mp)$ as 1/2 of $B(\chi_{c1}(1P) \to \overline{K}^0 K^+ \pi^- +$ c.c.$) = (7.1 \pm 0.6) \times 10^{-3}$. NODE=M053R02;LINKAGE=AB

[40] Averages the two measurements from COAN 06A and BRIERE 06. NODE=M053R02;LINKAGE=BI

[41] Uses $B(\psi(2S) \to \gamma\chi_{c1}) = 9.07 \pm 0.11 \pm 0.54$ % from ATHAR 04, $\psi(2S)$ mass and width from PDG 04, and $\Gamma_{ee}(\psi(2S)) = 2.54 \pm 0.03 \pm 0.11$ keV from ADAM 06. NODE=M053R02;LINKAGE=BR

$\psi(3770)$ REFERENCES

NODE=M053

	ABLIKIM	16B	PL B753 103	M. Ablikim *et al.*	(BES III Collab.)	REFID=57126
YOUR PAPER	ABLIKIM	15J	PR D91 092009	M. Ablikim *et al.*	(BES III Collab.)	REFID=56775
	ABLIKIM	14H	PR D89 112005	M. Ablikim *et al.*	(BES III Collab.)	REFID=55899
	ADAM	06	PRL 96 082004	N.E. Adam *et al.*	(CLEO Collab.)	REFID=50989
	BRIERE	06	PR D74 031106	R.A. Briere *et al.*	(CLEO Collab.)	REFID=51149
	COAN	06A	PRL 96 182002	T.E. Coan *et al.*	(CLEO Collab.)	REFID=51155
	HE	05	PRL 95 121801	Q. He *et al.*	(CLEO Collab.)	REFID=50924
	Also		PRL 96 199903 (errat.)	Q. He *et al.*	(CLEO Collab.)	REFID=51211
	ATHAR	04	PR D70 112002	S.B. Athar *et al.*	(CLEO Collab.)	REFID=50331
	PDG	04	PL B592 1	S. Eidelman *et al.*	(PDG Collab.)	REFID=49653

Reference = ABLIKIM 15K; PR D91 112001
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M070

$J/\psi(1S)$

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

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

NODE=M070230

HADRONIC DECAYS

NODE=M070305

$\Gamma(\phi\pi^0)/\Gamma_{total}$ **Γ_{77}/Γ**

NODE=M070R33

The two different fit values of ABLIKIM 15K below have the same statistical significance of 6.4 σ and cannot be distinguished at this moment.

NODE=M070R33

NODE=M070R33

	VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	2.94 ±0.16 ±0.16		0.8k	[1] ABLIKIM	15K	BES3	$e^+e^- \to J/\psi \to K^+K^-\gamma\gamma$
YOUR DATA	0.124±0.033±0.030		35 ± 9	[2] ABLIKIM	15K	BES3	$e^+e^- \to J/\psi \to K^+K^-\gamma\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •							
	<6.4	90		[3] ABLIKIM	05B	BES2	$e^+e^- \to J/\psi \to \phi\gamma\gamma$
	<6.8	90		COFFMAN	88	MRK3	$e^+e^- \to K^+K^-\pi^0$

NODE=M070R33

NODE=M070R33

OCCUR=2

YOUR NOTE [1] Corresponding to one of the two fit solutions with $\delta = (-95.9 \pm 1.5)^\circ$ for the phase angle between the resonant $J/\psi \to \phi\pi^0$ and non-phi $J/\psi \to K^+K^-\pi^0$ contributions. NODE=M070R33;LINKAGE=A

YOUR NOTE [2] Corresponding to one of the two fit solutions with $\delta = (-152.1 \pm 7.7)^\circ$ for the phase angle between the resonant $J/\psi \to \phi\pi^0$ and non-phi $J/\psi \to K^+K^-\pi^0$ contributions. NODE=M070R33;LINKAGE=C

[3] Superseded by ABLIKIM 15K. NODE=M070R33;LINKAGE=B

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER	ABLIKIM	15K	PR D91 112001	M. Ablikim *et al.*	(BES III Collab.)
	ABLIKIM	05B	PR D71 032003	M. Ablikim *et al.*	(BES Collab.)
	COFFMAN	88	PR D38 2695	D.M. Coffman *et al.*	(Mark III Collab.)

REFID=56776
REFID=50496
REFID=40346

Reference = ABLIKIM 15L; PR D91 112005
Verifier code = BES3

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July 21, 2016

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Russian Federation

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M025

$\psi(4160)$

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

$\psi(4160)$ BRANCHING RATIOS

NODE=M025225

$\Gamma(J/\psi\eta)/\Gamma_{total}$ **Γ_{20}/Γ**

NODE=M025R04
NODE=M025R04

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<8	90	COAN	06	CLEO	4.12–4.2 $e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA possibly seen		[18] ABLIKIM	15L	BES3	$e^+e^- \to J/\psi\eta$
seen		WANG	13B	BELL	$e^+e^- \to J/\psi\eta\gamma$

YOUR NOTE [18] An enhancement around 4.2 GeV is observed. NODE=M025R04;LINKAGE=A

$\psi(4160)$ REFERENCES

NODE=M025

YOUR PAPER

ABLIKIM	15L	PR D91 112005	M. Ablikim *et al.*	(BES III Collab.)
WANG	13B	PR D87 051101	X.L. Wang *et al.*	(BELLE Collab.)
COAN	06	PRL 96 162003	T.E. Coan *et al.*	(CLEO Collab.)

REFID=56777
REFID=55377
REFID=51075

Reference = ABLIKIM 15M; PR D91 112008
Verifier code = BES3

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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=M109

$h_1(1380)$

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

OMITTED FROM SUMMARY TABLE

Seen in partial-wave analysis of the $K\overline{K}\pi$ system. Needs confirmation.

NODE=M109

$h_1(1380)$ MASS

NODE=M109M

	VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
	1407±12 OUR AVERAGE	Error includes scale factor of 1.5.			
YOUR DATA	1412± 4±8	ABLIKIM	15M	BES3	$\psi(2S) \to \gamma\chi_{c1,2} \to \gamma K^*\overline{K}$
	1440±60	ABELE	97H	CBAR	$\overline{p}p \to K^0_L K^0_S \pi^0\pi^0$
	1380±20	ASTON	88C	LASS	11 $K^- p \to K^0_S K^\pm \pi^\mp \Lambda$

NODE=M109M

NODE=M109M

$h_1(1380)$ WIDTH

NODE=M109W

	VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
	89±23 OUR AVERAGE				
YOUR DATA	84±12±40	ABLIKIM	15M	BES3	$\psi(2S) \to \gamma\chi_{c1,2} \to \gamma K^*\overline{K}$
	170±80	ABELE	97H	CBAR	$\overline{p}p \to K^0_L K^0_S \pi^0\pi^0$
	80±30	ASTON	88C	LASS	11 $K^- p \to K^0_S K^\pm \pi^\mp \Lambda$

NODE=M109W

NODE=M109W

$h_1(1380)$ REFERENCES

NODE=M109

YOUR PAPER	ABLIKIM	15M	PR D91 112008	M. Ablikim *et al.*	(BES III Collab.)
	ABELE	97H	PL B415 280	A. Abele *et al.*	(Crystal Barrel Collab.)
	ASTON	88C	PL B201 573	D. Aston *et al.*	(SLAC, NAGO, CINC, INUS)

REFID=56778
REFID=45765
REFID=40282

$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M056

$\chi_{c0}(1P)$

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

$\chi_{c0}(1P)$ BRANCHING RATIOS

NODE=M056220

HADRONIC DECAYS

NODE=M056305

$\Gamma(\overline{K}^0 K^+ \pi^- \phi + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{52}/Γ

NODE=M056R90
NODE=M056R90

	VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**3.68±0.30±0.50**	ABLIKIM	15M	BES3	$\psi(2S) \to \gamma\chi_{c0}$

$\Gamma(K^+ K^- \pi^0 \phi)/\Gamma_{\text{total}}$ — Γ_{53}/Γ

NODE=M056R91
NODE=M056R91

	VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.90±0.14±0.32**	ABLIKIM	15M	BES3	$\psi(2S) \to \gamma\chi_{c0}$

$\chi_{c0}(1P)$ REFERENCES

NODE=M056

YOUR PAPER ABLIKIM 15M PR D91 112008 M. Ablikim *et al.* (BES III Collab.) REFID=56778

NODE=M055

$\chi_{c1}(1P)$

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

See the Review on "$\psi(2S)$ and χ_c branching ratios" before the $\chi_{c0}(1P)$ Listings. NODE=M055

$\chi_{c1}(1P)$ BRANCHING RATIOS

NODE=M055225

HADRONIC DECAYS

NODE=M055305

$\Gamma(\overline{K}^0 K^+ \pi^- \phi + \text{c.c.})/\Gamma_{\text{total}}$ **Γ_{38}/Γ**

NODE=M055R69
NODE=M055R69

	VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA	**3.27±0.28±0.46**	ABLIKIM	15M	BES3	$\psi(2S) \to \gamma\chi_{c1}$

$\Gamma(K^+ K^- \pi^0 \phi)/\Gamma_{\text{total}}$ **Γ_{39}/Γ**

NODE=M055R70
NODE=M055R70

	VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA	**1.62±0.12±0.28**	ABLIKIM	15M	BES3	$\psi(2S) \to \gamma\chi_{c1}$

$\chi_{c1}(1P)$ REFERENCES

NODE=M055

YOUR PAPER ABLIKIM 15M PR D91 112008 M. Ablikim *et al.* (BES III Collab.) REFID=56778

NODE=M057

$\chi_{c2}(1P)$

$I^G(J^{PC}) = 0^+(2^{++})$

See the Review on "$\psi(2S)$ and χ_c branching ratios" before the $\chi_{c0}(1P)$ Listings. NODE=M057

$\chi_{c2}(1P)$ BRANCHING RATIOS

NODE=M057225

HADRONIC DECAYS

NODE=M057305

$\Gamma(\overline{K}^0 K^+ \pi^- \phi + \text{c.c.})/\Gamma_{\text{total}}$ **Γ_{41}/Γ**

NODE=M057R79
NODE=M057R79

	VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA	**4.83±0.32±0.66**	ABLIKIM	15M	BES3	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma(K^+ K^- \pi^0 \phi)/\Gamma_{\text{total}}$ **Γ_{42}/Γ**

NODE=M057R80
NODE=M057R80

	VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA	**2.74±0.16±0.44**	ABLIKIM	15M	BES3	$\psi(2S) \to \gamma\chi_{c2}$

$\chi_{c2}(1P)$ REFERENCES

NODE=M057

YOUR PAPER ABLIKIM 15M PR D91 112008 M. Ablikim *et al.* (BES III Collab.) REFID=56778

Reference = ABLIKIM 15N; PR D91 112018
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M056

$\chi_{c0}(1P)$

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

$\chi_{c0}(1P)$ BRANCHING RATIOS

NODE=M056220

HADRONIC DECAYS

NODE=M056305

$\Gamma(\pi^0\eta_c)/\Gamma_{total}$ — **Γ_{35}/Γ**

NODE=M056R00
NODE=M056R00

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$<1.6\times10^{-3}$**	90	[1] ABLIKIM	15N	BES3	$\psi(2s)e^+e^- \to \gamma\pi^0\eta_c$

YOUR NOTE [1] Using $B(\eta_c \to K^0_S K^\pm\pi^\mp)\times B(K^0_S \to \pi^+\pi^-)\times B(\pi^0 \to \gamma\gamma) = (1.66\pm0.11)\times10^{-2}$.

NODE=M056R00;LINKAGE=A

$\chi_{c0}(1P)$ REFERENCES

NODE=M056

YOUR PAPER ABLIKIM 15N PR D91 112018 M. Ablikim *et al.* (BES III Collab.)

REFID=56779

NODE=M057

$\chi_{c2}(1P)$

$I^G(J^{PC}) = 0^+(2^{++})$

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

NODE=M057

$\chi_{c2}(1P)$ BRANCHING RATIOS

NODE=M057225

HADRONIC DECAYS

NODE=M057305

$\Gamma(\pi^0\eta_c)/\Gamma_{total}$ — **Γ_{73}/Γ**

NODE=M057R77
NODE=M057R77

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$<3.2\times10^{-3}$**	90	[1] ABLIKIM	15N	BES3	$\psi(2S)e^+e^- \to \gamma\pi^0\eta_c$

YOUR NOTE [1] Using $B(\eta_c \to K^0_S K^\pm\pi^\mp)\times B(K^0_S \to \pi^+\pi^-)\times B(\pi^0 \to \gamma\gamma) = (1.66\pm0.11)\times10^{-2}$.

NODE=M057R77;LINKAGE=A

$\chi_{c2}(1P)$ REFERENCES

NODE=M057

YOUR PAPER ABLIKIM 15N PR D91 112018 M. Ablikim *et al.* (BES III Collab.)

REFID=56779

Reference = ABLIKIM 15O; PR D92 012001
Verifier code = BES3

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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=M002

$\eta'(958)$

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

$\eta'(958)$ BRANCHING RATIOS

NODE=M002230

$\Gamma(\gamma e^+ e^-)/\Gamma(\gamma\gamma)$ — **Γ_{20}/Γ_6**

NODE=M002R00
NODE=M002R00

	VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**2.13±0.09±0.07**	864	ABLIKIM	15O	BES3	$J/\psi \to \gamma e^+ e^-$

$\eta'(958) \to \gamma \ell^+ \ell^-$ TRANSITION FORM FACTOR SLOPE

NODE=M002FFL

Related to the effective virtual meson mass Λ, via slope $\approx \Lambda^{-2}$. See e.g. LANDSBERG 85, eq. (3.8), for a detailed definition.

NODE=M002FFL

NODE=M002FFL

	VALUE (GeV^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
	1.62±0.17 OUR AVERAGE					
YOUR DATA	1.60±0.17±0.08	864	[1] ABLIKIM	15O	BES3	$J/\psi \to \gamma e^+ e^-$
	1.7 ±0.4	33	[1] VIKTOROV	80		25,33 $\pi^- p \to 2\mu\gamma$

YOUR NOTE [1] In the single-pole Ansatz where slope $= 1/(\Lambda^2 + \gamma^2)$ with Λ, γ being a Breit-Wigner mass, width for the effective contributing vector meson.

NODE=M002FFL;LINKAGE=A

$\eta'(958)$ REFERENCES

NODE=M002

YOUR PAPER

ABLIKIM	15O	PR D92 012001	M. Ablikim *et al.*	(BES III Collab.)	REFID=56780
LANDSBERG	85	PRPL 128 301	L.G. Landsberg	(SERP)	REFID=10844
VIKTOROV	80	SJNP 32 520	V.A. Viktorov *et al.*	(SERP)	REFID=20298

Translated from YAF 32 1005.

Reference = ABLIKIM 15P; PR D92 012007
Verifier code = BES3

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

NODE=MXXX005

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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=M002

$\eta'(958)$

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

$\eta'(958)$ BRANCHING RATIOS

NODE=M002230

$\Gamma(3\pi^0)/\Gamma_{total}$ — **Γ_7/Γ**

NODE=M002R55
NODE=M002R55

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
	3.7 ±0.4 OUR AVERAGE					
YOUR DATA	4.79±0.59±1.14	183	[1] ABLIKIM	15P	BES3	$J/\psi \to K^+K^-3\pi$
	3.56±0.22±0.34	309	ABLIKIM	12E	BES3	$J/\psi \to \gamma(3\pi^0)$

YOUR NOTE [1] We have added all systematic uncertainties in quadrature to a single value. — NODE=M002R55;LINKAGE=A

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

NODE=M002R21
NODE=M002R21

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
	3.9 ±0.4 OUR AVERAGE					
YOUR DATA	4.28±0.49±1.11	78	[1] ABLIKIM	15P	BES3	$J/\psi \to K^+K^-3\pi$
	3.83±0.15±0.39	1014	ABLIKIM	12E	BES3	$J/\psi \to \gamma(\pi^+\pi^-\pi^0)$
	$3.7\ ^{+1.1}_{-0.9}\ \pm0.4$		[2] NAIK	09	CLEO	$J/\psi \to \gamma\eta'$

YOUR NOTE [1] We have added all systematic uncertainties in quadrature to a single value. — NODE=M002R21;LINKAGE=A
[2] Not independent of measured value of Γ_{10}/Γ_1 from NAIK 09. — NODE=M002R21;LINKAGE=NA

$\eta'(958)$ REFERENCES

NODE=M002

YOUR PAPER

ABLIKIM	15P	PR D92 012007	M. Ablikim *et al.*	(BES III Collab.)
ABLIKIM	12E	PRL 108 182001	M. Ablikim *et al.*	(BES III Collab.)
NAIK	09	PRL 102 061801	P. Naik *et al.*	(CLEO Collab.)

REFID=56781
REFID=54270
REFID=52678

NODE=M003

$f_0(980)$

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

See also the minireview on scalar mesons under $f_0(500)$. (See the index for the page number.)

