Reference = MORI 07A; JPSJ 76 074102
Verifier code = BELLE

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

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Michael Doser
CERN, European Organization for Nuclear Rese
CH-1211 Genève 23
Switzerland

PHONE: 41-(22)-767–6552
FAX: 41-(22)-767–8955
EMAIL: michael.doser@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=M002

$\eta'(958)$

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

$\eta'(958)$ BRANCHING RATIOS

NODE=M002230

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

NODE=M002R20
NODE=M002R20

	VALUE (units 10^{-4})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*	
YOUR DATA	**< 29**	90	[18] MORI	07A	BELL	$\gamma\gamma \to \pi^+\pi^-$	
	• • • We do not use the following data for averages, fits, limits, etc. • • •						
YOUR DATA	< 3.3	90	[19] MORI	07A	BELL	$\gamma\gamma \to \pi^+\pi^-$	OCCUR=2
	<800	95	DANBURG	73	HBC	2.2 $K^- p \to \Lambda X^0$	
	<200	90	RITTENBERG	69	HBC	1.7–2.7 $K^- p$	

[18] Taking into account interference with the $\gamma\gamma \to \pi^+\pi^-$ continuum. NODE=M002R20;LINKAGE=MO
[19] Without interference with the $\gamma\gamma \to \pi^+\pi^-$ continuum. NODE=M002R20;LINKAGE=MR

$\eta'(958)$ REFERENCES

NODE=M002

YOUR PAPER	MORI	07A	JPSJ 76 074102	T. Mori *et al.*	(BELLE Collab.)	REFID=51691
	DANBURG	73	PR D8 3744	J.S. Danburg *et al.*	(BNL, MICH) JP	REFID=20280
	RITTENBERG	69	Thesis UCRL 18863	A. Rittenberg	(LRL) I	REFID=20266

Reference = CHEN 07B; PL B651 15
Verifier code = BELLE

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$c\bar{c}$ MESONS

NODE=MXXX025

NODE=M056

$\chi_{c0}(1P)$ $I^G(J^{PC}) = 0^+(0^{++})$

$\chi_{c0}(1P)$ PARTIAL WIDTHS

NODE=M056217

$\chi_{c0}(1P)$ Γ(i)$\Gamma(\gamma\gamma)/\Gamma$(total)

NODE=M056224

$\Gamma(K^0_S K^0_S) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ **$\Gamma_{30}\Gamma_{52}/\Gamma$**

NODE=M056G5

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **$7.00 \pm 0.65 \pm 0.71$**	134 ± 12	CHEN	07B	BELL	$e^+e^- \to e^+e^-\chi_{c0}$

NODE=M056G5

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

NODE=M056220

HADRONIC DECAYS

NODE=M056305

$\Gamma(K^0_S K^0_S)/\Gamma(\pi\pi)$ **Γ_{30}/Γ_{21}**

NODE=M056R53

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
YOUR DATA $0.31 \pm 0.05 \pm 0.05$	[31,32] CHEN		07B	BELL $e^+e^- \to e^+e^-\chi_{c0}$

NODE=M056R53

$\Gamma(K^0_S K^0_S)/\Gamma(K^+K^-)$ **Γ_{30}/Γ_{29}**

NODE=M056R52

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
YOUR DATA $0.49 \pm 0.08 \pm 0.08$	[32,33] CHEN		07B	BELL $e^+e^- \to e^+e^-\chi_{c0}$

NODE=M056R52

[31] Using $\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ from the $\pi^+\pi^-$ measurement of NAKAZAWA 05 rescaled by 3/2 to convert to $\pi\pi$.

NODE=M056R53;LINKAGE=CH

[32] Not independent from other measurements.

NODE=M056R53;LINKAGE=NI

[33] Using $\Gamma(K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ from NAKAZAWA 05.