NODE=M003

$f_0(980)$ MASS

NODE=M003M1

NODE=M003M1

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
990 ±20 OUR ESTIMATE					→ UNCHECKED ←
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA 989.4± 1.3	424	ABLIKIM	15P	BES3	$J/\psi \to K^+K^-3\pi$
989.9± 0.4	706	ABLIKIM	12E	BES3	$J/\psi \to \gamma3\pi$
$1003\ ^{+5}_{-27}$		[1,2] GARCIA-MAR..	11	RVUE	Compilation
996 ± 7		[1,3] GARCIA-MAR..	11	RVUE	Compilation
$996\ ^{+4}_{-14}$		[4] MOUSSALLAM	11	RVUE	Compilation
981 ±43		[5] MENNESSIER	10	RVUE	Compilation
$1030\ ^{+30}_{-10}$		[6] ANISOVICH	09	RVUE	0.0 $\overline{p}p$, πN
$977\ ^{+11}_{-9}\ \pm 1$	44	[7] ECKLUND	09	CLEO	4.17 $e^+e^- \to D_s^- D_s^{*+}$ + c.c.
$982.2\pm 1.0^{+8.1}_{-8.0}$		[8] UEHARA	08A	BELL	10.6 $e^+e^- \to e^+e^-\pi^0\pi^0$
$976.8\pm 0.3^{+10.1}_{-0.6}$	64k	[9] AMBROSINO	07	KLOE	1.02 $e^+e^- \to \pi^0\pi^0\gamma$

OCCUR=2

$984.7 \pm 0.4^{+2.4}_{-3.7}$	64k	[10] AMBROSINO	07	KLOE	$1.02\ e^+e^- \to \pi^0\pi^0\gamma$	OCCUR=2
973 ± 3	262 ± 30	[11] AUBERT	07AK	BABR	$10.6\ e^+e^- \to \phi\pi^+\pi^-\gamma$	
970 ± 7	54 ± 9	[11] AUBERT	07AK	BABR	$10.6\ e^+e^- \to \phi\pi^0\pi^0\gamma$	OCCUR=2
953 ± 20	2.6k	[12] BONVICINI	07	CLEO	$D^+ \to \pi^-\pi^+\pi^+$	
$985.6^{+1.2}_{-1.5} \pm {}^{1.1}_{1.6}$		[13] MORI	07	BELL	$10.6\ e^+e^- \to e^+e^-\pi^+\pi^-$	
$983.0 \pm 0.6^{+4.0}_{-3.0}$		[14] AMBROSINO	06B	KLOE	$1.02\ e^+e^- \to \pi^+\pi^-\gamma$	
$977.3 \pm 0.9^{+3.7}_{-4.3}$		[15] AMBROSINO	06B	KLOE	$1.02\ e^+e^- \to \pi^+\pi^-\gamma$	OCCUR=2
950 ± 9	4286	[16] GARMASH	06	BELL	$B^+ \to K^+\pi^+\pi^-$	
965 ± 10		[17] ABLIKIM	05	BES2	$J/\psi \to \phi\pi^+\pi^-$, ϕK^+K^-	
1031 ± 8		[18] ANISOVICH	03	RVUE		
1037 ± 31		TIKHOMIROV	03	SPEC	$40.0\ \pi^- C \to K^0_S K^0_S K^0_L X$	
973 ± 1	2438	[19] ALOISIO	02D	KLOE	$e^+e^- \to \pi^0\pi^0\gamma$	
$977 \pm 3 \pm 2$	848	[20] AITALA	01A	E791	$D^+_s \to \pi^-\pi^+\pi^+$	
969.8 ± 4.5	419	[21] ACHASOV	00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$	
$985 {}^{+16}_{-12}$	419	[22,23] ACHASOV	00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$	OCCUR=2
$976 \pm 5 \pm 6$		[24] AKHMETSHIN	99B	CMD2	$e^+e^- \to \pi^+\pi^-\gamma$	
$977 \pm 3 \pm 6$	268	[24] AKHMETSHIN	99C	CMD2	$e^+e^- \to \pi^0\pi^0\gamma$	
$975 \pm 4 \pm 6$		[25] AKHMETSHIN	99C	CMD2	$e^+e^- \to \pi^0\pi^0\gamma$	OCCUR=2
$975 \pm 4 \pm 6$		[26] AKHMETSHIN	99C	CMD2	$e^+e^- \to \pi^+\pi^-\gamma$, $\pi^0\pi^0\gamma$	OCCUR=3
985 ± 10		BARBERIS	99	OMEG	$450\ pp \to p_s p_f K^+K^-$	
982 ± 3		BARBERIS	99B	OMEG	$450\ pp \to p_s p_f \pi^+\pi^-$	
982 ± 3		BARBERIS	99C	OMEG	$450\ pp \to p_s p_f \pi^0\pi^0$	
$987 \pm 6 \pm 6$		[27] BARBERIS	99D	OMEG	$450\ pp \to K^+K^-$, $\pi^+\pi^-$	
989 ± 15		BELLAZZINI	99	GAM4	$450\ pp \to pp\pi^0\pi^0$	
991 ± 3		[28] KAMINSKI	99	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\sigma\sigma$	
~ 980		[28] OLLER	99	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$	
~ 993.5		OLLER	99B	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$	
~ 987		[28] OLLER	99C	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\eta\eta$	
957 ± 6		[29] ACKERSTAFF	98Q	OPAL	$Z \to f_0 X$	
960 ± 10		ALDE	98	GAM4		
1015 ± 15		[28] ANISOVICH	98B	RVUE	Compilation	
1008		[30] LOCHER	98	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$	
955 ± 10		[29] ALDE	97	GAM2	$450\ pp \to pp\pi^0\pi^0$	
994 ± 9		[31] BERTIN	97C	OBLX	$0.0\ \overline{p}p \to \pi^+\pi^-\pi^0$	
$993.2 \pm 6.5 \pm 6.9$		[32] ISHIDA	96	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$	
1006		TORNQVIST	96	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $K\pi$, $\eta\pi$	
997 ± 5	3k	[33] ALDE	95B	GAM2	$38\ \pi^- p \to \pi^0\pi^0 n$	
960 ± 10	10k	[34] ALDE	95B	GAM2	$38\ \pi^- p \to \pi^0\pi^0 n$	OCCUR=2
994 ± 5		AMSLER	95B	CBAR	$0.0\ \overline{p}p \to 3\pi^0$	
~ 996		[35] AMSLER	95D	CBAR	$0.0\ \overline{p}p \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$	
987 ± 6		[36] ANISOVICH	95	RVUE		
1015		JANSSEN	95	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$	
983		[37] BUGG	94	RVUE	$\overline{p}p \to \eta 2\pi^0$	
973 ± 2		[38] KAMINSKI	94	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$	
988		[39] ZOU	94B	RVUE		
988 ± 10		[40] MORGAN	93	RVUE	$\pi\pi(K\overline{K}) \to \pi\pi(K\overline{K})$, $J/\psi \to \phi\pi\pi(K\overline{K})$, $D_s \to \pi(\pi\pi)$	
971.1 ± 4.0		[29] AGUILAR-...	91	EHS	$400\ pp$	
979 ± 4		[41] ARMSTRONG	91	OMEG	$300\ pp \to pp\pi\pi$, $ppK\overline{K}$	
956 ± 12		BREAKSTONE	90	SFM	$pp \to pp\pi^+\pi^-$	
959.4 ± 6.5		[29] AUGUSTIN	89	DM2	$J/\psi \to \omega\pi^+\pi^-$	
978 ± 9		[29] ABACHI	86B	HRS	$e^+e^- \to \pi^+\pi^- X$	

$985.0^{+9.0}_{-39.0}$	ETKIN	82B	MPS	23 $\pi^- p \rightarrow n 2K^0_S$
974 ± 4	[41] GIDAL	81	MRK2	$J/\psi \rightarrow \pi^+\pi^- X$
975	[42] ACHASOV	80	RVUE	
986 ±10	[41] AGUILAR-...	78	HBC	0.7 $\overline{p}p \rightarrow K^0_S K^0_S$
969 ± 5	[41] LEEPER	77	ASPK	2–2.4 $\pi^- p \rightarrow \pi^+\pi^- n,\ K^+K^- n$
987 ± 7	[41] BINNIE	73	CNTR	$\pi^- p \rightarrow n$MM
1012 ± 6	[43] GRAYER	73	ASPK	17 $\pi^- p \rightarrow \pi^+\pi^- n$
1007 ±20	[43] HYAMS	73	ASPK	17 $\pi^- p \rightarrow \pi^+\pi^- n$
997 ± 6	[43] PROTOPOP...	73	HBC	7 $\pi^+ p \rightarrow \pi^+ p \pi^+\pi^-$

[1] Quoted number refers to real part of pole position. NODE=M003M1;LINKAGE=GC

[2] Analytic continuation using Roy equations. Uses the K_{e4} data of BATLEY 10C and the $\pi N \rightarrow \pi\pi N$ data of HYAMS 73, GRAYER 74, and PROTOPOPESCU 73. NODE=M003M1;LINKAGE=GM

[3] Analytic continuation using GKPY equations. Uses the K_{e4} data of BATLEY 10C and the $\pi N \rightarrow \pi\pi N$ data of HYAMS 73, GRAYER 74, and PROTOPOPESCU 73. NODE=M003M1;LINKAGE=GI

[4] Pole position. Used Roy equations. NODE=M003M1;LINKAGE=MU

[5] Average of the analyses of three data sets in the K-matrix model. Uses the data of BATLEY 08A, HYAMS 73, and GRAYER 74, partially of COHEN 80 or ETKIN 82B. NODE=M003M1;LINKAGE=ME

[6] On sheet II in a 2-pole solution. The other pole is found on sheet III at (850−100i) MeV NODE=M003M1;LINKAGE=AO

[7] Using a relativistic Breit-Wigner function and taking into account the finite D_s mass. NODE=M003M1;LINKAGE=EC

[8] Breit-Wigner mass. Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g_{f_0 K K}/g_{f_0 \pi\pi} = 0$. NODE=M003M1;LINKAGE=UE

[9] In the kaon-loop fit. NODE=M003M1;LINKAGE=AK

[10] In the no-structure fit. NODE=M003M1;LINKAGE=AS

[11] Systematic errors not estimated. NODE=M003M1;LINKAGE=NS

[12] FLATTE 76 parameterization. $g_{f_0 \pi\pi} = 329 \pm 96$ MeV/c^2 assuming $g_{f_0 K\overline{K}}/g_{f_0 \pi\pi}$=2. NODE=M003M1;LINKAGE=BO

[13] Breit-Wigner mass. Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g_{f_0 K K}/g_{f_0 \pi\pi} = 4.21 \pm 0.25 \pm 0.21$ from ABLIKIM 05. NODE=M003M1;LINKAGE=MO

[14] In the kaon-loop fit following formalism of ACHASOV 89. NODE=M003M1;LINKAGE=AB

[15] In the no-structure fit assuming a direct coupling of ϕ to $f_0\gamma$. NODE=M003M1;LINKAGE=AM

[16] FLATTE 76 parameterization. Supersedes GARMASH 05. NODE=M003M1;LINKAGE=GR

[17] FLATTE 76 parameterization, $g_{f_0 K\overline{K}}/g_{f_0 \pi\pi} = 4.21 \pm 0.25 \pm 0.21$. NODE=M003M1;LINKAGE=AL

[18] K-matrix pole from combined analysis of $\pi^- p \rightarrow \pi^0\pi^0 n$, $\pi^- p \rightarrow K\overline{K} n$, $\pi^+\pi^- \rightarrow \pi^+\pi^-$, $\overline{p}p \rightarrow \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$, $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, $K^0_S K^0_S \pi^0$, $K^+ K^0_S \pi^-$ at rest, $\overline{p}n \rightarrow \pi^-\pi^-\pi^+$, $K^0_S K^- \pi^0$, $K^0_S K^0_S \pi^-$ at rest. NODE=M003M;LINKAGE=KM

[19] 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. NODE=M003M1;LINKAGE=KD

[20] Coupled-channel Breit-Wigner, couplings g_π=0.09±0.01±0.01, g_K=0.02±0.04±0.03. NODE=M003M;LINKAGE=TL

[21] Supersedes ACHASOV 98I. Using the model of ACHASOV 89. NODE=M003M;LINKAGE=V9

[22] Supersedes ACHASOV 98I. NODE=M003M;LINKAGE=V8

[23] In the "narrow resonance" approximation. NODE=M003M1;LINKAGE=AI

[24] Assuming $\Gamma(f_0)$= 40 MeV. NODE=M003M;LINKAGE=SM

[25] From a narrow pole fit taking into account $f_0(980)$ and $f_0(1200)$ intermediate mechanisms. NODE=M003M;LINKAGE=ST

[26] From the combined fit of the photon spectra in the reactions $e^+e^- \rightarrow \pi^+\pi^-\gamma$, $\pi^0\pi^0\gamma$. NODE=M003M;LINKAGE=SL

[27] Supersedes BARBERIS 99 and BARBERIS 99B NODE=M003M1;LINKAGE=BD

[28] T-matrix pole. NODE=M003M1;LINKAGE=AN

[29] From invariant mass fit. NODE=M003M1;LINKAGE=A

[30] On sheet II in a 2 pole solution. The other pole is found on sheet III at (1039−93i) MeV. NODE=M003M1;LINKAGE=LC

[31] On sheet II in a 2 pole solution. The other pole is found on sheet III at (963-29i) MeV. NODE=M003M1;LINKAGE=X

[32] Reanalysis of data from HYAMS 73, GRAYER 74, SRINIVASAN 75, and ROSSELET 77 using the interfering amplitude method. NODE=M003M1;LINKAGE=AA

[33] At high $|t|$. NODE=M003M1;LINKAGE=LA

[34] At low $|t|$. NODE=M003M1;LINKAGE=LB

[35] On sheet II in a 4-pole solution, the other poles are found on sheet III at (953−55i) MeV and on sheet IV at (938−35i) MeV. NODE=M003M1;LINKAGE=KL

[36] Combined fit of ALDE 95B, ANISOVICH 94, AMSLER 94D. NODE=M003M1;LINKAGE=CF

[37] On sheet II in a 2 pole solution. The other pole is found on sheet III at (996−103i) MeV. NODE=M003M1;LINKAGE=C2

[38] From sheet II pole position. NODE=M003M1;LINKAGE=KM

[39] On sheet II in a 2 pole solution. The other pole is found on sheet III at (797−185i) MeV and can be interpreted as a shadow pole. NODE=M003M1;LINKAGE=L

[40] On sheet II in a 2 pole solution. The other pole is found on sheet III at (978−28i) MeV. NODE=M003M1;LINKAGE=K

[41] From coupled channel analysis. NODE=M003M1;LINKAGE=B

[42] Coupled channel analysis with finite width corrections. NODE=M003M;LINKAGE=B

[43] Included in AGUILAR-BENITEZ 78 fit. NODE=M003M;LINKAGE=R

$f_0(980)$ WIDTH

NODE=M003W1

Width determination very model dependent. Peak width in $\pi\pi$ is about 50 MeV, but decay width can be much larger. NODE=M003W1

NODE=M003W1

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
	10 to 100 OUR ESTIMATE					→ UNCHECKED ←
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA	15.3 ± 4.7	424	ABLIKIM	15P	BES3	$J/\psi \to K^+ K^- 3\pi$
	9.5 ± 1.1	706	ABLIKIM	12E	BES3	$J/\psi \to \gamma 3\pi$
	$42 {}^{+20}_{-16}$		[1,2] GARCIA-MAR..11		RVUE	Compilation
	$50 {}^{+20}_{-12}$		[2,3] GARCIA-MAR..11		RVUE	Compilation OCCUR=2
	$48 {}^{+22}_{-6}$		[4] MOUSSALLAM11		RVUE	Compilation
	36 ± 22		[5] MENNESSIER	10	RVUE	Compilation
	$70 {}^{+20}_{-32}$		[6] ANISOVICH	09	RVUE	0.0 $\overline{p}p$, πN
	$91 {}^{+30}_{-22} \pm 3$	44	[7] ECKLUND	09	CLEO	4.17 $e^+e^- \to D_s^- D_s^{*+}$ + c.c.
	$66.9 \pm 2.2 {}^{+17.6}_{-12.5}$		[8] UEHARA	08A	BELL	10.6 $e^+e^- \to e^+e^-\pi^0\pi^0$
	65 ± 13	262 ± 30	[9] AUBERT	07AK	BABR	10.6 $e^+e^- \to \phi\pi^+\pi^-\gamma$
	81 ± 21	54 ± 9	[9] AUBERT	07AK	BABR	10.6 $e^+e^- \to \phi\pi^0\pi^0\gamma$ OCCUR=2
	$51.3 {}^{+20.8}_{-17.7} {}^{+13.2}_{-3.8}$		[10] MORI	07	BELL	10.6 $e^+e^- \to e^+e^-\pi^+\pi^-$
	$61 \pm 9 {}^{+14}_{-8}$	2584	[11] GARMASH	05	BELL	$B^+ \to K^+\pi^+\pi^-$
	64 ± 16		[12] ANISOVICH	03	RVUE	
	121 ± 23		TIKHOMIROV	03	SPEC	40.0 $\pi^- C \to K_S^0 K_S^0 K_L^0 X$
	~ 70		[13] BRAMON	02	RVUE	1.02 $e^+e^- \to \pi^0\pi^0\gamma$
	$44 \pm 2 \pm 2$	848	[14] AITALA	01A	E791	$D_s^+ \to \pi^-\pi^+\pi^+$
	201 ± 28	419	[15] ACHASOV	00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$
	122 ± 13	419	[16,17] ACHASOV	00H	SND	$e^+e^- \to \pi^0\pi^0\gamma$ OCCUR=2
	56 ± 20		[18] AKHMETSHIN	99C	CMD2	$e^+e^- \to \pi^0\pi^0\gamma$
	65 ± 20		BARBERIS	99	OMEG	450 $pp \to p_s p_f K^+K^-$
	80 ± 10		BARBERIS	99B	OMEG	450 $pp \to p_s p_f \pi^+\pi^-$
	80 ± 10		BARBERIS	99C	OMEG	450 $pp \to p_s p_f \pi^0\pi^0$
	$48 \pm 12 \pm 8$		[19] BARBERIS	99D	OMEG	450 $pp \to K^+K^-$, $\pi^+\pi^-$
	65 ± 25		BELLAZZINI	99	GAM4	450 $pp \to pp\pi^0\pi^0$
	71 ± 14		[20] KAMINSKI	99	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\sigma\sigma$
	~ 28		[20] OLLER	99	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
	~ 25		OLLER	99B	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
	~ 14		[20] OLLER	99C	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $\eta\eta$
	70 ± 20		ALDE	98	GAM4	
	86 ± 16		[20] ANISOVICH	98B	RVUE	Compilation
	54		[21] LOCHER	98	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
	69 ± 15		[22] ALDE	97	GAM2	450 $pp \to pp\pi^0\pi^0$
	38 ± 20		[23] BERTIN	97C	OBLX	0.0 $\overline{p}p \to \pi^+\pi^-\pi^0$
	~ 100		[24] ISHIDA	96	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
	34		TORNQVIST	96	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $K\pi$, $\eta\pi$
	48 ± 10	3k	[25] ALDE	95B	GAM2	38 $\pi^- p \to \pi^0\pi^0 n$
	95 ± 20	10k	[26] ALDE	95B	GAM2	38 $\pi^- p \to \pi^0\pi^0 n$ OCCUR=2
	26 ± 10		AMSLER	95B	CBAR	0.0 $\overline{p}p \to 3\pi^0$
	~ 112		[27] AMSLER	95D	CBAR	0.0 $\overline{p}p \to \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$
	80 ± 12		[28] ANISOVICH	95	RVUE	
	30		JANSSEN	95	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$

74	[29] BUGG	94	RVUE	$\overline{p}p \rightarrow \eta 2\pi^0$
29 ± 2	[30] KAMINSKI	94	RVUE	$\pi\pi \rightarrow \pi\pi$, $K\overline{K}$
46	[31] ZOU	94B	RVUE	
48 ± 12	[32] MORGAN	93	RVUE	$\pi\pi(K\overline{K}) \rightarrow \pi\pi(K\overline{K})$, $J/\psi \rightarrow \phi\pi\pi(K\overline{K})$, $D_s \rightarrow \pi(\pi\pi)$
37.4 ± 10.6	[22] AGUILAR-...	91	EHS	400 pp
72 ± 8	[33] ARMSTRONG	91	OMEG	300 $pp \rightarrow pp\pi\pi$, $ppK\overline{K}$
110 ± 30	BREAKSTONE	90	SFM	$pp \rightarrow pp\pi^+\pi^-$
29 ± 13	[22] ABACHI	86B	HRS	$e^+e^- \rightarrow \pi^+\pi^- X$
120 ±281 ±20	ETKIN	82B	MPS	23 $\pi^- p \rightarrow n2K^0_S$
28 ± 10	[33] GIDAL	81	MRK2	$J/\psi \rightarrow \pi^+\pi^- X$
70 to 300	[34] ACHASOV	80	RVUE	
100 ± 80	[35] AGUILAR-...	78	HBC	0.7 $\overline{p}p \rightarrow K^0_S K^0_S$
30 ± 8	[33] LEEPER	77	ASPK	2–2.4 $\pi^- p \rightarrow \pi^+\pi^- n$, $K^+K^- n$
48 ± 14	[33] BINNIE	73	CNTR	$\pi^- p \rightarrow n$MM
32 ± 10	[36] GRAYER	73	ASPK	17 $\pi^- p \rightarrow \pi^+\pi^- n$
30 ± 10	[36] HYAMS	73	ASPK	17 $\pi^- p \rightarrow \pi^+\pi^- n$
54 ± 16	[36] PROTOPOP...	73	HBC	7 $\pi^+ p \rightarrow \pi^+ p\pi^+\pi^-$