NODE=M056R52;LINKAGE=CH

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

NODE=M056

YOUR PAPER CHEN 07B PL B651 15 W.T. Chen *et al.* (BELLE Collab.) REFID=51710
NAKAZAWA 05 PL B615 39 H. Nakazawa *et al.* (BELLE Collab.) REFID=50807

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

$\chi_{c2}(1P)$ PARTIAL WIDTHS

NODE=M057220

$\chi_{c2}(1P)$ Γ(i)$\Gamma(\gamma\gamma)/\Gamma$(total)

NODE=M057224

$\Gamma(K^0_S K^0_S) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ **$\Gamma_{15}\Gamma_{38}/\Gamma$**

NODE=M057G6

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **$0.31 \pm 0.05 \pm 0.03$**	38 ± 7	CHEN	07B	BELL	$e^+e^- \to e^+e^-\chi_{c2}$

NODE=M057G6

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

NODE=M057225

HADRONIC DECAYS

NODE=M057305

$\Gamma(K^0_S K^0_S)/\Gamma(\pi\pi)$ **Γ_{15}/Γ_{9}**

NODE=M057R36

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
YOUR DATA $0.27 \pm 0.07 \pm 0.04$	[24,25] CHEN		07B	BELL $e^+e^- \to e^+e^-\chi_{c2}$

NODE=M057R36

$\Gamma(K^0_S K^0_S)/\Gamma(K^+K^-)$ Γ_{15}/Γ_{14}

NODE=M057R37
NODE=M057R37

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
YOUR DATA $0.70 \pm 0.21 \pm 0.12$	[25,26] CHEN	07B BELL	$e^+e^- \to e^+e^-\chi_{c2}$

[24] Using $\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ from the $\pi^+\pi^-$ measurement of NAKAZAWA 05 rescaled by 3/2 to convert to $\pi\pi$.
NODE=M057R36;LINKAGE=CH

[25] Not independent from other measurements.
NODE=M057R36;LINKAGE=NI

[26] Using $\Gamma(K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ from NAKAZAWA 05.
NODE=M057R37;LINKAGE=CH

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

NODE=M057

YOUR PAPER	CHEN	07B	PL B651 15	W.T. Chen *et al.*	(BELLE Collab.)	REFID=51710
	NAKAZAWA	05	PL B615 39	H. Nakazawa *et al.*	(BELLE Collab.)	REFID=50807

Reference = SOKOLOV 07; PR D75 071103R
Verifier code = BELLE

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$b\overline{b}$ MESONS

NODE=MXXX030

NODE=M047

$\Upsilon(4S)$ or $\Upsilon(10580)$

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

$\Upsilon(4S)$ BRANCHING RATIOS

NODE=M047230

non-$B\overline{B}$ DECAYS

NODE=M047NBB

$\Gamma(\Upsilon(1S)\pi^+\pi^-)/\Gamma_{total}$ **Γ_{13}/Γ**

NODE=M047R7
NODE=M047R7

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
1.01±0.29 OUR AVERAGE Error includes scale factor of 2.1.					
YOUR DATA 1.78±0.40±0.03			[15] SOKOLOV 07	BELL	$e^+e^- \to \pi^+\pi^-\mu^+\mu^-$
0.90±0.15±0.02		167 ± 19	[16] AUBERT 06R	BABR	$e^+e^- \to \pi^+\pi^-\mu^+\mu^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.2	90		GLENN 99	CLE2	e^+e^-

[15] SOKOLOV 07 reports $[B(\Upsilon(4S) \to \Upsilon(1S)\pi^+\pi^-)] \times [B(\Upsilon(1S) \to \mu^+\mu^-)] = (4.42 \pm 0.81 \pm 0.56) \times 10^{-6}$. We divide by our best value $B(\Upsilon(1S) \to \mu^+\mu^-) = (2.48 \pm 0.05) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M047R7;LINKAGE=SO

[16] AUBERT 06R reports $[B(\Upsilon(4S) \to \Upsilon(1S)\pi^+\pi^-)] \times [B(\Upsilon(1S) \to \mu^+\mu^-)] = (2.23 \pm 0.25 \pm 0.27) \times 10^{-6}$. We divide by our best value $B(\Upsilon(1S) \to \mu^+\mu^-) = (2.48 \pm 0.05) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M047R7;LINKAGE=AU

$\Upsilon(4S)$ REFERENCES

NODE=M047

YOUR PAPER	SOKOLOV	07	PR D75 071103R	A. Sokolov *et al.*	(BELLE Collab.)	REFID=51715
	AUBERT	06R	PRL 96 232001	B. Aubert *et al.*	(BABAR Collab.)	REFID=51143
	GLENN	99	PR D59 052003	S. Glenn *et al.*		REFID=46890