[1] Analytic continuation using Roy equations. Uses the K_{e4} data of BATLEY 10C and the $\pi N \rightarrow \pi\pi N$ data of HYAMS 73, GRAYER 74, and PROTOPOPESCU 73. NODE=M003W1;LINKAGE=GC

[2] Quoted number refers to twice imaginary part of pole position. NODE=M003W1;LINKAGE=GI

[3] Analytic continuation using GKPY equations. Uses the K_{e4} data of BATLEY 10C and the $\pi N \rightarrow \pi\pi N$ data of HYAMS 73, GRAYER 74, and PROTOPOPESCU 73. NODE=M003W1;LINKAGE=GM

[4] Pole position. Used Roy equations. NODE=M003W1;LINKAGE=MU

[5] Average of the analyses of three data sets in the K-matrix model. Uses the data of BATLEY 08A, HYAMS 73, and GRAYER 74, partially of COHEN 80 or ETKIN 82B. NODE=M003W1;LINKAGE=ME

[6] On sheet II in a 2-pole solution. The other pole is found on sheet III at (850−100i) MeV NODE=M003W1;LINKAGE=AO

[7] Using a relativistic Breit-Wigner function and taking into account the finite D_s mass. NODE=M003W1;LINKAGE=EC

[8] Breit-Wigner $\pi\pi$ width. Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g_{f_0 KK}/g_{f_0 \pi\pi} = 0$. NODE=M003W1;LINKAGE=UE

[9] Systematic errors not estimated. NODE=M003W1;LINKAGE=NS

[10] Breit-Wigner $\pi\pi$ width. Using finite width corrections according to FLATTE 76 and ACHASOV 05, and the ratio $g_{f_0 KK}/g_{f_0 \pi\pi} = 4.21 \pm 0.25 \pm 0.21$ from ABLIKIM 05. NODE=M003W1;LINKAGE=MO

[11] Breit-Wigner, solution 1, PWA ambiguous. NODE=M003W1;LINKAGE=GA

[12] K-matrix pole from combined analysis of $\pi^- p \rightarrow \pi^0\pi^0 n$, $\pi^- p \rightarrow K\overline{K} n$, $\pi^+\pi^- \rightarrow \pi^+\pi^-$, $\overline{p}p \rightarrow \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$, $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, $K^0_S K^0_S \pi^0$, $K^+K^0_S\pi^-$ at rest, $\overline{p}n \rightarrow \pi^-\pi^-\pi^+$, $K^0_S K^-\pi^0$, $K^0_S K^0_S \pi^-$ at rest. NODE=M003W;LINKAGE=KM

[13] Using the data of AKHMETSHIN 99C, ACHASOV 00H, and ALOISIO 02D. NODE=M003W;LINKAGE=BR

[14] Breit-Wigner width. NODE=M003W;LINKAGE=TL

[15] Supersedes ACHASOV 98I. Using the model of ACHASOV 89. NODE=M003W;LINKAGE=V9

[16] Supersedes ACHASOV 98I. NODE=M003W;LINKAGE=V8

[17] In the "narrow resonance" approximation. NODE=M003W1;LINKAGE=AI

[18] From the combined fit of the photon spectra in the reactions $e^+e^- \rightarrow \pi^+\pi^-\gamma$, $\pi^0\pi^0\gamma$. NODE=M003W;LINKAGE=SL

[19] Supersedes BARBERIS 99 and BARBERIS 99B NODE=M003W1;LINKAGE=BD

[20] T-matrix pole. NODE=M003W1;LINKAGE=AN

[21] On sheet II in a 2 pole solution. The other pole is found on sheet III at (1039−93i) MeV. NODE=M003W1;LINKAGE=LO

[22] From invariant mass fit. NODE=M003W1;LINKAGE=A

[23] On sheet II in a 2 pole solution. The other pole is found on sheet III at (963-29i) MeV. NODE=M003W1;LINKAGE=X

[24] Reanalysis of data from HYAMS 73, GRAYER 74, SRINIVASAN 75, and ROSSELET 77 using the interfering amplitude method. NODE=M003W1;LINKAGE=AA

[25] At high $|t|$. NODE=M003W1;LINKAGE=LA

[26] At low $|t|$. NODE=M003W1;LINKAGE=LB

[27] On sheet II in a 4-pole solution, the other poles are found on sheet III at (953−55i) MeV and on sheet IV at (938−35i) MeV. NODE=M003W1;LINKAGE=KL

[28] Combined fit of ALDE 95B, ANISOVICH 94, NODE=M003W1;LINKAGE=CF

[29] On sheet II in a 2 pole solution. The other pole is found on sheet III at (996−103i) MeV. NODE=M003W1;LINKAGE=C2

[30] From sheet II pole position. NODE=M003W1;LINKAGE=KM

[31] On sheet II in a 2 pole solution. The other pole is found on sheet III at (797−185i) MeV and can be interpreted as a shadow pole. NODE=M003W1;LINKAGE=L

[32] On sheet II in a 2 pole solution. The other pole is found on sheet III at (978−28i) MeV. NODE=M003W1;LINKAGE=K

[33] From coupled channel analysis. NODE=M003W1;LINKAGE=B

[34] Coupled channel analysis with finite width corrections. NODE=M003W;LINKAGE=B

[35] From coupled channel fit to the HYAMS 73 and PROTOPOPESCU 73 data. With a simultaneous fit to the $\pi\pi$ phase-shifts, inelasticity and to the $K^0_S K^0_S$ invariant mass. NODE=M003W;LINKAGE=C

[36] Included in AGUILAR-BENITEZ 78 fit. NODE=M003W;LINKAGE=R

$f_0(980)$ REFERENCES

NODE=M003

YOUR PAPER

ABLIKIM	15P	PR D92 012007	M. Ablikim *et al.*	(BES III Collab.)	REFID=56781
ABLIKIM	12E	PRL 108 182001	M. Ablikim *et al.*	(BES III Collab.)	REFID=54270
GARCIA-MAR...	11	PRL 107 072001	R. Garcia-Martin *et al.*	(MADR, CRAC)	REFID=16761
MOUSSALLAM	11	EPJ C71 1814	B. Moussallam		REFID=53975
BATLEY	10C	EPJ C70 635	J.R. Batley *et al.*	(CERN NA48/2 Collab.)	REFID=53567
MENNESSIER	10	PL B688 59	G. Mennessier, S. Narison, X.-G. Wang		REFID=53657
ANISOVICH	09	IJMP A24 2481	V.V. Anisovich, A.V. Sarantsev		REFID=52719
ECKLUND	09	PR D80 052009	K.M. Ecklund *et al.*	(CLEO Collab.)	REFID=53041
BATLEY	08A	EPJ C54 411	J.R. Batley *et al.*	(CERN NA48/2 Collab.)	REFID=52487
UEHARA	08A	PR D78 052004	S. Uehara *et al.*	(BELLE Collab.)	REFID=52309
AMBROSINO	07	EPJ C49 473	F. Ambrosino *et al.*	(KLOE Collab.)	REFID=51616
AUBERT	07AK	PR D76 012008	B. Aubert *et al.*	(BABAR Collab.)	REFID=51908
BONVICINI	07	PR D76 012001	G. Bonvicini *et al.*	(CLEO Collab.)	REFID=51721
MORI	07	PR D75 051101	T. Mori *et al.*	(BELLE Collab.)	REFID=51652
AMBROSINO	06B	PL B634 148	F. Ambrosino *et al.*	(KLOE Collab.)	REFID=51043
GARMASH	06	PRL 96 251803	A. Garmash *et al.*	(BELLE Collab.)	REFID=51162
ABLIKIM	05	PL B607 243	M. Ablikim *et al.*	(BES Collab.)	REFID=50450
ACHASOV	05	PR D72 013006	N.N. Achasov, G.N. Shestakov		REFID=50762
GARMASH	05	PR D71 092003	A. Garmash *et al.*	(BELLE Collab.)	REFID=50641
ANISOVICH	03	EPJ A16 229	V.V. Anisovich *et al.*		REFID=49401
TIKHOMIROV	03	PAN 66 828	G.D. Tikhomirov *et al.*		REFID=49423
		Translated from YAF 66 860.			
ALOISIO	02D	PL B537 21	A. Aloisio *et al.*	(KLOE Collab.)	REFID=48824
BRAMON	02	EPJ C26 253	A. Bramon *et al.*		REFID=49178
ACHASOV	01F	PR D63 094007	N.N. Achasov, V.V. Gubin	(Novosibirsk SND Collab.)	REFID=48312
AITALA	01A	PRL 86 765	E.M. Aitala *et al.*	(FNAL E791 Collab.)	REFID=48004
AITALA	01B	PRL 86 770	E.M. Aitala *et al.*	(FNAL E791 Collab.)	REFID=48005
ACHASOV	00H	PL B485 349	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=47930
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
BARBERIS	99	PL B453 305	D. Barberis *et al.*	(Omega Expt.)	REFID=46921
BARBERIS	99B	PL B453 316	D. Barberis *et al.*	(Omega Expt.)	REFID=46922
BARBERIS	99C	PL B453 325	D. Barberis *et al.*	(Omega Expt.)	REFID=46923
BARBERIS	99D	PL B462 462	D. Barberis *et al.*	(Omega Expt.)	REFID=47395
BELLAZZINI	99	PL B467 296	R. Bellazzini *et al.*		REFID=47400
KAMINSKI	99	EPJ C9 141	R. Kaminski, L. Lesniak, B. Loiseau	(CRAC, PARIN)	REFID=46927
OLLER	99	PR D60 099906 (erratum)	J.A. Oller *et al.*		REFID=46899
OLLER	99B	NP A652 407 (erratum)	J.A. Oller, E. Oset		REFID=46924
OLLER	99C	PR D60 074023	J.A. Oller, E. Oset		REFID=47386
ACHASOV	98I	PL B440 442	M.N. Achasov *et al.*		REFID=46600
ACKERSTAFF	98Q	EPJ C4 19	K. Ackerstaff *et al.*	(OPAL Collab.)	REFID=46145
ALDE	98	EPJ A3 361	D. Alde *et al.*	(GAM4 Collab.)	REFID=46605
Also		PAN 62 405	D. Alde *et al.*	(GAMS Collab.)	REFID=46914
		Translated from YAF 62 446.			
ANISOVICH	98B	SPU 41 419	V.V. Anisovich *et al.*		REFID=46331
		Translated from UFN 168 481.			
LOCHER	98	EPJ C4 317	M.P. Locher *et al.*	(PSI)	REFID=46372
ALDE	97	PL B397 350	D.M. Alde *et al.*	(GAMS Collab.)	REFID=45392
BERTIN	97C	PL B408 476	A. Bertin *et al.*	(OBELIX Collab.)	REFID=45701
ISHIDA	96	PTP 95 745	S. Ishida *et al.*	(TOKY, MIYA, KEK)	REFID=45770
TORNQVIST	96	PRL 76 1575	N.A. Tornqvist, M. Roos	(HELS)	REFID=44507
ALDE	95B	ZPHY C66 375	D.M. Alde *et al.*	(GAMS Collab.)	REFID=44375
AMSLER	95B	PL B342 433	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44377
AMSLER	95D	PL B355 425	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44441
ANISOVICH	95	PL B355 363	V.V. Anisovich *et al.*	(PNPI, SERP)	REFID=44442
JANSSEN	95	PR D52 2690	G. Janssen *et al.*	(STON, ADLD, JULI)	REFID=44508
AMSLER	94D	PL B333 277	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44093
ANISOVICH	94	PL B323 233	V.V. Anisovich *et al.*	(Crystal Barrel Collab.)	REFID=43659
BUGG	94	PR D50 4412	D.V. Bugg *et al.*	(LOQM)	REFID=44078
KAMINSKI	94	PR D50 3145	R. Kaminski, L. Lesniak, J.P. Maillet	(CRAC+)	REFID=45771
ZOU	94B	PR D50 591	B.S. Zou, D.V. Bugg	(LOQM)	REFID=44072
MORGAN	93	PR D48 1185	D. Morgan, M.R. Pennington	(RAL, DURH)	REFID=43614
AGUILAR-...	91	ZPHY C50 405	M. Aguilar-Benitez *et al.*	(LEBC-EHS Collab.)	REFID=41637
ARMSTRONG	91	ZPHY C51 351	T.A. Armstrong *et al.*	(ATHU, BARI, BIRM+)	REFID=41744
BREAKSTONE	90	ZPHY C48 569	A.M. Breakstone *et al.*	(ISU, BGNA, CERN+)	REFID=41376
ACHASOV	89	NP B315 465	N.N. Achasov, V.N. Ivanchenko		REFID=48021
AUGUSTIN	89	NP B320 1	J.E. Augustin, G. Cosme	(DM2 Collab.)	REFID=41004
ABACHI	86B	PRL 57 1990	S. Abachi *et al.*	(PURD, ANL, IND, MICH+)	REFID=20394
ETKIN	82B	PR D25 1786	A. Etkin *et al.*	(BNL, CUNY, TUFTS, VAND)	REFID=20390
GIDAL	81	PL 107B 153	G. Gidal *et al.*	(SLAC, LBL)	REFID=20386
ACHASOV	80	SJNP 32 566	N.N. Achasov, S.A. Devyanin, G.N. Shestakov	(NOVM)	REFID=20458
		Translated from YAF 32 1098.			
COHEN	80	PR D22 2595	D. Cohen *et al.*	(ANL) IJP	REFID=20381
AGUILAR-...	78	NP B140 73	M. Aguilar-Benitez *et al.*	(MADR, BOMB+)	REFID=20368
LEEPER	77	PR D16 2054	R.J. Leeper *et al.*	(ISU)	REFID=20365
ROSSELET	77	PR D15 574	L. Rosselet *et al.*	(GEVA, SACL)	REFID=11004
FLATTE	76	PL 63B 224	S.M. Flatte	(CERN)	REFID=20446
SRINIVASAN	75	PR D12 681	V. Srinivasan *et al.*	(NDAM, ANL)	REFID=21062
GRAYER	74	NP B75 189	G. Grayer *et al.*	(CERN, MPIM)	REFID=20113
BINNIE	73	PRL 31 1534	D.M. Binnie *et al.*	(LOIC, SHMP)	REFID=20343
GRAYER	73	Tallahassee	G. Grayer *et al.*	(CERN, MPIM)	REFID=20347
HYAMS	73	NP B64 134	B.D. Hyams *et al.*	(CERN, MPIM)	REFID=20107
PROTOPOP...	73	PR D7 1279	S.D. Protopopescu *et al.*	(LBL)	REFID=20108

NODE=M008

$f_1(1285)$

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

$f_1(1285)$ MASS

NODE=M008M

NODE=M008M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
	1282.0 ± 0.5 OUR AVERAGE Error includes scale factor of 1.8. See the ideogram below.					
YOUR DATA	1287.4 ± 3.0	87	ABLIKIM	15P	BES3	$J/\psi \to K^+K^-3\pi$
	1281.16 ± 0.39 ± 0.45		[1] LEES	12X	BABR	$\tau^- \to \pi^- f_1(1285)\nu_\tau$
	1285.1 ± 1.0 $^{+1.6}_{-0.3}$		[2] ABLIKIM	11J	BES3	$J/\psi \to \omega(\eta\pi^+\pi^-)$
	1281 ± 2 ± 1		AUBERT	07AU	BABR	10.6 $e^+e^- \to f_1(1285)\pi^+\pi^-\gamma$
	1276.1 ± 8.1 ± 8.0	203	BAI	04J	BES2	$J/\psi \to \gamma\gamma\pi^+\pi^-$
	1274 ± 6	237	ABDALLAH	03H	DLPH	91.2 $e^+e^- \to K^0_S K^\pm\pi^\mp + X$
	1280 ± 4		ACCIARRI	01G	L3	
	1288 ± 4 ± 5	20k	ADAMS	01B	B852	18 GeV $\pi^- p \to K^+K^-\pi^0 n$
	1284 ± 6	1400	ALDE	97B	GAM4	100 $\pi^- p \to \eta\pi^0\pi^0 n$
	1281 ± 1		BARBERIS	97B	OMEG	450 $pp \to pp2(\pi^+\pi^-)$
	1281 ± 1		BARBERIS	97C	OMEG	450 $pp \to ppK^0_S K^\pm\pi^\mp$
	1280 ± 2		[3] ANTINORI	95	OMEG	300,450 $pp \to pp2(\pi^+\pi^-)$
	1282.2 ± 1.5		LEE	94	MPS2	18 $\pi^- p \to K^+\overline{K}^0 2\pi^- p$
	1279 ± 5		FUKUI	91C	SPEC	8.95 $\pi^- p \to \eta\pi^+\pi^- n$
	1278 ± 2	140	ARMSTRONG	89	OMEG	300 $pp \to K\overline{K}\pi pp$
	1278 ± 2		ARMSTRONG	89G	OMEG	85 $\pi^+ p \to 4\pi\pi p$, $pp \to 4\pi pp$
	1280.1 ± 2.1	60	RATH	89	MPS	21.4 $\pi^- p \to K^0_S K^0_S \pi^0 n$
	1285 ± 1	4750	[4] BIRMAN	88	MPS	8 $\pi^- p \to K^+\overline{K}^0\pi^- n$
	1280 ± 1	504	BITYUKOV	88	SPEC	32.5 $\pi^- p \to K^+K^-\pi^0 n$
	1280 ± 4		ANDO	86	SPEC	8 $\pi^- p \to \eta\pi^+\pi^- n$
	1277 ± 2	420	REEVES	86	SPEC	6.6 $p\overline{p} \to KK\pi X$
	1285 ± 2		CHUNG	85	SPEC	8 $\pi^- p \to NK\overline{K}\pi$
	1279 ± 2	604	ARMSTRONG	84	OMEG	85 $\pi^+ p \to K\overline{K}\pi\pi p$, $pp \to K\overline{K}\pi pp$
	1286 ± 1		CHAUVAT	84	SPEC	ISR 31.5 pp
	1278 ± 4		EVANGELIS...	81	OMEG	12 $\pi^- p \to \eta\pi^+\pi^-\pi^- p$
	1283 ± 3	103	DIONISI	80	HBC	4 $\pi^- p \to K\overline{K}\pi n$
	1282 ± 2	320	NACASCH	78	HBC	0.7,0.76 $\overline{p}p \to K\overline{K}3\pi$
	1279 ± 5	210	GRASSLER	77	HBC	16 $\pi^\mp p$
	1286 ± 3	180	DUBOC	72	HBC	1.2 $\overline{p}p \to 2K4\pi$
	1283 ± 5		DAHL	67	HBC	1.6–4.2 $\pi^- p$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	1284.2 ± 2.2		[5] AAIJ	14Y	LHCB	$\overline{B}^0_{(s)} \to J/\psi 2(\pi^+\pi^-)$
	1281.9 ± 0.5		[5] SOSA	99	SPEC	$pp \to p_{\rm slow}(K^0_S K^+\pi^-)\, p_{\rm fast}$
	1282.8 ± 0.6		[5] SOSA	99	SPEC	$pp \to p_{\rm slow}(K^0_S K^-\pi^+)\, p_{\rm fast}$
	1270 ± 10		AMELIN	95	VES	37 $\pi^- N \to \pi^-\pi^+\pi^-\gamma N$
	1280 ± 2		ABATZIS	94	OMEG	450 $pp \to pp2(\pi^+\pi^-)$
	1282 ± 4		ARMSTRONG	93C	E760	$\overline{p}p \to \pi^0\eta\eta \to 6\gamma$
	1270 ± 6 ± 10		ARMSTRONG	92C	OMEG	300 $pp \to pp\pi^+\pi^-\gamma$
	1281 ± 1		ARMSTRONG	89E	OMEG	300 $pp \to pp2(\pi^+\pi^-)$
	1279 ± 6 ± 10	16	BECKER	87	MRK3	$e^+e^- \to \phi K\overline{K}\pi$
	1286 ± 9		GIDAL	87	MRK2	$e^+e^- \to e^+e^-\eta\pi^+\pi^-$
	1287 ± 5	353	BITYUKOV	84B	SPEC	32 $\pi^- p \to K^+K^-\pi^0 n$
	∼ 1279		[6] TORNQVIST	82B	RVUE	
	1275 ± 6	31	BROMBERG	80	SPEC	100 $\pi^- p \to K\overline{K}\pi X$
	1288 ± 9	200	GURTU	79	HBC	4.2 $K^- p \to n\eta 2\pi$

OCCUR=2

$\sim$ 1275.0	46	[7] STANTON	79	CNTR	8.5 $\pi^- p \to n 2\gamma 2\pi$
1271 ±10	34	CORDEN	78	OMEG	12–15 $\pi^- p \to K^+ K^- \pi n$
1295 ±12	85	CORDEN	78	OMEG	12–15 $\pi^- p \to n 5\pi$
1292 ±10	150	DEFOIX	72	HBC	0.7 $\overline{p} p \to 7\pi$
1280 ± 3	500	[8] THUN	72	MMS	13.4 $\pi^- p$
1303 ± 8		BARDADIN-...	71	HBC	8 $\pi^+ p \to p 6\pi$
1283 ± 6		BOESEBECK	71	HBC	16.0 $\pi p \to p 5\pi$
1270 ±10		CAMPBELL	69	DBC	2.7 $\pi^+ d$
1285 ± 7		LORSTAD	69	HBC	0.7 $\overline{p} p$, 4,5-body
1290 ± 7		D'ANDLAU	68	HBC	1.2 $\overline{p} p$, 5–6 body

[1] Using the $2\pi^+ 2\pi^-$ and $\pi^+ \pi^- \eta$ modes of $f_1(1285)$ decay. NODE=M008M;LINKAGE=LE
[2] The selected process is $J/\psi \to \omega a_0(980) \pi$. NODE=M008M;LINKAGE=BL
[3] Supersedes ABATZIS 94, ARMSTRONG 89E. NODE=M008M;LINKAGE=B
[4] From partial wave analysis of $K^+ \overline{K}^0 \pi^-$ system. NODE=M008M;LINKAGE=A
[5] No systematic error given. NODE=M008M;LINKAGE=N1
[6] From a unitarized quark-model calculation. NODE=M008M;LINKAGE=T
[7] From phase shift analysis of $\eta \pi^+ \pi^-$ system. NODE=M008M;LINKAGE=P
[8] Seen in the missing mass spectrum. NODE=M008M;LINKAGE=S

$f_1(1285)$ WIDTH

NODE=M008W

Only experiments giving width error less than 20 MeV are kept for averaging. NODE=M008W

NODE=M008W

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
	24.1± 1.0 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.			
YOUR DATA	18.3± 6.3	87	ABLIKIM	15P	BES3	$J/\psi \to K^+ K^- 3\pi$
	22.0± 3.1 $^{+2.0}_{-1.5}$		[1] ABLIKIM	11J	BES3	$J/\psi \to \omega(\eta \pi^+ \pi^-)$
	35 ± 6 ± 4		AUBERT	07AU	BABR	10.6 $e^+ e^- \to f_1(1285) \pi^+ \pi^- \gamma$
	40.0± 8.6± 9.3	203	BAI	04J	BES2	$J/\psi \to \gamma\gamma \pi^+ \pi^-$
	29 ±12	237	ABDALLAH	03H	DLPH	91.2 $e^+ e^- \to K^0_S K^\pm \pi^\mp + X$
	45 ± 9 ± 7	20k	ADAMS	01B	B852	18 GeV $\pi^- p \to K^+ K^- \pi^0 n$
	55 ±18	1400	ALDE	97B	GAM4	100 $\pi^- p \to \eta \pi^0 \pi^0 n$
	24 ± 3		BARBERIS	97B	OMEG	450 $pp \to pp 2(\pi^+ \pi^-)$
	20 ± 2		BARBERIS	97C	OMEG	450 $pp \to pp K^0_S K^\pm \pi^\mp$
	36 ± 5		[2] ANTINORI	95	OMEG	300,450 $pp \to pp 2(\pi^+ \pi^-)$
	29.0± 4.1		LEE	94	MPS2	18 $\pi^- p \to K^+ \overline{K}^0 2\pi^- p$
	25 ± 4	140	ARMSTRONG	89	OMEG	300 $pp \to K \overline{K} \pi pp$
	22 ± 2	4750	[3] BIRMAN	88	MPS	8 $\pi^- p \to K^+ \overline{K}^0 \pi^- n$
	25 ± 4	504	BITYUKOV	88	SPEC	32.5 $\pi^- p \to K^+ K^- \pi^0 n$
	19 ± 5		ANDO	86	SPEC	8 $\pi^- p \to \eta \pi^+ \pi^- n$
	32 ± 8	420	REEVES	86	SPEC	6.6 $p \overline{p} \to K K \pi X$
	22 ± 2		CHUNG	85	SPEC	8 $\pi^- p \to N K \overline{K} \pi$
	32 ± 3	604	ARMSTRONG	84	OMEG	85 $\pi^+ p \to K \overline{K} \pi \pi p$, $pp \to K \overline{K} \pi pp$
	24 ± 3		CHAUVAT	84	SPEC	ISR 31.5 pp
	29 ±10	103	DIONISI	80	HBC	4 $\pi^- p \to K \overline{K} \pi n$
	28.3± 6.7	320	NACASCH	78	HBC	0.7,0.76 $\overline{p} p \to K \overline{K} 3\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
	32.4± 5.8		[4] AAIJ	14Y	LHCB	$\overline{B}^0_{(s)} \to J/\psi 2(\pi^+ \pi^-)$
	18.2± 1.2		[4] SOSA	99	SPEC	$pp \to p_{slow} (K^0_S K^+ \pi^-) p_{fast}$
	19.4± 1.5		[4] SOSA	99	SPEC	$pp \to p_{slow} (K^0_S K^- \pi^+) p_{fast}$
	40 ± 5		ABATZIS	94	OMEG	450 $pp \to pp 2(\pi^+ \pi^-)$
	31 ± 5		ARMSTRONG	89E	OMEG	300 $pp \to pp 2(\pi^+ \pi^-)$
	41 ±12		ARMSTRONG	89G	OMEG	85 $\pi^+ p \to 4\pi \pi p$, $pp \to 4\pi pp$
	17.9±10.9	60	RATH	89	MPS	21.4 $\pi^- p \to K^0_S K^0_S \pi^0 n$
	14 $^{+20}_{-14}$ ±10	16	BECKER	87	MRK3	$e^+ e^- \to \phi K \overline{K} \pi$
	26 ±12		EVANGELIS...	81	OMEG	12 $\pi^- p \to \eta \pi^+ \pi^- \pi^- p$

OCCUR=2

OCCUR=2

25	±15	200	GURTU	79	HBC	4.2 $K^- p \to n\eta 2\pi$
∼ 10			[5] STANTON	79	CNTR	8.5 $\pi^- p \to n 2\gamma 2\pi$
24	±18	210	GRASSLER	77	HBC	16 $\pi^\mp p$
28	± 5	150	[6] DEFOIX	72	HBC	0.7 $\overline{p}p \to 7\pi$
46	± 9	180	[6] DUBOC	72	HBC	1.2 $\overline{p}p \to 2K 4\pi$
37	± 5	500	[7] THUN	72	MMS	13.4 $\pi^- p$
10	±10		BOESEBECK	71	HBC	16.0 $\pi p \to p 5\pi$
30	±15		CAMPBELL	69	DBC	2.7 $\pi^+ d$
60	±15		[6] LORSTAD	69	HBC	0.7 $\overline{p}p$, 4,5-body
35	±10		[6] DAHL	67	HBC	1.6–4.2 $\pi^- p$

[1] The selected process is $J/\psi \to \omega a_0(980)\pi$. NODE=M008W;LINKAGE=BL
[2] Supersedes ABATZIS 94, ARMSTRONG 89E. NODE=M008W;LINKAGE=B
[3] From partial wave analysis of $K^+ \overline{K}^0 \pi^-$ system. NODE=M008W;LINKAGE=A
[4] No systematic error given. NODE=M008W;LINKAGE=N1
[5] From phase shift analysis of $\eta\pi^+\pi^-$ system. NODE=M008W;LINKAGE=P
[6] Resolution is not unfolded. NODE=M008W;LINKAGE=R
[7] Seen in the missing mass spectrum. NODE=M008W;LINKAGE=S

$f_1(1285)$ REFERENCES

NODE=M008

YOUR PAPER	ABLIKIM	15P	PR D92 012007	M. Ablikim *et al.*	(BES III Collab.)	REFID=56781
	AAIJ	14Y	PRL 112 091802	R. Aaij *et al.*	(LHCb Collab.)	REFID=55837
	LEES	12X	PR D86 092010	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54714
	ABLIKIM	11J	PRL 107 182001	M. Ablikim *et al.*	(BES III Collab.)	REFID=53931
	AUBERT	07AU	PR D76 092005	B. Aubert *et al.*	(BABAR Collab.)	REFID=52049
	BAI	04J	PL B594 47	J.Z. Bai *et al.*	(BES Collab.)	REFID=50167
	ABDALLAH	03H	PL B569 129	J. Abdallah *et al.*	(DELPHI Collab.)	REFID=49548
	ACCIARRI	01G	PL B501 1	M. Acciarri *et al.*	(L3 Collab.)	REFID=48319
	ADAMS	01B	PL B516 264	G.S. Adams *et al.*	(BNL E852 Collab.)	REFID=49649
	SOSA	99	PRL 83 913	M. Sosa *et al.*		REFID=46937
	ALDE	97B	PAN 60 386	D. Alde *et al.*	(GAMS Collab.)	REFID=45396
			Translated from YAF 60 458.			
	BARBERIS	97B	PL B413 217	D. Barberis *et al.*	(WA 102 Collab.)	REFID=45758
	BARBERIS	97C	PL B413 225	D. Barberis *et al.*	(WA 102 Collab.)	REFID=45759
	AMELIN	95	ZPHY C66 71	D.V. Amelin *et al.*	(VES Collab.)	REFID=44376
	ANTINORI	95	PL B353 589	F. Antinori *et al.*	(ATHU, BARI, BIRM+)	REFID=44437
	ABATZIS	94	PL B324 509	S. Abatzis *et al.*	(ATHU, BARI, BIRM+)	REFID=44090
	LEE	94	PL B323 227	J.H. Lee *et al.*	(BNL, IND, KYUN, MASD+)	REFID=44092
	ARMSTRONG	93C	PL B307 394	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)	REFID=43587
	ARMSTRONG	92C	ZPHY C54 371	T.A. Armstrong *et al.*	(ATHU, BARI, BIRM+)	REFID=42097
	FUKUI	91C	PL B267 293	S. Fukui *et al.*	(SUGI, NAGO, KEK, KYOT+)	REFID=41748
	ARMSTRONG	89	PL B221 216	T.A. Armstrong *et al.*	(CERN, CDEF, BIRM+) JPC	REFID=40729
	ARMSTRONG	89E	PL B228 536	T.A. Armstrong, M. Benayoun	(ATHU, BARI, BIRM+)	REFID=41011
	ARMSTRONG	89G	ZPHY C43 55	T.A. Armstrong *et al.*	(CERN, BIRM, BARI+)	REFID=40930
	RATH	89	PR D40 693	M.G. Rath *et al.*	(NDAM, BRAN, BNL, CUNY+)	REFID=40924
	BIRMAN	88	PRL 61 1557	A. Birman *et al.*	(BNL, FSU, IND, MASD) JP	REFID=40568
	BITYUKOV	88	PL B203 327	S.I. Bityukov *et al.*	(SERP)	REFID=40569
	BECKER	87	PRL 59 186	J.J. Becker *et al.*	(Mark III Collab.)	REFID=40015
	GIDAL	87	PRL 59 2012	G. Gidal *et al.*	(LBL, SLAC, HARV)	REFID=40223
	ANDO	86	PRL 57 1296	A. Ando *et al.*	(KEK, KYOT, NIRS, SAGA+) IJP	REFID=20891
	REEVES	86	PR D34 1960	D.F. Reeves *et al.*	(FLOR, BNL, IND+) JP	REFID=20936
	CHUNG	85	PRL 55 779	S.U. Chung *et al.*	(BNL, FLOR, IND+) JP	REFID=20934
	ARMSTRONG	84	PL 146B 273	T.A. Armstrong *et al.*	(ATHU, BARI, BIRM+) JP	REFID=20929
	BITYUKOV	84B	PL 144B 133	S.I. Bityukov *et al.*	(SERP)	REFID=20468
	CHAUVAT	84	PL 148B 382	P. Chauvat *et al.*	(CERN, CLER, UCLA+)	REFID=20932
	TORNQVIST	82B	NP B203 268	N.A. Tornqvist	(HELS)	REFID=20573
	EVANGELIS...	81	NP B178 197	C. Evangelista *et al.*	(BARI, BONN, CERN+)	REFID=20462
	BROMBERG	80	PR D22 1513	C.M. Bromberg *et al.*	(CIT, FNAL, ILLC+)	REFID=20922
	DIONISI	80	NP B169 1	C. Dionisi *et al.*	(CERN, MADR, CDEF+)	REFID=20924
	GURTU	79	NP B151 181	A. Gurtu *et al.*	(CERN, ZEEM, NIJM, OXF)	REFID=20456
	STANTON	79	PRL 42 346	N.R. Stanton *et al.*	(OSU, CARL, MCGI+) JP	REFID=20887
	CORDEN	78	NP B144 253	M.J. Corden *et al.*	(BIRM, RHEL, TELA+) JP	REFID=20452
	NACASCH	78	NP B135 203	R. Nacasch *et al.*	(PARIS, MADR, CERN)	REFID=20919
	GRASSLER	77	NP B121 189	H. Grassler *et al.*	(AACH3, BERL, BONN+)	REFID=20447
	DEFOIX	72	NP B44 125	C. Defoix *et al.*	(CDEF, CERN)	REFID=20435
	DUBOC	72	NP B46 429	J. Duboc *et al.*	(PARIS, LIVP)	REFID=20339
	THUN	72	PRL 28 1733	R. Thun *et al.*	(STON, NEAS)	REFID=20911
	BARDADIN-...	71	PR D4 2711	M. Bardadin-Otwinowska *et al.*	(WARS)	REFID=20196
	BOESEBECK	71	PL 34B 659	K. Boesebeck	(AACH, BERL, BONN, CERN, CRAC+)	REFID=20905
	CAMPBELL	69	PRL 22 1204	J.H. Campbell *et al.*	(PURD)	REFID=20419
	LORSTAD	69	NP B14 63	B. Lorstad *et al.*	(CDEF, CERN) JP	REFID=20901
	D'ANDLAU	68	NP B5 693	C. d'Andlau *et al.*	(CDEF, CERN, IRAD+) IJP	REFID=20897
	DAHL	67	PR 163 1377	O.I. Dahl *et al.*	(LRL) IJP	REFID=20321

$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M070

$J/\psi(1S)$

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

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

NODE=M070230

HADRONIC DECAYS

NODE=M070305

$\Gamma(\phi\pi^0 f_0(980) \to \phi\pi^0\pi^+\pi^-)/\Gamma_{total}$ **Γ_{59}/Γ**

NODE=M070S97
NODE=M070S97

	VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**4.50±0.80±0.61**	355	ABLIKIM	15P	BES3	$J/\psi \to K^+K^-3\pi$

$\Gamma(\phi\pi^0 f_0(980) \to \phi\pi^0 p^0\pi^0)/\Gamma_{total}$ **Γ_{60}/Γ**

NODE=M070S98
NODE=M070S98

	VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.67±0.50±0.24**	70	ABLIKIM	15P	BESE	$J/\psi \to K^+K^-3\pi$

$\Gamma(\phi f_1(1285) \to \phi\pi^0 f_0(980) \to \phi\pi^0\pi^+\pi^-)/\Gamma_{total}$ **Γ_{66}/Γ**

NODE=M070S99
NODE=M070S99

	VALUE (units 10^{-7})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**9.36±2.31±1.54**	78	ABLIKIM	15P	BES3	$J/\psi \to K^+K^-3\pi$

$\Gamma(\phi f_1(1285) \to \phi\pi^0 f_0(980) \to \phi\pi^0\pi^0\pi^0)/\Gamma_{total}$ **Γ_{67}/Γ**

NODE=M070S00
NODE=M070S00

	VALUE (units 10^{-7})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**2.08±1.63±1.47**	9	ABLIKIM	15P	BES3	$J/\psi \to K^+K^-3\pi$

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER ABLIKIM 15P PR D92 012007 M. Ablikim *et al.* (BES III Collab.)