Reference = DRUTSKOY 07A; PR D76 012002
Verifier code = BELLE

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$b\overline{b}$ MESONS

NODE=MXXX030

$\Upsilon(10860)$

NODE=M092

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

$\Upsilon(10860)$ BRANCHING RATIOS

NODE=M092230

$\Gamma(B_s^*\overline{B}_s^*)/\Gamma(B_s^{(*)}\overline{B}_s^{(*)})$ $\Gamma_{12}/\Gamma_9 = \Gamma_{12}/(\Gamma_{10}+\Gamma_{11}+\Gamma_{12})$

NODE=M092R19

NODE=M092R19

	VALUE (units 10^{-2})	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA	$93^{+7}_{-9}\pm1$	[5] DRUTSKOY	07A	BELL	10.86 $e^+e^- \to B_s^{(*)}\overline{B}_s^{(*)}$

[5] From a measurement of $\sigma(e^+e^- \to B_s^*\overline{B}_s^*)$ / $\sigma(e^+e^- \to B_s^{(*)}\overline{B}_s^{(*)})$ at $\sqrt{s} = 10.86$ GeV.

NODE=M092R19;LINKAGE=DR

$\Upsilon(10860)$ REFERENCES

NODE=M092

YOUR PAPER DRUTSKOY 07A PR D76 012002 A. Drutskoy *et al.* (BELLE Collab.)

REFID=51852

Reference = KUZMIN 07; PR D76 012006
Verifier code = BELLE

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CHARMED MESONS
($C = \pm 1$)

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

NODE=MXXX035

NODE=MXXX035

NODE=M150

$D_2^*(2460)^\pm$

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

$J^P = 2^+$ assignment strongly favored(ALBRECHT 89B).

NODE=M150

$D_2^*(2460)^\pm$ MASS

NODE=M150205

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
$2460.1^{+2.6}_{-3.5}$ OUR AVERAGE Error includes scale factor of 1.5. See the ideogram below.					
YOUR DATA $2465.7 \pm 1.8^{+1.4}_{-4.8}$	2909	KUZMIN	07	BELL	$e^+e^- \to$ hadrons
$2463 \pm 3 \pm 3$	310	BERGFELD	94B	CLE2	$e^+e^- \to D^0\pi^+X$
$2453 \pm 3 \pm 2$	185	FRABETTI	94B	E687	γBe $\to D^0\pi^+X$
$2469 \pm 4 \pm 6$		ALBRECHT	89F	ARG	$e^+e^- \to D^0\pi^+X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2467.6 \pm 1.5 \pm 0.8$	3.5k	[1] LINK	04A	FOCS	γ A

[1] Fit includes the contribution from $D_0^*(2400)^\pm$. Not independent of the corresponding mass difference measurement, $(m_{D_2^*(2460)^\pm}) - (m_{D_2^*(2460)^0})$.

NODE=M150M

NODE=M150M;LINKAGE=LI

$D_2^*(2460)^\pm$ WIDTH

NODE=M150210

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
37 ± 6 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.					
YOUR DATA $49.7 \pm 3.8 \pm 6.4$	2909	KUZMIN	07	BELL	$e^+e^- \to$ hadrons
$34.1 \pm 6.5 \pm 4.2$	3.5k	[2] LINK	04A	FOCS	γ A
$27 \ ^{+11}_{-8} \pm 5$	310	BERGFELD	94B	CLE2	$e^+e^- \to D^0\pi^+X$
$23 \pm 9 \pm 5$	185	FRABETTI	94B	E687	γBe $\to D^0\pi^+X$

[2] Fit includes the contribution from $D_0^*(2400)^\pm$.

NODE=M150W

NODE=M150W;LINKAGE=LI

$D_2^*(2460)^\pm$ REFERENCES

NODE=M150

YOUR PAPER	KUZMIN	07	PR D76 012006	A. Kuzmin *et al.*	(BELLE Collab.)	REFID=51854
	LINK	04A	PL B586 11	J.M. Link *et al.*	(FOCUS Collab.)	REFID=49775
	BERGFELD	94B	PL B340 194	T. Bergfeld *et al.*	(CLEO Collab.)	REFID=44099
	FRABETTI	94B	PRL 72 324	P.L. Frabetti *et al.*	(FNAL E687 Collab.)	REFID=43687
	ALBRECHT	89B	PL B221 422	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=40736
	ALBRECHT	89F	PL B231 208	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=40931

Reference = EPIFANOV 07; PL B654 65
Verifier code = BELLE

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

NODE=MXXX020

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

NODE=MXXX020

NODE=M018

$K^*(892)$

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

$K^*(892)$ MASS

NODE=M018205

CHARGED ONLY, PRODUCED IN τ LEPTON DECAYS

NODE=M018MCT
NODE=M018MCT

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT	
YOUR DATA **895.47±0.20±0.74**	53k	[6] EPIFANOV	07	BELL	$\tau^- \to K^0_S \pi^- \nu_\tau$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
896.4 ±0.9	11970	[7] BONVICINI	02	CLEO	$\tau^- \to K^- \pi^0 \nu_\tau$	
895 ±2		[8] BARATE	99R	ALEP	$\tau^- \to K^- \pi^0 \nu_\tau$	

[6] From a fit in the $K^*_0(800) + K^*(892) + K^*(1410)$ model.

NODE=M018MCT;LINKAGE=EF

[7] Calculated by us from the shift by 4.7 ± 0.9 MeV (statistical uncertainty only) reported in BONVICINI 02 with respect to the world average value from PDG 00.

NODE=M018MCT;LINKAGE=BO

[8] With mass and width of the $K^*(1410)$ fixed at 1412 MeV and 227 MeV, respectively.

NODE=M018MCT;LINKAGE=BA

$K^*(892)$ WIDTH

NODE=M018215

CHARGED ONLY, PRODUCED IN τ LEPTON DECAYS

NODE=M018W5
NODE=M018W5

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT	
YOUR DATA **46.2±0.6±1.2**	53k	[17] EPIFANOV	07	BELL	$\tau^- \to K^0_S \pi^- \nu_\tau$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
55 ±8		[18] BARATE	99R	ALEP	$\tau^- \to K^- \pi^0 \nu_\tau$	

[17] From a fit in the $K^*_0(800) + K^*(892) + K^*(1410)$ model.

NODE=M018W5;LINKAGE=EF

[18] With mass and width of the $K^*(1410)$ fixed at 1412 MeV and 227 MeV, respectively.

NODE=M018W5;LINKAGE=BA

$K^*(892)$ REFERENCES

NODE=M018

YOUR PAPER	EPIFANOV	07	PL B654 65	D. Epifanov *et al.*	(BELLE Collab.)	REFID=51929
	BONVICINI	02	PRL 88 111803	G. Bonvicini *et al.*	(CLEO Collab.)	REFID=48701
	PDG	00	EPJ C15 1	D.E. Groom *et al.*		REFID=47469
	BARATE	99R	EPJ C11 599	R. Barate *et al.*	(ALEPH Collab.)	REFID=47366

Reference = WANG 07D; PRL 99 142002
Verifier code = BELLE

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tom Browder

EMAIL: teb@phys.hawaii.edu

April 10, 2008

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

Sincerely,

Michael Doser
CERN, European Organization for Nuclear Rese
CH-1211 Genève 23
Switzerland

PHONE: 41-(22)-767–6552
FAX: 41-(22)-767–8955
EMAIL: michael.doser@cern.ch

$c\bar{c}$ MESONS

NODE=MXXX025

NODE=M181

$X(4360)$

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

OMITTED FROM SUMMARY TABLE

Seen in radiative return from e^+e^- collisions at $\sqrt{s} = 9.54$–10.58 GeV by AUBERT 07S and WANG 07D. See also the review under the $X(3872)$ particle listings. (See the index for the page number.)

NODE=M181

$X(4360)$ MASS

NODE=M181205

NODE=M181M

	VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA	**4361± 9±9**	[1] WANG	07D	BELL	10.58 $e^+e^- \to \gamma\pi^+\pi^-\psi(2S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	4324±24	[2] AUBERT	07S	BABR	10.58 $e^+e^- \to \gamma\pi^+\pi^-\psi(2S)$

[1] From a two-resonance fit. NODE=M181M;LINKAGE=WA

[2] From a single-resonance fit. Systematic errors not estimated. NODE=M181M;LINKAGE=AU

$X(4360)$ WIDTH

NODE=M181210

NODE=M181W

	VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA	**74±15±10**	[3] WANG	07D	BELL	10.58 $e^+e^- \to \gamma\pi^+\pi^-\psi(2S)$
	• • • We do not use the following data for averages, fits, limits, etc. • • •				
	172±33	[4] AUBERT	07S	BABR	10.58 $e^+e^- \to \gamma\pi^+\pi^-\psi(2S)$