REFID=56781

Reference = ABLIKIM 15Q; PR D92 012008
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M210

$X(3900)$

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

Charged $X(3900)$ seen as a peak in the invariant mass distribution of the $J/\psi\pi^\pm$ system by BES III (ABLIKIM 13T) in $e^+e^- \rightarrow \pi^+\pi^- J/\psi$ at c.m. energy of 4.26 GeV and by radiative return from e^+e^- collisions at $\sqrt{s}$ from 9.46 to 10.86 GeV at Belle (LIU 13B). Angular analysis of ABLIKIM 14A and ABLIKIM 15AC favor the $J^P = 1^+$ assignment. Neutral $X(3900)$ seen in the $J/\psi\pi^0$ invariant mass distribution in $e^+e^- \rightarrow \pi^0\pi^0 J/\psi$ at c.m. energies of 4.23, 4.26, and 4.36 GeV by BES III (ABLIKIM 15U) and at 4.17 GeV by XIAO 13A. Peaks in $(D\overline{D}^*)^{0,\pm}$ reported by BES III (ABLIKIM 14A, ABLIKIM 15AB) are assumed to be related. NODE=M210

$X(3900)$ BRANCHING RATIOS

NODE=M210225

$\Gamma(J/\psi\eta)/\Gamma_{total}$ **Γ_7/Γ** NODE=M210R04

	VALUE	DOCUMENT ID		TECN	CHG	COMMENT
YOUR DATA	**not seen**	ABLIKIM	15Q	BES3	0	4.0–4.6 $e^+e^- \rightarrow J/\psi\eta\pi^0$

NODE=M210R04

$\Gamma(J/\psi\eta)/\Gamma(J/\psi\pi)$ **Γ_7/Γ_1** NODE=M210R05

	VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
YOUR DATA	<0.15	90	ABLIKIM	15Q	BES3	0	4.226 $e^+e^- \rightarrow J/\psi\eta\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •							
YOUR DATA	<0.65	90	ABLIKIM	15Q	BES3	0	4.257 $e^+e^- \rightarrow J/\psi\eta\pi^0$

NODE=M210R05

OCCUR=2

$X(3900)$ REFERENCES

NODE=M210

	ABLIKIM	15AB	PRL 115 222002	M. Ablikim *et al.*	(BES III Collab.)
	ABLIKIM	15AC	PR D92 092006	M. Ablikim *et al.*	(BES III Collab.) JP
YOUR PAPER	ABLIKIM	15Q	PR D92 012008	M. Ablikim *et al.*	(BES III Collab.)
	ABLIKIM	15U	PRL 115 112003	M. Ablikim *et al.*	(BES III Collab.)
	ABLIKIM	14A	PRL 112 022001	M. Ablikim *et al.*	(BES III Collab.) JP
	ABLIKIM	13T	PRL 110 252001	M. Ablikim *et al.*	(BES III Collab.)
	LIU	13B	PRL 110 252002	Z.Q. Liu *et al.*	(BELLE Collab.)
	XIAO	13A	PL B727 366	T. Xiao *et al.*	(NWES)

REFID=56954
REFID=56967
REFID=56782
REFID=56786
REFID=55648
REFID=55409
REFID=55410
REFID=55593

NODE=M074

$X(4260)$

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

Seen in radiative return from e^+e^- collisions at $\sqrt{s} = 9.54$–10.58 GeV by AUBERT,B 05I, HE 06B, and YUAN 07, and in e^+e^- collisions at $\sqrt{s} \approx 4.26$ GeV by COAN 06. Possibly seen by AUBERT 06 in $B^- \rightarrow K^-\pi^+\pi^- J/\psi$. See also the mini-review under the $X(3872)$. (See the index for the page number.) NODE=M074

$X(4260)$ BRANCHING RATIOS

NODE=M074240

$\Gamma(J/\psi\eta\pi^0)/\Gamma_{total}$ **Γ_{13}/Γ** NODE=M074R28

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**not seen**	ABLIKIM	15Q	BES3	4.0–4.6 $e^+e^- \rightarrow J/\psi\eta\pi^0$

NODE=M074R28

$X(4260)$ REFERENCES

NODE=M074

YOUR PAPER	ABLIKIM	15Q	PR D92 012008	M. Ablikim *et al.*	(BES III Collab.)
	YUAN	07	PRL 99 182004	C.Z. Yuan *et al.*	(BELLE Collab.)
	AUBERT	06	PR D73 011101	B. Aubert *et al.*	(BABAR Collab.)
	COAN	06	PRL 96 162003	T.E. Coan *et al.*	(CLEO Collab.)
	HE	06B	PR D74 091104	Q. He *et al.*	(CLEO Collab.)
	AUBERT,B	05I	PRL 95 142001	B. Aubert *et al.*	(BABAR Collab.)

REFID=56782
REFID=51960
REFID=51017
REFID=51075
REFID=51523
REFID=50776

Reference = ABLIKIM 15G; PR D92 012014
Verifier code = BES3

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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=M002

$\eta'(958)$

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

$\eta'(958)$ β PARAMETER
$|\text{MATRIX ELEMENT}|^2 = (1 + 2\beta Z)$

NODE=M002226

See the "Note on η Decay Parameters" in our 1994 edition Physical Review **D50** 1173 (1994), p. 1454.

NODE=M002226

β decay parameter

NODE=M002B0

	VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
	-0.61 ± 0.08 OUR AVERAGE		Error includes scale factor of 1.2.			
YOUR DATA	$-0.640 \pm 0.046 \pm 0.047$	1.8k	ABLIKIM	15G	BES3	$J/\psi \to \gamma(\pi^0\pi^0\pi^0)$
	-0.59 ± 0.18	235	BLIK	08	GAMS	32 $\pi^- p \to \eta' n$
	-0.1 ± 0.3		ALDE	87B	GAM2	38 $\pi^- p \to n3\pi^0$

NODE=M002B0

$\eta'(958)$ REFERENCES

NODE=M002

YOUR PAPER	ABLIKIM	15G	PR D92 012014	M. Ablikim *et al.*	(BES III Collab.)	REFID=56602
	BLIK	08	PAN 71 2124 Translated from YAF 71 2161.	A. Blik *et al.*	(GAMS-4π Collab.)	REFID=52663
	PDG	94	PR D50 1173	L. Montanet *et al.*	(CERN, LBL, BOST+)	REFID=43653
	ALDE	87B	ZPHY C36 603	D.M. Alde *et al.*	(LANL, BELG, SERP, LAPP)	REFID=40236

Reference = ABLIKIM 15R; PR D92 032009
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M210

$X(3900)$

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

Charged $X(3900)$ seen as a peak in the invariant mass distribution of the $J/\psi\pi^\pm$ system by BES III (ABLIKIM 13T) in $e^+e^- \rightarrow \pi^+\pi^- J/\psi$ at c.m. energy of 4.26 GeV and by radiative return from e^+e^- collisions at $\sqrt{s}$ from 9.46 to 10.86 GeV at Belle (LIU 13B). Angular analysis of ABLIKIM 14A and ABLIKIM 15AC favor the $J^P = 1^+$ assignment. Neutral $X(3900)$ seen in the $J/\psi\pi^0$ invariant mass distribution in $e^+e^- \rightarrow \pi^0\pi^0 J/\psi$ at c.m. energies of 4.23, 4.26, and 4.36 GeV by BES III (ABLIKIM 15U) and at 4.17 GeV by XIAO 13A. Peaks in $(D\overline{D}^*)^{0,\pm}$ reported by BES III (ABLIKIM 14A, ABLIKIM 15AB) are assumed to be related.

NODE=M210

$X(3900)$ BRANCHING RATIOS

NODE=M210225

	$\Gamma(\omega\pi^\pm)/\Gamma_{total}$					Γ_6/Γ
	VALUE	*DOCUMENT ID*	*TECN*	*CHG*	*COMMENT*	
YOUR DATA	**not seen**	ABLIKIM 15R	BES3	$\pm$	$e^+e^- \rightarrow \omega\pi^+\pi^-$	

NODE=M210R00
NODE=M210R00

$X(3900)$ REFERENCES

NODE=M210

	ABLIKIM	15AB	PRL 115 222002	M. Ablikim *et al.*	(BES III Collab.)	REFID=56954
	ABLIKIM	15AC	PR D92 092006	M. Ablikim *et al.*	(BES III Collab.) JP	REFID=56967
YOUR PAPER	ABLIKIM	15R	PR D92 032009	M. Ablikim *et al.*	(BES III Collab.)	REFID=56783
	ABLIKIM	15U	PRL 115 112003	M. Ablikim *et al.*	(BES III Collab.)	REFID=56786
	ABLIKIM	14A	PRL 112 022001	M. Ablikim *et al.*	(BES III Collab.) JP	REFID=55648
	ABLIKIM	13T	PRL 110 252001	M. Ablikim *et al.*	(BES III Collab.)	REFID=55409
	LIU	13B	PRL 110 252002	Z.Q. Liu *et al.*	(BELLE Collab.)	REFID=55410
	XIAO	13A	PL B727 366	T. Xiao *et al.*	(NWES)	REFID=55593

Reference = ABLIKIM 15AD; PR D92 051101
Verifier code = BES3

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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=M002

$\eta'(958)$

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

$\eta'(958)$ BRANCHING RATIOS

NODE=M002230

$\Gamma(\omega\gamma)/\Gamma_{total}$ — **Γ_4/Γ**

NODE=M002R49
NODE=M002R49

	VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**2.55±0.03±0.16**	33.2k	[1] ABLIKIM	15AD	BES3	$J/\psi \to \eta'\gamma$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	2.34±0.30±0.04	70	[2] PEDLAR	09	CLEO	$J/\psi \to \gamma\eta'$

YOUR NOTE [1] Using B($J/\psi \to \eta'\gamma$) = (5.15 ± 0.16) × 10^{-3} and B($\omega \to \pi^+\pi^-\pi^0$) = (89.2 ± 0.7)%.
[2] Not independent of other η' branching fractions and ratios in PEDLAR 09.

NODE=M002R49;LINKAGE=A
NODE=M002R49;LINKAGE=PE

$\Gamma(\omega e^+e^-)/\Gamma(\omega\gamma)$ — **Γ_5/Γ_4**

NODE=M002R60
NODE=M002R60

	VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
YOUR DATA	7.71±1.34±0.54	[1] ABLIKIM	15AD	BES3	$J/\psi \to \eta'\gamma$

YOUR NOTE [1] Obtained from other ABLIKIM 15AD meausurements with common systematics taken into account.

NODE=M002R60;LINKAGE=A

$\Gamma(\omega e^+e^-)/\Gamma_{total}$ — **Γ_5/Γ**

NODE=M002R59
NODE=M002R59

	VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.97±0.34±0.17**	66	[1] ABLIKIM	15AD	BES3	$J/\psi \to \eta'\gamma$

YOUR NOTE [1] Using B($J/\psi \to \eta'\gamma$) = (5.15 ± 0.16) × 10^{-3} and B($\omega \to \pi^+\pi^-\pi^0$) = (89.2 ± 0.7)%.

NODE=M002R59;LINKAGE=A

$\eta'(958)$ REFERENCES

NODE=M002

YOUR PAPER ABLIKIM 15AD PR D92 051101 M. Ablikim *et al.* (BES III Collab.) REFID=56983
PEDLAR 09 PR D79 111101 T.K. Pedlar *et al.* (CLEO Collab.) REFID=52998

Reference = ABLIKIM 15AE; PR D92 052003
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M070

$J/\psi(1S)$

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

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

NODE=M070230

RADIATIVE DECAYS

NODE=M070310

$\Gamma(\gamma\pi^0\pi^0)/\Gamma_{total}$ — **Γ_{145}/Γ**

NODE=M070B00

NODE=M070B00

	VALUE (units 10^{-3})	*DOCUMENT ID*	*TECN*	*COMMENT*
YOUR DATA	**1.15±0.05**	[1] ABLIKIM	15AE BES3	$J/\psi \to \gamma\pi^0\pi^0$

YOUR NOTE [1] The uncertainty is systematic as statistical is netligible.

NODE=M070B00;LINKAGE=A

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER ABLIKIM 15AE PR D92 052003 M. Ablikim *et al.* (BES III Collab.)

REFID=56984

Reference = ABLIKIM 15AC; PR D92 092006
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M210

$X(3900)$

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

Charged $X(3900)$ seen as a peak in the invariant mass distribution of the $J/\psi\pi^\pm$ system by BES III (ABLIKIM 13T) in $e^+e^- \to \pi^+\pi^- J/\psi$ at c.m. energy of 4.26 GeV and by radiative return from e^+e^- collisions at $\sqrt{s}$ from 9.46 to 10.86 GeV at Belle (LIU 13B). Angular analysis of ABLIKIM 14A and ABLIKIM 15AC favor the $J^P = 1^+$ assignment. Neutral $X(3900)$ seen in the $J/\psi\pi^0$ invariant mass distribution in $e^+e^- \to \pi^0\pi^0 J/\psi$ at c.m. energies of 4.23, 4.26, and 4.36 GeV by BES III (ABLIKIM 15U) and at 4.17 GeV by XIAO 13A. Peaks in $(D\overline{D}^*)^{0,\pm}$ reported by BES III (ABLIKIM 14A, ABLIKIM 15AB) are assumed to be related.

NODE=M210

$X(3900)$ MASS

NODE=M210M

NODE=M210M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
	3886.6±2.4 OUR AVERAGE		Error includes scale factor of 1.6. See the ideogram below.				
	$3885.7^{+4.3}_{-5.7}\pm8.4$		[1] ABLIKIM	15AB	BES3	0	$e^+e^- \to \pi^0(D\overline{D}^*)^0$
YOUR DATA	3881.7±1.6±1.6	1248	[1] ABLIKIM	15AC	BES3	±	$e^+e^- \to \pi^\pm(D\overline{D}^*)^\mp$
	3894.8±2.3±3.2	356	[1] ABLIKIM	15U	BES3	0	$e^+e^- \to \pi^0\pi^0 J/\psi$
	3883.9±1.5±4.2	1212	[1] ABLIKIM	14A	BES3	±	$e^+e^- \to \pi^\pm(D\overline{D}^*)^\mp$
	3899.0±3.6±4.9	307	[1] ABLIKIM	13T	BES3	±	$e^+e^- \to \pi^+\pi^- J/\psi$
	3894.5±6.6±4.5	159	[1] LIU	13B	BELL	±	$e^+e^- \to \gamma\pi^+\pi^- J/\psi$
	3886 ±4 ±2	81	[1,2] XIAO	13A		±	4.17 $e^+e^- \to \pi^+\pi^- J/\psi$
	3904 ±9 ±5	25	[1,2] XIAO	13A		0	4.17 $e^+e^- \to \pi^0\pi^0 J/\psi$

OCCUR=2

[1] Neglecting interference between the $X(3900)$ and non-resonant continuum.

[2] For $M^2(\pi^+\pi^-) < 0.65$ GeV^2. Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration.

NODE=M210M;LINKAGE=A

NODE=M210M;LINKAGE=B

$X(3900)$ WIDTH

NODE=M210W

NODE=M210W

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
	28.1± 2.6 OUR AVERAGE						
	$35\ ^{+11}_{-12}\ \pm15$		[1] ABLIKIM	15AB	BES3	0	$e^+e^- \to \pi^0(D\overline{D}^*)^0$
YOUR DATA	26.6± 2.0± 2.1	1248	[1] ABLIKIM	15AC	BES3	±	$e^+e^- \to \pi^\pm(D\overline{D}^*)^\mp$
	29.6± 8.2± 8.2	356	[1] ABLIKIM	15U	BES3	0	$e^+e^- \to \pi^0\pi^0 J/\psi$
	24.8± 3.3±11.0	1212	[1] ABLIKIM	14A	BES3	±	$e^+e^- \to \pi^\pm(D\overline{D}^*)^\mp$
	46 ±10 ±20	307	[1] ABLIKIM	13T	BES3	±	$e^+e^- \to \pi^+\pi^- J/\psi$
	63 ±24 ±26	159	[1] LIU	13B	BELL	±	$e^+e^- \to \gamma\pi^+\pi^- J/\psi$
	37 ± 4 ± 8	81	[1,2] XIAO	13A		±	4.17 $e^+e^- \to \pi^+\pi^- J/\psi$

[1] Neglecting interference between the $X(3900)$ and non-resonant continuum.

[2] For $M^2(\pi^+\pi^-) < 0.65$ GeV^2. Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration.

NODE=M210W;LINKAGE=A

NODE=M210W;LINKAGE=B

$X(3900)$ BRANCHING RATIOS

NODE=M210225

$\Gamma(D^0D^{*-}+\text{c.c.})/\Gamma_{\text{total}}$ — Γ_4/Γ

NODE=M210R09

NODE=M210R09

	VALUE	DOCUMENT ID		TECN	CHG	COMMENT
YOUR DATA	**seen**	ABLIKIM	15AC	BES3	±	$e^+e^- \to \pi^+D^0D^{*-}+$ c.c.
	seen	ABLIKIM	14A	BES3	±	$e^+e^- \to \pi^+D^0D^{*-}+$ c.c.

$\Gamma(D^-D^{*0}+\text{c.c.})/\Gamma_{\text{total}}$ — Γ_5/Γ

NODE=M210R10

NODE=M210R10

	VALUE	DOCUMENT ID		TECN	CHG	COMMENT
YOUR DATA	**seen**	ABLIKIM	15AC	BES3	±	$e^+e^- \to \pi^+D^-D^{*0}+$ c.c.
	seen	ABLIKIM	14A	BES3	±	$e^+e^- \to \pi^+D^-D^{*0}+$ c.c.

X(3900) REFERENCES

NODE=M210

	ABLIKIM	15AB	PRL 115 222002	M. Ablikim *et al.*	(BES III Collab.)	REFID=56954
YOUR PAPER	ABLIKIM	15AC	PR D92 092006	M. Ablikim *et al.*	(BES III Collab.) JP	REFID=56967
	ABLIKIM	15U	PRL 115 112003	M. Ablikim *et al.*	(BES III Collab.)	REFID=56786
	ABLIKIM	14A	PRL 112 022001	M. Ablikim *et al.*	(BES III Collab.) JP	REFID=55648
	ABLIKIM	13T	PRL 110 252001	M. Ablikim *et al.*	(BES III Collab.)	REFID=55409
	LIU	13B	PRL 110 252002	Z.Q. Liu *et al.*	(BELLE Collab.)	REFID=55410
	XIAO	13A	PL B727 366	T. Xiao *et al.*	(NWES)	REFID=55593

NODE=M213

X(4020)

$I(J^P) = 1(?^?)$

Charged X(4020) seen by ABLIKIM 13X from $e^+e^- \rightarrow \pi^+\pi^- h_c(1P)$ at c.m. energy from 3.90 to 4.42 GeV as a peak in the invariant mass distribution of the $\pi^\pm h_c(1P)$ system, and by ABLIKIM 14B from $e^+e^- \rightarrow (D^*\overline{D}^*)^\pm\pi^\mp$ events in $(D^*\overline{D}^*)^\pm$ mass. A neutral X(4020) seen by ABLIKIM 14P at three c.m. energies in the same range in $e^+e^- \rightarrow \pi^0\pi^0 h_c(1P)$ as a peak in the larger of the two masses recoiling against a π^0. ABLIKIM 15AA observes a 5.9 σ signal in $(D^*\overline{D}^*)^0$ in $e^+e^- \rightarrow (D^*\overline{D}^*)^0\ \pi^0$ events using collisions at two c.m. energies. Production rates and mass values support grouping neutral and charged X(4020) together as manifestations of a single $I = 1$ particle.

NODE=M213

X(4020) BRANCHING RATIOS

NODE=M213225

	$\Gamma(D\overline{D}^* + \text{c.c.})/\Gamma_{\text{total}}$					Γ_3/Γ
	VALUE	*DOCUMENT ID*	*TECN*	*CHG*	*COMMENT*	
YOUR DATA	**not seen**	ABLIKIM 15AC	BES3	$\pm$	$e^+e^- \rightarrow \pi^\pm(D\overline{D}^*)^\mp$	

NODE=M213R03
NODE=M213R03

X(4020) REFERENCES

NODE=M213

	ABLIKIM	15AA	PRL 115 182002	M. Ablikim *et al.*	(BES III Collab.)	REFID=56951
YOUR PAPER	ABLIKIM	15AC	PR D92 092006	M. Ablikim *et al.*	(BES III Collab.)	REFID=56967
	ABLIKIM	14B	PRL 112 132001	M. Ablikim *et al.*	(BES III Collab.)	REFID=55654
	ABLIKIM	14P	PRL 113 212002	M. Ablikim *et al.*	(BES III Collab.)	REFID=56118
	ABLIKIM	13X	PRL 111 242001	M. Ablikim *et al.*	(BES III Collab.)	REFID=55635

Reference = ABLIKIM 16A; PR D93 011102
Verifier code = BES3

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Xiao-Rui Lyu

EMAIL: xiaorui@ucas.ac.cn

July 21, 2016

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Russian Federation

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M073

$\psi(4415)$

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

$\psi(4415)$ BRANCHING RATIOS

NODE=M073225

	$\Gamma(\omega\chi_{c2})/\Gamma_{total}$				Γ_{14}/Γ
	VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA	**possibly seen**	ABLIKIM	16A	BES3	$e^+e^- \to \gamma\pi^+\pi^-\pi^0\ell^+\ell^-$

NODE=M073R00
NODE=M073R00

$\psi(4415)$ REFERENCES

NODE=M073

YOUR PAPER ABLIKIM 16A PR D93 011102 M. Ablikim *et al.* (BES III Collab.)

REFID=57122

Reference = ABLIKIM 14A; PRL 112 022001
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M210

$X(3900)$

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

Charged $X(3900)$ seen as a peak in the invariant mass distribution of the $J/\psi\pi^\pm$ system by BES III (ABLIKIM 13T) in $e^+e^- \to \pi^+\pi^- J/\psi$ at c.m. energy of 4.26 GeV and by radiative return from e^+e^- collisions at $\sqrt{s}$ from 9.46 to 10.86 GeV at Belle (LIU 13B). Angular analysis of ABLIKIM 14A and ABLIKIM 15AC favor the $J^P = 1^+$ assignment. Neutral $X(3900)$ seen in the $J/\psi\pi^0$ invariant mass distribution in $e^+e^- \to \pi^0\pi^0 J/\psi$ at c.m. energies of 4.23, 4.26, and 4.36 GeV by BES III (ABLIKIM 15U) and at 4.17 GeV by XIAO 13A. Peaks in $(D\overline{D}^*)^{0,\pm}$ reported by BES III (ABLIKIM 14A, ABLIKIM 15AB) are assumed to be related.

NODE=M210

$X(3900)$ BRANCHING RATIOS

NODE=M210225

$\Gamma(D^0 D^{*-} + \text{c.c.})/\Gamma_{\text{total}}$ — **Γ_4/Γ**

NODE=M210R09

NODE=M210R09

	VALUE	DOCUMENT ID		TECN	CHG	COMMENT
	seen	ABLIKIM	15AC	BES3	$\pm$	$e^+e^- \to \pi^+ D^0 D^{*-}$ + c.c.
YOUR DATA	**seen**	ABLIKIM	14A	BES3	$\pm$	$e^+e^- \to \pi^+ D^0 D^{*-}$ + c.c.

$\Gamma(D^- D^{*0} + \text{c.c.})/\Gamma_{\text{total}}$ — **Γ_5/Γ**

NODE=M210R10

NODE=M210R10

	VALUE	DOCUMENT ID		TECN	CHG	COMMENT
	seen	ABLIKIM	15AC	BES3	$\pm$	$e^+e^- \to \pi^+ D^- D^{*0}$ + c.c.
YOUR DATA	**seen**	ABLIKIM	14A	BES3	$\pm$	$e^+e^- \to \pi^+ D^- D^{*0}$ + c.c.

$X(3900)$ REFERENCES

NODE=M210

ABLIKIM	15AB	PRL 115 222002	M. Ablikim *et al.*	(BES III Collab.)	REFID=56954
ABLIKIM	15AC	PR D92 092006	M. Ablikim *et al.*	(BES III Collab.) JP	REFID=56967
ABLIKIM	15U	PRL 115 112003	M. Ablikim *et al.*	(BES III Collab.)	REFID=56786
YOUR PAPER ABLIKIM	14A	PRL 112 022001	M. Ablikim *et al.*	(BES III Collab.) JP	REFID=55648
ABLIKIM	13T	PRL 110 252001	M. Ablikim *et al.*	(BES III Collab.)	REFID=55409
LIU	13B	PRL 110 252002	Z.Q. Liu *et al.*	(BELLE Collab.)	REFID=55410
XIAO	13A	PL B727 366	T. Xiao *et al.*	(NWES)	REFID=55593

Reference = ABLIKIM 14M; PRL 112 251801
Verifier code = BES3

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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=M002

$\eta'(958)$

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

$\eta'(958)$ BRANCHING RATIOS

NODE=M002230

$\Gamma(2(\pi^+\pi^-))/\Gamma_{total}$ — **Γ_{12}/Γ**

NODE=M002R24
NODE=M002R24

	VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**8.5±0.9±0.3**		199	[1] ABLIKIM	14M	BES3	$J/\psi \to \gamma\eta'$
• • • We do not use the following data for averages, fits, limits, etc. • • •							
	$<$ 24	90		[2] NAIK	09	CLEO	$J/\psi \to \gamma\eta'$
	$<$1000	90		RITTENBERG	69	HBC	1.7–2.7 K^-p

YOUR NOTE [1] ABLIKIM 14M reports $[\Gamma(\eta'(958) \to 2(\pi^+\pi^-))/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta'(958))] = (4.40 \pm 0.35 \pm 0.30) \times 10^{-7}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta'(958)) = (5.15 \pm 0.16) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M002R24;LINKAGE=A

[2] Not independent of measured value of Γ_{12}/Γ_1 from NAIK 09.

NODE=M002R24;LINKAGE=NA

$\Gamma(\pi^+\pi^-2\pi^0)/\Gamma_{total}$ — **Γ_{13}/Γ**

NODE=M002R51
NODE=M002R51

	VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**1.8±0.4±0.1**		84	[1] ABLIKIM	14M	BES3	$J/\psi \to \gamma\eta'$
• • • We do not use the following data for averages, fits, limits, etc. • • •							
	$<$27	90		[2] NAIK	09	CLEO	$J/\psi \to \gamma\eta'$

YOUR NOTE [1] ABLIKIM 14M reports $[\Gamma(\eta'(958) \to \pi^+\pi^-2\pi^0)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta'(958))] = (9.38\pm1.79\pm0.89)\times10^{-7}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta'(958)) = (5.15 \pm 0.16) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M002R51;LINKAGE=A

[2] Not independent of measured value of Γ_{13}/Γ_1 from NAIK 09.

NODE=M002R51;LINKAGE=NA

$\eta'(958)$ REFERENCES

NODE=M002

YOUR PAPER

ABLIKIM	14M	PRL 112 251801	M. Ablikim *et al.*	(BES III Collab.)	REFID=55904
NAIK	09	PRL 102 061801	P. Naik *et al.*	(CLEO Collab.)	REFID=52678
RITTENBERG	69	Thesis UCRL 18863	A. Rittenberg	(LRL) I	REFID=20266

Reference = ABLIKIM 14P; PRL 113 212002
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M213

$X(4020)$

$I(J^P) = 1(?^?)$

Charged X(4020) seen by ABLIKIM 13X from $e^+e^- \rightarrow \pi^+\pi^- h_c(1P)$ at c.m. energy from 3.90 to 4.42 GeV as a peak in the invariant mass distribution of the $\pi^\pm h_c(1P)$ system, and by ABLIKIM 14B from $e^+e^- \rightarrow (D^*\overline{D}^*)^\pm\pi^\mp$ events in $(D^*\overline{D}^*)^\pm$ mass. A neutral X(4020) seen by ABLIKIM 14P at three c.m. energies in the same range in $e^+e^- \rightarrow \pi^0\pi^0 h_c(1P)$ as a peak in the larger of the two masses recoiling against a π^0. ABLIKIM 15AA observes a 5.9 σ signal in $(D^*\overline{D}^*)^0$ in $e^+e^- \rightarrow (D^*\overline{D}^*)^0\ \pi^0$ events using collisions at two c.m. energies. Production rates and mass values support grouping neutral and charged X(4020) together as manifestations of a single $I = 1$ particle. NODE=M213

$X(4020)$ MASS

NODE=M213M

NODE=M213M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
	4024.1±1.9 OUR AVERAGE						
	$4025.5^{+2.0}_{-4.7}\pm3.1$	116	[1] ABLIKIM	15AA	BES3	0	$e^+e^- \rightarrow (D^*\overline{D}^*)^0\ \pi^0$
	$4026.3\pm2.6\pm3.7$	401	[1] ABLIKIM	14B	BES3	±	$e^+e^- \rightarrow (D^*\overline{D}^*)^\pm\ \pi^\mp$
YOUR DATA	$4023.9\pm2.2\pm3.8$	61	[1,2] ABLIKIM	14P	BES3	0	$e^+e^- \rightarrow \pi^0\pi^0 h_c$
	$4022.9\pm0.8\pm2.7$	253	[1] ABLIKIM	13X	BES3	±	$e^+e^- \rightarrow \pi^+\pi^- h_c$

[1] Neglecting interference between the $X(4020)$ and non-resonant continuum. NODE=M213M;LINKAGE=AB

YOUR NOTE [2] Assuming $J^P = 1^+$ and width of 7.9 ± 2.6 MeV. NODE=M213M;LINKAGE=B

$X(4020)$ BRANCHING RATIOS

NODE=M213225

$\Gamma(h_c(1P)\pi)/\Gamma_{total}$ **Γ_1/Γ** NODE=M213R01

NODE=M213R01

	VALUE	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
YOUR DATA	**seen**	61	ABLIKIM	14P	BES3	0	$e^+e^- \rightarrow \pi^0\pi^0 h_c$
	seen	253	ABLIKIM	13X	BES3	±	$e^+e^- \rightarrow \pi^+\pi^- h_c$

$X(4020)$ REFERENCES

NODE=M213

	ABLIKIM	15AA	PRL 115 182002	M. Ablikim *et al.*	(BES III Collab.)	REFID=56951
	ABLIKIM	14B	PRL 112 132001	M. Ablikim *et al.*	(BES III Collab.)	REFID=55654
YOUR PAPER	ABLIKIM	14P	PRL 113 212002	M. Ablikim *et al.*	(BES III Collab.)	REFID=56118
	ABLIKIM	13X	PRL 111 242001	M. Ablikim *et al.*	(BES III Collab.)	REFID=55635

Reference = ABLIKIM 15C; PRL 114 092003
Verifier code = BES3

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$c\bar{c}$ MESONS

NODE=MXXX025

NODE=M222

$X(4230)$

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

OMITTED FROM SUMMARY TABLE

Enhancement reported by ABLIKIM 15C in $e^+e^- \to \omega\chi_{c0}$ at $\sqrt{s}$ = 4.23–4.26 GeV at 9σ significance. Lineshape found to be inconsistent with origination from $X(4260)$. NEEDS CONFIRMATION. NODE=M222

$X(4230)$ MASS

NODE=M222M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**4230±8±6**	180	[1] ABLIKIM	15C	BES3	$e^+e^- \to \omega\chi_{c0}$

NODE=M222M

YOUR NOTE [1] From a 3-parameter fit of measured cross sections from $\sqrt{s}$ = 4.21–4.42 GeV to a phase-space modified Breit-Wigner function, using the decays $\chi_{c0} \to \pi^+\pi^-$, $\chi_{c0} \to K^+K^-$, and $\omega \to \pi^+\pi^-\pi^0$. NODE=M222M;LINKAGE=A

$X(4230)$ WIDTH

NODE=M222W

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**38±12±2**	180	[1] ABLIKIM	15C	BES3	$e^+e^- \to \omega\chi_{c0}$

NODE=M222W

YOUR NOTE [1] From a 3-parameter fit of measured cross sections from $\sqrt{s}$ = 4.21–4.42 GeV to a phase-space modified Breit-Wigner function, using the decays $\chi_{c0} \to \pi^+\pi^-$, $\chi_{c0} \to K^+K^-$, and $\omega \to \pi^+\pi^-\pi^0$. NODE=M222W;LINKAGE=A

$X(4230)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

NODE=M222220

$\Gamma(\omega\chi_{c0}) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ **$\Gamma_2\Gamma_1/\Gamma$**

NODE=M222G01

	VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**2.7±0.5±0.4**	180	[1] ABLIKIM	15C	BES3	$e^+e^- \to \omega\chi_{c0}$

NODE=M222G01

YOUR NOTE [1] From a 3-parameter fit of measured cross sections from $\sqrt{s}$ = 4.21–4.42 GeV to a phase-space modified Breit-Wigner function, using the decays $\chi_{c0} \to \pi^+\pi^-$, $\chi_{c0} \to K^+K^-$, and $\omega \to \pi^+\pi^-\pi^0$. NODE=M222G01;LINKAGE=A

$X(4230)$ BRANCHING RATIOS

NODE=M222225

$\Gamma(\omega\chi_{c0})/\Gamma_{\text{total}}$ **Γ_2/Γ**

NODE=M222R01

	VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**seen**	180	[1] ABLIKIM	15C	BES3	$e^+e^- \to \omega\chi_{c0}$

NODE=M222R01

YOUR NOTE [1] From a 3-parameter fit of measured cross sections from $\sqrt{s}$ = 4.21–4.42 GeV to a phase-space modified Breit-Wigner function, using the decays $\chi_{c0} \to \pi^+\pi^-$, $\chi_{c0} \to K^+K^-$, and $\omega \to \pi^+\pi^-\pi^0$. NODE=M222R01;LINKAGE=A

$X(4230)$ REFERENCES

NODE=M222

YOUR PAPER ABLIKIM 15C PRL 114 092003 M. Ablikim *et al.* (BES III Collab.) REFID=56401

Reference = ABLIKIM 15S; PRL 115 011803
Verifier code = BES3

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Xiao-Rui Lyu

EMAIL: xiaorui@ucas.ac.cn

July 21, 2016

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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

$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M212

$\psi(3823)$ was $X(3823)$,

$J^{PC} = 2^{--}$
J, P need confirmation.

Seen by BHARDWAJ 13 in $B \to \chi_{c1}\gamma K$ and ABLIKIM 15S in $e^+e^- \to \pi^+\pi^-\gamma\chi_{c1}$ decays as a narrow peak in the invariant mass distribution of the $\chi_{c1}\gamma$ system. Properties consistent with the $\psi_2(1^3D_2)$ $c\overline{c}$ state. NODE=M212

$\psi(3823)$ MASS

NODE=M212M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
	3822.2±1.2 OUR AVERAGE					
YOUR DATA	3821.7±1.3±0.7	19 ± 5	[1] ABLIKIM	15S	BES3	$e^+e^- \to \pi^+\pi^-\chi_{c1}\gamma$
	3823.1±1.8±0.7	33 ± 10	[2] BHARDWAJ	13	BELL	$B \to \chi_{c1}\gamma K$

NODE=M212M

YOUR NOTE

[1] From a simultaneous unbinned maximum likelihood fit of $e^+e^- \to \pi^+\pi^-\chi_{c1}\gamma$ data (the $\pi^+\pi^-$ recoil mass) taken at $\sqrt{s}$ values of 4.23, 4.26, 4.36, 4.42, and 4.60 GeV to simulated events including both $\psi(2S) \to \chi_{c1}\gamma$ and $\psi(3823) \to \chi_{c1}\gamma$ together, with floating mass scale offset for $\psi(2S)$, floating $\psi(3823)$ mass, and zero $\psi(3823)$ width, resulting in a significance of 5.9σ when including systematic uncertainties. NODE=M212M;LINKAGE=B

[2] From a simultaneous fit to $B^\pm \to (\chi_{c1}\gamma)K^\pm$ and $B^0 \to (\chi_{c1}\gamma)K^0_S$ with significance 4.0σ including systematics. Corrected for the measured $\psi(2S)$ mass using $B \to \psi(2S)K \to (\gamma\chi_{c1})K$ decays. NODE=M212M;LINKAGE=A

$\psi(3823)$ WIDTH

NODE=M212W

	VALUE (MeV)	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**<16**	90	[1] ABLIKIM	15S	BES3	$e^+e^- \to \pi^+\pi^-\chi_{c1}\gamma$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	<24	90	[2] BHARDWAJ	13	BELL	$B \to \chi_{c1}\gamma K$

NODE=M212W

YOUR NOTE

[1] From a fit of $e^+e^- \to \pi^+\pi^-\chi_{c1}\gamma$ data (the $\pi^+\pi^-$ recoil mass) taken at $\sqrt{s}$ values of 4.23, 4.26, 4.36, 4.42, and 4.60 GeV to a Breit-Wigner function with the mass fixed from the likelihood fit above, Gaussian resolution smearing, and floating width. NODE=M212W;LINKAGE=B

[2] From a simultaneous fit to $B^\pm \to (\chi_{c1}\gamma)K^\pm$ and $B^0 \to (\chi_{c1}\gamma)K^0_S$ with significance 4.0σ including systematics. NODE=M212W;LINKAGE=A

$\psi(3823)$ BRANCHING RATIOS

NODE=M212225

$\Gamma(\chi_{c2}\gamma)/\Gamma_{total}$ — Γ_2/Γ

NODE=M212R02

	VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA	not seen	[1] ABLIKIM	15S	BES3	$e^+e^- \to \pi^+\pi^-\chi_{c2}\gamma$
	not seen	[2] BHARDWAJ	13	BELL	$B^+ \to \chi_{c2}\gamma K^+$

NODE=M212R02

YOUR NOTE

[1] From a simultaneous unbinned maximum likelihood fit of $e^+e^- \to \pi^+\pi^-\chi_{c2}\gamma$ data (the $\pi^+\pi^-$ recoil mass) taken at $\sqrt{s}$ values of 4.23, 4.26, 4.36, 4.42, and 4.60 GeV to simulated events including both $\psi(2S) \to \chi_{c2}\gamma$ and $\psi(3823) \to \chi_{c2}\gamma$ together, with floating mass scale offset for $\psi(2S)$, $\psi(3823)$ mass floating (fixed to that above), and zero $\psi(3823)$ width. NODE=M212R02;LINKAGE=B

[2] Reported $B(B^\pm \to \psi(3823)K^\pm) \times B(\psi(3823) \to \gamma\chi_{c2}) < 3.6 \times 10^{-6}$ at 90% CL. NODE=M212R02;LINKAGE=A

$\Gamma(\chi_{c2}\gamma)/\Gamma(\chi_{c1}\gamma)$ — Γ_2/Γ_1

NODE=M212R03

	VALUE	CL%	DOCUMENT ID		TECN	COMMENT
	<0.41	90	BHARDWAJ	13	BELL	$B^+ \to \chi_{c1/c2}\gamma K^+$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA	<0.42	90	[1] ABLIKIM	15S	BES3	$e^+e^- \to \pi^+\pi^-\chi_{c1}\gamma$

NODE=M212R03

YOUR NOTE

[1] From a simultaneous unbinned maximum likelihood fit of $e^+e^- \to \pi^+\pi^-\chi_{c1(2)}\gamma$ data (the $\pi^+\pi^-$ recoil mass) taken at $\sqrt{s}$ values of 4.23, 4.26, 4.36, 4.42, and 4.60 GeV to simulated events including both $\psi(2S) \to \chi_{c1(2)}\gamma$ and $\psi(3823) \to \chi_{c1(2)}\gamma$ together, with floating mass scale offset for $\psi(2S)$, $\psi(3823)$ mass floating (fixed to that above), and zero $\psi(3823)$ width. NODE=M212R03;LINKAGE=A

$\psi(3823)$ REFERENCES

NODE=M212

YOUR PAPER	ABLIKIM	15S	PRL 115 011803	M. Ablikim *et al.*	(BES III Collab.)	REFID=56784
	BHARDWAJ	13	PRL 111 032001	V. Bhardwaj *et al.*	(BELLE Collab.)	REFID=55412

NODE=M181

$X(4360)$

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

Seen in radiative return from e^+e^- collisions at $\sqrt{s}$ = 9.54–10.58 GeV by AUBERT 07S, WANG 07D, and LEES 14F. See also the review under the $X(3872)$ particle listings. (See the index for the page number.)