[3] From a two-resonance fit. NODE=M181W;LINKAGE=WA

[4] From a single-resonance fit. Systematic errors not estimated. NODE=M181W;LINKAGE=AU

$X(4360)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

NODE=M181230

$\Gamma(\psi(2S)\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_2\Gamma_1/\Gamma$

NODE=M181G1

NODE=M181G1

VALUE (eV)	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
YOUR DATA 10.4±1.7±1.5	[5] WANG	07D	BELL	10.58 $e^+e^- \to \gamma\pi^+\pi^-\psi(2S)$
YOUR DATA 11.8±1.8±1.4	[6] WANG	07D	BELL	10.58 $e^+e^- \to \gamma\pi^+\pi^-\psi(2S)$ OCCUR=2

[5] Solution I of two equivalent solutions in a fit using two interfering resonances. NODE=M181G1;LINKAGE=WA

[6] Solution II of two equivalent solutions in a fit using two interfering resonances. NODE=M181G1;LINKAGE=WN

$X(4360)$ REFERENCES

NODE=M181

	AUBERT	07S	PRL 98 212001	B. Aubert *et al.*	(BABAR Collab.)	REFID=51724
YOUR PAPER	WANG	07D	PRL 99 142002	X.-L. Wang *et al.*	(BELLE Collab.)	REFID=51959

Reference = YUAN 07; PRL 99 182004
Verifier code = BELLE

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EMAIL: michael.doser@cern.ch

$c\bar{c}$ MESONS

NODE=MXXX025

$X(4260)$

NODE=M074

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

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 $B^- \to K^-\pi^+\pi^- J/\psi$. See also the mini-review under the $X(3872)$. (See the index for the page number.)

NODE=M074

$X(4260)$ MASS

NODE=M074205

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$4263^{+\ 8}_{-\ 9}$ OUR AVERAGE Error includes scale factor of 1.1.					
YOUR DATA $4247 \pm 12^{+17}_{-32}$		[1] YUAN	07	BELL	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
$4284^{+17}_{-16} \pm 4$	13.6	HE	06B	CLEO	9.4–10.6 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
$4259 \pm 8^{+\ 2}_{-\ 6}$	125	[2] AUBERT,B	05I	BABR	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$

[1] From a two-resonance fit. NODE=M074M;LINKAGE=YU
[2] From a single-resonance fit. Two interfering resonances are not excluded. NODE=M074M;LINKAGE=AU

NODE=M074M

$X(4260)$ WIDTH

NODE=M074210

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
95 ± 14 OUR AVERAGE					
YOUR DATA $108 \pm 19 \pm 10$		[3] YUAN	07	BELL	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
$73^{+39}_{-25} \pm 5$	13.6	HE	06B	CLEO	9.4–10.6 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
$88 \pm 23^{+\ 6}_{-\ 4}$	125	[4] AUBERT,B	05I	BABR	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$

[3] From a two-resonance fit. NODE=M074W;LINKAGE=YU
[4] From a single-resonance fit. Two interfering resonances are not excluded. NODE=M074W;LINKAGE=AU

NODE=M074W

$X(4260)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

NODE=M074230

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

NODE=M074G1

VALUE (eV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$5.9^{+1.2}_{-0.9}$ OUR AVERAGE					
YOUR DATA $6.0 \pm 1.2^{+4.7}_{-0.5}$		[5] YUAN	07	BELL	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
$8.9^{+3.9}_{-3.1} \pm 1.8$	8.1	HE	06B	CLEO	9.4–10.6 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
$5.5 \pm 1.0^{+0.8}_{-0.7}$	125	[6] AUBERT,B	05I	BABR	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA $20.6 \pm 2.3^{+9.1}_{-1.7}$		[7] YUAN	07	BELL	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$

NODE=M074G1
NODE=M074G1
OCCUR=2

[5] Solution I of two equivalent solutions in a fit using two interfering resonances. NODE=M074G1;LINKAGE=YU
[6] From a single-resonance fit. Two interfering resonances are not excluded. NODE=M074G1;LINKAGE=AU
[7] Solution II of two equivalent solutions in a fit using two interfering resonances. NODE=M074G1;LINKAGE=YA