NODE=M181

$X(4360)$ BRANCHING RATIOS

NODE=M181225

$\Gamma(\psi(3823)\pi^+\pi^-)/\Gamma_{total}$ — Γ_3/Γ

NODE=M181R03
NODE=M181R03

	VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**possibly seen**	19	[1] ABLIKIM	15S	BES3	$e^+e^- \to \pi^+\pi^-\chi_{c1}\gamma$

YOUR NOTE [1] From a fit of $e^+e^- \to \pi^+\pi^-\psi(3823)$, $\psi(3823) \to \chi_{c1}\gamma$ cross sections taken at $\sqrt{s}$ values of 4.23, 4.26, 4.36, 4.42, and 4.60 GeV to the $X(4360)$ line shape.

NODE=M181R03;LINKAGE=A

$X(4360)$ REFERENCES

NODE=M181

YOUR PAPER	ABLIKIM	15S	PRL 115 011803	M. Ablikim *et al.*	(BES III Collab.)	REFID=56784
	LEES	14F	PR D89 111103	J.P. Lees *et al.*	(BABAR Collab.)	REFID=55938
	AUBERT	07S	PRL 98 212001	B. Aubert *et al.*	(BABAR Collab.)	REFID=51724
	WANG	07D	PRL 99 142002	X.L. Wang *et al.*	(BELLE Collab.)	REFID=51959

NODE=M073

$\psi(4415)$

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

$\psi(4415)$ BRANCHING RATIOS

NODE=M073225

$\Gamma(\psi(3823)\pi^+\pi^-)/\Gamma_{total}$ — Γ_{17}/Γ

NODE=M073R13
NODE=M073R13

	VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**possibly seen**	19	[20] ABLIKIM	15S	BES3	$e^+e^- \to \pi^+\pi^-\chi_{c1}\gamma$

YOUR NOTE [20] From a fit of $e^+e^- \to \pi^+\pi^-\psi(3823)$, $\psi(3823) \to \chi_{c1}\gamma$ cross sections taken at $\sqrt{s}$ values of 4.23, 4.26, 4.36, 4.42, and 4.60 GeV to the $\psi(4415)$ line shape.

NODE=M073R13;LINKAGE=A

$\psi(4415)$ REFERENCES

NODE=M073

YOUR PAPER	ABLIKIM	15S	PRL 115 011803	M. Ablikim *et al.*	(BES III Collab.)	REFID=56784

Reference = ABLIKIM 15T; PRL 115 091803
Verifier code = BES3

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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=M175

$\eta(1475)$

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

See also the $\eta(1405)$.

NODE=M175

$\eta(1475)$ MASS

NODE=M175205

$K\overline{K}\pi$ MODE ($K^*(892)$ K dominant)

NODE=M175M5
NODE=M175M5

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1476± 4 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.			
1469±14±13	74	ACHARD	07	L3	183–209 $e^+e^- \to e^+e^- K^0_S K^\pm \pi^\mp$
1460±19	3651	NICHITIU	02	OBLX	
1485± 8± 5	20k	ADAMS	01B	B852	18 GeV $\pi^- p \to K^+ K^- \pi^0 n$
1500±10		CICALO	99	OBLX	0 $\overline{p}p \to K^\pm K^0_S \pi^\mp \pi^+ \pi^-$
1464±10		BERTIN	97	OBLX	0 $\overline{p}p \to K^\pm (K^0) \pi^\mp \pi^+ \pi^-$
1460±10		BERTIN	95	OBLX	0 $\overline{p}p \to K\overline{K}\pi\pi\pi$
$1490^{+14}_{-8}{}^{+3}_{-16}$	1100	BAI	90C	MRK3	$J/\psi \to \gamma K^0_S K^\pm \pi^\mp$
1475± 4		RATH	89	MPS	21.4 $\pi^- p \to n K^0_S K^0_S \pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA 1565± 8^{+0}_{-63}		[1] ABLIKIM	15T	BES3	$J/\psi \to \gamma K^0_S K^0_S \eta$
1421±14		AUGUSTIN	92	DM2	$J/\psi \to \gamma K\overline{K}\pi$

OCCUR=2
OCCUR=2

YOUR NOTE [1] Could also be the $\eta(1405)$.

NODE=M175M5;LINKAGE=A

$\eta(1475)$ WIDTH

NODE=M175210

$K\overline{K}\pi$ MODE ($K^*(892)$ K dominant)

NODE=M175W5
NODE=M175W5

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
85± 9 OUR AVERAGE		Error includes scale factor of 1.5. See the ideogram below.			
67±18± 7	74	ACHARD	07	L3	183–209 $e^+e^- \to e^+e^- K^0_S K^\pm \pi^\mp$
120±19	3651	NICHITIU	02	OBLX	
98±18± 3	20k	ADAMS	01B	B852	18 GeV $\pi^- p \to K^+ K^- \pi^0 n$
100±20		CICALO	99	OBLX	0 $\overline{p}p \to K^\pm K^0_S \pi^\mp \pi^+ \pi^-$
105±15		BERTIN	97	OBLX	0.0 $\overline{p}p \to K^\pm (K^0) \pi^\mp \pi^+ \pi^-$
105±15		BERTIN	95	OBLX	0 $\overline{p}p \to K\overline{K}\pi\pi\pi$
63±18		AUGUSTIN	92	DM2	$J/\psi \to \gamma K\overline{K}\pi$
$54^{+37}_{-21}{}^{+13}_{-24}$		BAI	90C	MRK3	$J/\psi \to \gamma K^0_S K^\pm \pi^\mp$
51±13		RATH	89	MPS	21.4 $\pi^- p \to n K^0_S K^0_S \pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA $54^{+14}_{-13}{}^{+21}_{-28}$		[1] ABLIKIM	15T	BES3	$J/\psi \to \gamma K^0_S K^0_S \eta$

OCCUR=2
OCCUR=2
OCCUR=2

YOUR NOTE [1] Could also be the $\eta(1405)$.

NODE=M175W5;LINKAGE=A

$\eta(1475)$ REFERENCES

NODE=M175

YOUR PAPER

ABLIKIM	15T	PRL 115 091803	M. Ablikim *et al.*	(BES III Collab.)	REFID=56785
ACHARD	07	JHEP 0703 018	P. Achard *et al.*	(L3 Collab.)	REFID=51698
NICHITIU	02	PL B545 261	F. Nichitiu *et al.*	(OBELIX Collab.)	REFID=48848
ADAMS	01B	PL B516 264	G.S. Adams *et al.*	(BNL E852 Collab.)	REFID=49649
CICALO	99	PL B462 453	C. Cicalo *et al.*	(OBELIX Collab.)	REFID=47394
BERTIN	97	PL B400 226	A. Bertin *et al.*	(OBELIX Collab.)	REFID=45417
BERTIN	95	PL B361 187	A. Bertin *et al.*	(OBELIX Collab.)	REFID=44614
AUGUSTIN	92	PR D46 1951	J.E. Augustin, G. Cosme	(DM2 Collab.)	REFID=41584
BAI	90C	PRL 65 2507	Z. Bai *et al.*	(Mark III Collab.)	REFID=41578
RATH	89	PR D40 693	M.G. Rath *et al.*	(NDAM, BRAN, BNL, CUNY+)	REFID=40924

NODE=M085

$X(1835)$

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

OMITTED FROM SUMMARY TABLE

Could be a superposition of two states, one with small width appearing as threshold enhancement in $p\overline{p}$, the other one with a larger width, decaying into $\pi^+\pi^-\eta'$ and $K^0_S K^0_S \eta$. For the former ABLIKIM 12D determine $J^{PC} = 0^{-+}$. NODE=M085

$X(1835)$ MASS

NODE=M085M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
$1835.8^{+4.0}_{-3.2}$ OUR AVERAGE					
YOUR DATA $1844 \pm 9 {}^{+16}_{-25}$		ABLIKIM	15T	BES3	$J/\psi \to \gamma K^0_S K^0_S \eta$
$1836.5 \pm 3.0 {}^{+5.6}_{-2.1}$	4265	[1] ABLIKIM	11C	BES3	$J/\psi \to \gamma \pi^+\pi^-\eta'$
$1833.7 \pm 6.1 \pm 2.7$	264	ABLIKIM	05R	BES2	$J/\psi \to \gamma \pi^+\pi^-\eta'$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1832 {}^{+19}_{-5} \pm 26$		[2] ABLIKIM	12D	BES3	$J/\psi \to \gamma p\overline{p}$
$1877.3 \pm 6.3 {}^{+3.4}_{-7.4}$		[3] ABLIKIM	11J	BES3	$J/\psi \to \omega(\eta\pi^+\pi^-)$
$1837 {}^{+10}_{-12} {}^{+9}_{-7}$	231	[4,5] ALEXANDER	10	CLEO	$J/\psi \to \gamma p\overline{p}$
1831 ± 7		[5,6] ABLIKIM	05R	BES2	$J/\psi \to \gamma p\overline{p}$
$1859 {}^{+3}_{-10} {}^{+5}_{-25}$		[5] BAI	03F	BES2	$J/\psi \to \gamma p\overline{p}$

OCCUR=2

[1] From a fit of the $\pi^+\pi^-\eta'$ mass distribution to a combination of $\gamma f_1(1510)$, $\gamma X(1835)$, and two unconfirmed states $\gamma X(2120)$, and $\gamma X(2370)$, for $M(p\overline{p}) < 2.8$ GeV, and accounting for backgrounds from non-η' events and $J/\psi \to \pi^0\pi^+\pi^-\eta'$. NODE=M085M;LINKAGE=AI

[2] From the fit including final state interaction effects in isospin 0 S-wave according to SIBIRTSEV 05A. Supersedes ABLIKIM 10G. NODE=M085M;LINKAGE=AK

[3] The selected process is $J/\psi \to \omega a_0(980)\pi$. This state may be due also to $\eta_2(1870)$ or to a combination of $X(1835)$ and $\eta_2(1870)$. NODE=M085M;LINKAGE=BL

[4] From a fit of the $p\overline{p}$ mass distribution to a combination of $\gamma X(1835)$, γR with $M(R) = 2100$ MeV and $\Gamma(R) = 160$ MeV, and $\gamma p\overline{p}$ phase space, for $M(p\overline{p}) < 2.85$ GeV. NODE=M085M;LINKAGE=AE

[5] Evidence for a threshold enhancement in the $p\overline{p}$ mass spectrum was also reported by ABE 02K, AUBERT,B 05L, and WANG 05A in $B^+ \to p\overline{p}K^+$, WANG 05A in $B^0 \to p\overline{p}K^0_S$, ABE 02W in $\overline{B}^0 \to p\overline{p}D^0$, DEL-AMO-SANCHEZ 12 in $B \to D(D^*)p\overline{p}(\pi)$, and WEI 08 in $B^+ \to p\overline{p}\pi^+$ decays. Not seen by ATHAR 06 in $\Upsilon(1S) \to p\overline{p}\gamma$. NODE=M085M;LINKAGE=HF

[6] From the fit including final state interaction effects in isospin 0 S-wave according to SIBIRTSEV 05A. Systematic errors not estimated. NODE=M085M;LINKAGE=AB

$X(1835)$ WIDTH

NODE=M085W

VALUE (MeV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
112 ± 40 OUR AVERAGE Error includes scale factor of 2.4. See the ideogram below.						
YOUR DATA $192 {}^{+20}_{-17} {}^{+62}_{-43}$			ABLIKIM	15T	BES3	$J/\psi \to \gamma K^0_S K^0_S \eta$
$190 \pm 9 {}^{+38}_{-36}$		4265	[1] ABLIKIM	11C	BES3	$J/\psi \to \gamma \pi^+\pi^-\eta'$
$67.7 \pm 20.3 \pm 7.7$		264	ABLIKIM	05R	BES2	$J/\psi \to \gamma \pi^+\pi^-\eta'$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 76	90		[2] ABLIKIM	12D	BES3	$J/\psi \to \gamma p\overline{p}$
$57 \pm 12 {}^{+19}_{-4}$			[3] ABLIKIM	11J	BES3	$J/\psi \to \omega(\eta\pi^+\pi^-)$
$0 {}^{+44}_{-0}$		231	[4,5] ALEXANDER	10	CLEO	$J/\psi \to \gamma p\overline{p}$
< 153	90		[5,6] ABLIKIM	05R	BES2	$J/\psi \to \gamma p\overline{p}$
< 30			[5] BAI	03F	BES2	$J/\psi \to \gamma p\overline{p}$

OCCUR=2

[1] From a fit of the $\pi^+\pi^-\eta'$ mass distribution to a combination of $\gamma f_1(1510)$, $\gamma X(1835)$, and two unconfirmed states $\gamma X(2120)$, and $\gamma X(2370)$, for $M(p\overline{p}) < 2.8$ GeV, and accounting for backgrounds from non-η' events and $J/\psi \to \pi^0\pi^+\pi^-\eta'$. NODE=M085W;LINKAGE=AI

[2] From the fit including final state interaction effects in isospin 0 S-wave according to SIBIRTSEV 05A. Supersedes ABLIKIM 10G. NODE=M085W;LINKAGE=AK

[3] The selected process is $J/\psi \to \omega a_0(980)\pi$. This state may be due also to $\eta_2(1870)$ or to a combination of $X(1835)$ and $\eta_2(1870)$. NODE=M085W;LINKAGE=BL

[4] From a fit of the $p\overline{p}$ mass distribution to a combination of $\gamma X(1835)$, γR with $M(R)$ = 2100 MeV and $\Gamma(R)$ = 160 MeV, and $\gamma p\overline{p}$ phase space, for $M(p\overline{p}) < 2.85$ GeV. NODE=M085W;LINKAGE=AE

[5] Evidence for a threshold enhancement in the $p\overline{p}$ mass spectrum was also reported by ABE 02K, AUBERT,B 05L, and WANG 05A in $B^+ \rightarrow p\overline{p}K^+$, WANG 05A in $B^0 \rightarrow p\overline{p}K^0_S$, ABE 02W in $\overline{B}^0 \rightarrow p\overline{p}D^0$, DEL-AMO-SANCHEZ 12 in $B \rightarrow D(D^*)p\overline{p}(\pi)$, and WEI 08 in $B^+ \rightarrow p\overline{p}\pi^+$ decays. Not seen by ATHAR 06 in $\Upsilon(1S) \rightarrow p\overline{p}\gamma$. NODE=M085W;LINKAGE=HF

[6] From the fit including final state interaction effects in isospin 0 S-wave according to SIBIRTSEV 05A. Systematic errors not estimated. NODE=M085W;LINKAGE=AB

$X(1835)$ BRANCHING RATIOS

NODE=M085220

$\Gamma(\eta'\pi^+\pi^-)/\Gamma(K^0_S K^0_S \eta)$ — Γ_2/Γ_4

NODE=M085R00
NODE=M085R00

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
YOUR DATA 6.7±1.8	[1] ABLIKIM	15T BES3	$J/\psi \rightarrow \gamma K^0_S K^0_S \eta$

YOUR NOTE [1] Using resutls from ABLIKIM 05R. NODE=M085R00;LINKAGE=A

$X(1835)$ REFERENCES

NODE=M085

YOUR PAPER ABLIKIM	15T	PRL 115 091803	M. Ablikim *et al.*	(BES III Collab.)	REFID=56785
ABLIKIM	12D	PRL 108 112003	M. Ablikim *et al.*	(BES III Collab.) JPC	REFID=54269
DEL-AMO-SA...	12	PR D85 092017	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=54286
ABLIKIM	11C	PRL 106 072002	M. Ablikim *et al.*	(BES III Collab.)	REFID=53684
ABLIKIM	11J	PRL 107 182001	M. Ablikim *et al.*	(BES III Collab.)	REFID=53931
ABLIKIM	10G	CPC 34 421	M. Ablikim *et al.*	(BES III Collab.)	REFID=55685
ALEXANDER	10	PR D82 092002	J.P. Alexander *et al.*	(CLEO Collab.)	REFID=53525
WEI	08	PL B659 80	J.-T. Wei *et al.*	(BELLE Collab.)	REFID=52086
ATHAR	06	PR D73 032001	S.B. Athar *et al.*	(CLEO Collab.)	REFID=50993
ABLIKIM	05R	PRL 95 262001	M. Ablikim *et al.*	(BES Collab.)	REFID=50985
AUBERT,B	05L	PR D72 051101	B. Aubert *et al.*	(BABAR Collab.)	REFID=50827
SIBIRTSEV	05A	PR D71 054010	A. Sibirtsev, J. Haidenbauer		REFID=51038
WANG	05A	PL B617 141	M.-Z. Wang *et al.*	(BELLE Collab.)	REFID=50651
BAI	03F	PRL 91 022001	J.Z. Bai *et al.*	(BES II Collab.)	REFID=49473
ABE	02K	PRL 88 181803	K. Abe *et al.*	(BELLE Collab.)	REFID=48690
ABE	02W	PRL 89 151802	K. Abe *et al.*	(BELLE Collab.)	REFID=48980

$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M070

$J/\psi(1S)$

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

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

NODE=M070230

RADIATIVE DECAYS

NODE=M070310

$\Gamma(\gamma X(1835) \rightarrow \gamma K^0_S K^0_S \eta)/\Gamma_{total}$ — Γ_{191}/Γ

NODE=M070S96
NODE=M070S96

VALUE (units 10^{-5})	DOCUMENT ID	TECN	COMMENT
YOUR DATA $3.31^{+0.33+1.96}_{-0.30-1.29}$	ABLIKIM	15T BES3	$J/\psi \rightarrow \gamma K^0_S K^0_S \eta$

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER ABLIKIM	15T	PRL 115 091803	M. Ablikim *et al.*	(BES III Collab.)	REFID=56785

Reference = ABLIKIM 15U; PRL 115 112003
Verifier code = BES3

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July 21, 2016

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RU-630090 Novosibirsk
Russian Federation

EMAIL: simon.eidelman@cern.ch

$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M210

$X(3900)$

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

Charged $X(3900)$ seen as a peak in the invariant mass distribution of the $J/\psi\pi^\pm$ system by BES III (ABLIKIM 13T) in $e^+e^- \to \pi^+\pi^- J/\psi$ at c.m. energy of 4.26 GeV and by radiative return from e^+e^- collisions at $\sqrt{s}$ from 9.46 to 10.86 GeV at Belle (LIU 13B). Angular analysis of ABLIKIM 14A and ABLIKIM 15AC favor the $J^P = 1^+$ assignment. Neutral $X(3900)$ seen in the $J/\psi\pi^0$ invariant mass distribution in $e^+e^- \to \pi^0\pi^0 J/\psi$ at c.m. energies of 4.23, 4.26, and 4.36 GeV by BES III (ABLIKIM 15U) and at 4.17 GeV by XIAO 13A. Peaks in $(D\overline{D}^*)^{0,\pm}$ reported by BES III (ABLIKIM 14A, ABLIKIM 15AB) are assumed to be related.

NODE=M210

$X(3900)$ MASS

NODE=M210M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
	3886.6±2.4 OUR AVERAGE		Error includes scale factor of 1.6. See the ideogram below.				
	$3885.7^{+4.3}_{-5.7}\pm8.4$		[1] ABLIKIM	15AB	BES3	0	$e^+e^- \to \pi^0(D\overline{D}^*)^0$
	3881.7±1.6±1.6	1248	[1] ABLIKIM	15AC	BES3	±	$e^+e^- \to \pi^\pm(D\overline{D}^*)^\mp$
YOUR DATA	3894.8±2.3±3.2	356	[1] ABLIKIM	15U	BES3	0	$e^+e^- \to \pi^0\pi^0 J/\psi$
	3883.9±1.5±4.2	1212	[1] ABLIKIM	14A	BES3	±	$e^+e^- \to \pi^\pm(D\overline{D}^*)^\mp$
	3899.0±3.6±4.9	307	[1] ABLIKIM	13T	BES3	±	$e^+e^- \to \pi^+\pi^- J/\psi$
	3894.5±6.6±4.5	159	[1] LIU	13B	BELL	±	$e^+e^- \to \gamma\pi^+\pi^- J/\psi$
	3886 ±4 ±2	81	[1,2] XIAO	13A		±	4.17 $e^+e^- \to \pi^+\pi^- J/\psi$
	3904 ±9 ±5	25	[1,2] XIAO	13A		0	4.17 $e^+e^- \to \pi^0\pi^0 J/\psi$

NODE=M210M

OCCUR=2

[1] Neglecting interference between the $X(3900)$ and non-resonant continuum.

NODE=M210M;LINKAGE=A

[2] For $M^2(\pi^+\pi^-) < 0.65$ GeV^2. Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration.

NODE=M210M;LINKAGE=B

$X(3900)$ WIDTH

NODE=M210W

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
	28.1± 2.6 OUR AVERAGE						
	$35\ ^{+11}_{-12}\ \pm15$		[1] ABLIKIM	15AB	BES3	0	$e^+e^- \to \pi^0(D\overline{D}^*)^0$
	26.6± 2.0± 2.1	1248	[1] ABLIKIM	15AC	BES3	±	$e^+e^- \to \pi^\pm(D\overline{D}^*)^\mp$
YOUR DATA	29.6± 8.2± 8.2	356	[1] ABLIKIM	15U	BES3	0	$e^+e^- \to \pi^0\pi^0 J/\psi$
	24.8± 3.3±11.0	1212	[1] ABLIKIM	14A	BES3	±	$e^+e^- \to \pi^\pm(D\overline{D}^*)^\mp$
	46 ±10 ±20	307	[1] ABLIKIM	13T	BES3	±	$e^+e^- \to \pi^+\pi^- J/\psi$
	63 ±24 ±26	159	[1] LIU	13B	BELL	±	$e^+e^- \to \gamma\pi^+\pi^- J/\psi$
	37 ± 4 ± 8	81	[1,2] XIAO	13A		±	4.17 $e^+e^- \to \pi^+\pi^- J/\psi$

NODE=M210W

[1] Neglecting interference between the $X(3900)$ and non-resonant continuum.

NODE=M210W;LINKAGE=A

[2] For $M^2(\pi^+\pi^-) < 0.65$ GeV^2. Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration.

NODE=M210W;LINKAGE=B

$X(3900)$ BRANCHING RATIOS

NODE=M210225

$\Gamma(J/\psi\pi)/\Gamma_{total}$ — **Γ_1/Γ**

NODE=M210R01

NODE=M210R01

	VALUE	CL%	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
YOUR DATA	seen		356	ABLIKIM	15U	BES3	0	$e^+e^- \to \pi^0\pi^0 J/\psi$
	seen		307	ABLIKIM	13T	BES3	±	$e^+e^- \to \pi^+\pi^- J/\psi$
	seen		25	[1] XIAO	13A		0	4.17 $e^+e^- \to \pi^0\pi^0 J/\psi$
	• • • We do not use the following data for averages, fits, limits, etc. • • •							
	not seen	90		[2] ADOLPH	15D	COMP	±	$\gamma N \to J/\psi\pi^\pm N$

[1] Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration. NODE=M210R01;LINKAGE=XI

[2] ADOLPH 15D measure $B(X(3900)^{\pm} \rightarrow J/\psi\pi^{\pm})\ \sigma(\gamma N \rightarrow X(3900)^{\pm} N)/\sigma(\gamma N \rightarrow J/\psi N) < 3.7 \times 10^{-3}$ at 90% CL. NODE=M210R01;LINKAGE=A

$X(3900)$ REFERENCES

NODE=M210

	ABLIKIM	15AB	PRL 115 222002	M. Ablikim *et al.*	(BES III Collab.)	REFID=56954
	ABLIKIM	15AC	PR D92 092006	M. Ablikim *et al.*	(BES III Collab.) JP	REFID=56967
YOUR PAPER	ABLIKIM	15U	PRL 115 112003	M. Ablikim *et al.*	(BES III Collab.)	REFID=56786
	ADOLPH	15D	PL B742 330	C. Adolph *et al.*	(COMPASS Collab.)	REFID=56791
	ABLIKIM	14A	PRL 112 022001	M. Ablikim *et al.*	(BES III Collab.) JP	REFID=55648
	ABLIKIM	13T	PRL 110 252001	M. Ablikim *et al.*	(BES III Collab.)	REFID=55409
	LIU	13B	PRL 110 252002	Z.Q. Liu *et al.*	(BELLE Collab.)	REFID=55410
	XIAO	13A	PL B727 366	T. Xiao *et al.*	(NWES)	REFID=55593

Reference = ABLIKIM 15AA; PRL 115 182002
Verifier code = BES3

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Russian Federation

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M213

$X(4020)$

$I(J^P) = 1(?^?)$

Charged X(4020) seen by ABLIKIM 13X from $e^+e^- \rightarrow \pi^+\pi^- h_c(1P)$ at c.m. energy from 3.90 to 4.42 GeV as a peak in the invariant mass distribution of the $\pi^\pm h_c(1P)$ system, and by ABLIKIM 14B from $e^+e^- \rightarrow (D^*\overline{D}^*)^\pm\pi^\mp$ events in $(D^*\overline{D}^*)^\pm$ mass. A neutral X(4020) seen by ABLIKIM 14P at three c.m. energies in the same range in $e^+e^- \rightarrow \pi^0\pi^0 h_c(1P)$ as a peak in the larger of the two masses recoiling against a π^0. ABLIKIM 15AA observes a 5.9 σ signal in $(D^*\overline{D}^*)^0$ in $e^+e^- \rightarrow (D^*\overline{D}^*)^0\,\pi^0$ events using collisions at two c.m. energies. Production rates and mass values support grouping neutral and charged X(4020) together as manifestations of a single $I = 1$ particle. NODE=M213

$X(4020)$ MASS

NODE=M213M

NODE=M213M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
	4024.1±1.9 OUR AVERAGE						
YOUR DATA	$4025.5^{+2.0}_{-4.7}\pm3.1$	116	[1] ABLIKIM	15AA	BES3	0	$e^+e^- \rightarrow (D^*\overline{D}^*)^0\,\pi^0$
	4026.3±2.6±3.7	401	[1] ABLIKIM	14B	BES3	±	$e^+e^- \rightarrow (D^*\overline{D}^*)^\pm\,\pi^\mp$
	4023.9±2.2±3.8	61	[1,2] ABLIKIM	14P	BES3	0	$e^+e^- \rightarrow \pi^0\pi^0 h_c$
	4022.9±0.8±2.7	253	[1] ABLIKIM	13X	BES3	±	$e^+e^- \rightarrow \pi^+\pi^- h_c$

YOUR NOTE
[1] Neglecting interference between the $X(4020)$ and non-resonant continuum. NODE=M213M;LINKAGE=AB
[2] Assuming $J^P = 1^+$ and width of 7.9 ± 2.6 MeV. NODE=M213M;LINKAGE=B

$X(4020)$ WIDTH

NODE=M213W

NODE=M213W

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
	13 ±5 OUR AVERAGE	Error includes scale factor of 1.7. See the ideogram below.					
YOUR DATA	23.0±6.0±1.0	116	[1] ABLIKIM	15AA	BES3	0	$e^+e^- \rightarrow (D^*\overline{D}^*)^0\,\pi^0$
	24.8±5.6±7.7	401	[1] ABLIKIM	14B	BES3	±	$e^+e^- \rightarrow (D^*\overline{D}^*)^\pm\pi^\mp$
	7.9±2.7±2.6	253	[1] ABLIKIM	13X	BES3	±	$e^+e^- \rightarrow \pi^+\pi^- h_c$

YOUR NOTE
[1] Neglecting interference between the $X(4020)$ and non-resonant continuum. NODE=M213W;LINKAGE=AB

$X(4020)$ BRANCHING RATIOS

NODE=M213225

$\Gamma(D^*\overline{D}^*)/\Gamma_{total}$ Γ_2/Γ NODE=M213R02

NODE=M213R02

	VALUE	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
YOUR DATA	seen	116	[1] ABLIKIM	15AA	BES3	0	$e^+e^- \rightarrow (D^*\overline{D}^*)^0\,\pi^0$
	seen	401	[1] ABLIKIM	14B	BES3	±	$e^+e^- \rightarrow (D^*\overline{D}^*)^\pm\pi^\mp$

YOUR NOTE
[1] Neglecting interference between the $X(4020)$ and non-resonant continuum. NODE=M213R02;LINKAGE=A

$X(4020)$ REFERENCES

NODE=M213

YOUR PAPER

ABLIKIM	15AA	PRL 115 182002	M. Ablikim *et al.*	(BES III Collab.)	REFID=56951
ABLIKIM	14B	PRL 112 132001	M. Ablikim *et al.*	(BES III Collab.)	REFID=55654
ABLIKIM	14P	PRL 113 212002	M. Ablikim *et al.*	(BES III Collab.)	REFID=56118
ABLIKIM	13X	PRL 111 242001	M. Ablikim *et al.*	(BES III Collab.)	REFID=55635

Reference = ABLIKIM 15AB; PRL 115 222002
Verifier code = BES3

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M210

$X(3900)$

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

Charged $X(3900)$ seen as a peak in the invariant mass distribution of the $J/\psi\pi^\pm$ system by BES III (ABLIKIM 13T) in $e^+e^- \rightarrow \pi^+\pi^- J/\psi$ at c.m. energy of 4.26 GeV and by radiative return from e^+e^- collisions at $\sqrt{s}$ from 9.46 to 10.86 GeV at Belle (LIU 13B). Angular analysis of ABLIKIM 14A and ABLIKIM 15AC favor the $J^P = 1^+$ assignment. Neutral $X(3900)$ seen in the $J/\psi\pi^0$ invariant mass distribution in $e^+e^- \rightarrow \pi^0\pi^0 J/\psi$ at c.m. energies of 4.23, 4.26, and 4.36 GeV by BES III (ABLIKIM 15U) and at 4.17 GeV by XIAO 13A. Peaks in $(D\overline{D}^*)^{0,\pm}$ reported by BES III (ABLIKIM 14A, ABLIKIM 15AB) are assumed to be related.

NODE=M210

$X(3900)$ MASS

NODE=M210M

NODE=M210M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
	3886.6±2.4 OUR AVERAGE		Error includes scale factor of 1.6. See the ideogram below.				
YOUR DATA	$3885.7^{+4.3}_{-5.7}\pm8.4$		[1] ABLIKIM	15AB	BES3	0	$e^+e^- \rightarrow \pi^0(D\overline{D}^*)^0$
	3881.7±1.6±1.6	1248	[1] ABLIKIM	15AC	BES3	±	$e^+e^- \rightarrow \pi^\pm(D\overline{D}^*)^\mp$
	3894.8±2.3±3.2	356	[1] ABLIKIM	15U	BES3	0	$e^+e^- \rightarrow \pi^0\pi^0 J/\psi$
	3883.9±1.5±4.2	1212	[1] ABLIKIM	14A	BES3	±	$e^+e^- \rightarrow \pi^\pm(D\overline{D}^*)^\mp$
	3899.0±3.6±4.9	307	[1] ABLIKIM	13T	BES3	±	$e^+e^- \rightarrow \pi^+\pi^- J/\psi$
	3894.5±6.6±4.5	159	[1] LIU	13B	BELL	±	$e^+e^- \rightarrow \gamma\pi^+\pi^- J/\psi$
	3886 ±4 ±2	81	[1,2] XIAO	13A		±	4.17 $e^+e^- \rightarrow \pi^+\pi^- J/\psi$
	3904 ±9 ±5	25	[1,2] XIAO	13A		0	4.17 $e^+e^- \rightarrow \pi^0\pi^0 J/\psi$

OCCUR=2

YOUR NOTE

[1] Neglecting interference between the $X(3900)$ and non-resonant continuum. NODE=M210M;LINKAGE=A

[2] For $M^2(\pi^+\pi^-) < 0.65$ GeV^2. Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration. NODE=M210M;LINKAGE=B

$X(3900)$ WIDTH

NODE=M210W

NODE=M210W

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
	28.1± 2.6 OUR AVERAGE						
YOUR DATA	$35\ ^{+11}_{-12}\ \pm15$		[1] ABLIKIM	15AB	BES3	0	$e^+e^- \rightarrow \pi^0(D\overline{D}^*)^0$
	26.6± 2.0± 2.1	1248	[1] ABLIKIM	15AC	BES3	±	$e^+e^- \rightarrow \pi^\pm(D\overline{D}^*)^\mp$
	29.6± 8.2± 8.2	356	[1] ABLIKIM	15U	BES3	0	$e^+e^- \rightarrow \pi^0\pi^0 J/\psi$
	24.8± 3.3±11.0	1212	[1] ABLIKIM	14A	BES3	±	$e^+e^- \rightarrow \pi^\pm(D\overline{D}^*)^\mp$
	46 ±10 ±20	307	[1] ABLIKIM	13T	BES3	±	$e^+e^- \rightarrow \pi^+\pi^- J/\psi$
	63 ±24 ±26	159	[1] LIU	13B	BELL	±	$e^+e^- \rightarrow \gamma\pi^+\pi^- J/\psi$
	37 ± 4 ± 8	81	[1,2] XIAO	13A		±	4.17 $e^+e^- \rightarrow \pi^+\pi^- J/\psi$

YOUR NOTE

[1] Neglecting interference between the $X(3900)$ and non-resonant continuum. NODE=M210W;LINKAGE=A

[2] For $M^2(\pi^+\pi^-) < 0.65$ GeV^2. Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration. NODE=M210W;LINKAGE=B

$X(3900)$ BRANCHING RATIOS

NODE=M210225

$\Gamma(D^+D^{*-}+\text{c.c})/\Gamma_{\text{total}}$ — Γ_8/Γ

NODE=M210R06

NODE=M210R06

	VALUE	DOCUMENT ID		TECN	CHG	COMMENT
YOUR DATA	**seen**	ABLIKIM	15AB	BES3	0	$e^+e^- \rightarrow \pi^0(D\overline{D}^*)^0$

$\Gamma(D^0\overline{D}^{*0}+\text{c.c})/\Gamma_{\text{total}}$ — Γ_9/Γ

NODE=M210R07

NODE=M210R07

	VALUE	DOCUMENT ID		TECN	CHG	COMMENT
YOUR DATA	**seen**	ABLIKIM	15AB	BES3	0	$e^+e^- \rightarrow \pi^0(D\overline{D}^*)^0$

$\Gamma(D^+ D^{*-} + c.c)/\Gamma(D^0 \overline{D}^{*0} + c.c)$ Γ_8/Γ_9 NODE=M210R08

	VALUE	DOCUMENT ID		TECN	CHG	COMMENT	
YOUR DATA	**0.96±0.18±0.12**	ABLIKIM	15AB	BES3	0	$e^+ e^- \rightarrow \pi^0 (D\overline{D}^*)^0$	NODE=M210R08

$X(3900)$ REFERENCES

NODE=M210

YOUR PAPER	ABLIKIM	15AB	PRL 115 222002	M. Ablikim *et al.*	(BES III Collab.)	REFID=56954
	ABLIKIM	15AC	PR D92 092006	M. Ablikim *et al.*	(BES III Collab.) JP	REFID=56967
	ABLIKIM	15U	PRL 115 112003	M. Ablikim *et al.*	(BES III Collab.)	REFID=56786
	ABLIKIM	14A	PRL 112 022001	M. Ablikim *et al.*	(BES III Collab.) JP	REFID=55648
	ABLIKIM	13T	PRL 110 252001	M. Ablikim *et al.*	(BES III Collab.)	REFID=55409
	LIU	13B	PRL 110 252002	Z.Q. Liu *et al.*	(BELLE Collab.)	REFID=55410
	XIAO	13A	PL B727 366	T. Xiao *et al.*	(NWES)	REFID=55593