$X(4260)$ REFERENCES

NODE=M074

YOUR PAPER YUAN	07	PRL 99 182004	C.Z. Yuan *et al.*	(BELLE Collab.)	REFID=51960
AUBERT	06	PR D73 011101R	B. Aubert *et al.*	(BABAR Collab.)	REFID=51017
COAN	06	PRL 96 162003	T.E. Coan *et al.*	(CLEO Collab.)	REFID=51075
HE	06B	PR D74 091104R	Q. He *et al.*	(CLEO Collab.)	REFID=51523
AUBERT,B	05I	PRL 95 142001	B. Aubert *et al.*	(BABAR Collab.)	REFID=50776

Reference = UEHARA 08; EPJ C53 1
Verifier code = BELLE

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$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M026

$\eta_c(1S)$

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

$\eta_c(1S)$ MASS

NODE=M026205

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2980.3± 1.2 OUR AVERAGE		Error includes scale factor of 1.7. See the ideogram below.			
YOUR DATA 2986.1± 1.0± 2.5	7.5k	UEHARA	08	BELL	$\gamma\gamma \to \eta_c \to$ hadrons
2970 ± 5 ± 6	501	[1] ABE	07	BELL	$e^+e^- \to J/\psi(c\overline{c})$
2971 ± 3 $^{+2}_{-1}$	195	WU	06	BELL	$B^+ \to p\overline{p}K^+$
2974 ± 7 $^{+2}_{-1}$	20	WU	06	BELL	$B^+ \to \Lambda\overline{\Lambda}K^+$
2981.8± 1.3± 1.5	592	ASNER	04	CLEO	$\gamma\gamma \to \eta_c \to K^0_S K^\pm\pi^\mp$
2982.5± 1.1± 0.9	2547 ± 90	AUBERT	04D	BABR	$\gamma\gamma \to \eta_c(1S) \to K\overline{K}\pi$
2984.1± 2.1± 1.0	190	[2] AMBROGIANI	03	E835	$\overline{p}p \to \eta_c \to \gamma\gamma$
2977.5± 1.0± 1.2		[3] BAI	03	BES	$J/\psi \to \gamma\eta_c$
2979.6± 2.3± 1.6	182 ± 25	FANG	03	BELL	$B \to \eta_c K$
2976.3± 2.3± 1.2		[4,5,6] BAI	00F	BES	$J/\psi \to \gamma\eta_c$ and $\psi(2S) \to \gamma\eta_c$
2969 ± 4 ± 4	80	BAI	90B	MRK3	$J/\psi \to \gamma K^+K^-K^+K^-$
2984 ± 2.3± 4.0		GAISER	86	CBAL	$J/\psi \to \gamma$X, $\psi(2S) \to \gamma$X
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2982 ± 5	273 ± 43	[7] AUBERT	06E	BABR	$B^\pm \to K^\pm X_{c\overline{c}}$
2976.6± 2.9± 1.3	140	[4,5] BAI	00F	BES	$J/\psi \to \gamma\eta_c$
2980.4± 2.3± 0.6		[8] BRANDENB...	00B	CLE2	$\gamma\gamma \to \eta_c \to K^\pm K^0_S\pi^\mp$
2975.8± 3.9± 1.2		[4,5] BAI	99B	BES	Sup. by BAI 00F
2999 ± 8	25	ABREU	98O	DLPH	$e^+e^- \to e^+e^-$ +hadrons
2988.3 $^{+3.3}_{-3.1}$		ARMSTRONG	95F	E760	$\overline{p}p \to \gamma\gamma$
2974.4± 1.9		[4] BISELLO	91	DM2	$J/\psi \to \eta_c\gamma$
2956 ±12 ±12		BAI	90B	MRK3	$J/\psi \to \gamma K^+K^-K^0_S K^0_L$
2982.6 $^{+2.7}_{-2.3}$	12	BAGLIN	87B	SPEC	$\overline{p}p \to \gamma\gamma$
2980.2± 1.6		[4] BALTRUSAIT..	86	MRK3	$J/\psi \to \eta_c\gamma$
2976 ± 8		[9] BALTRUSAIT..	84	MRK3	$J/\psi \to 2\phi\gamma$
2982 ± 8	18	[10] HIMEL	80B	MRK2	e^+e^-
2980 ± 9		[10] PARTRIDGE	80B	CBAL	e^+e^-

[1] From a fit of the J/ψ recoil mass spectrum. Supersedes ABE,K 02 and ABE 04G. NODE=M026M;LINKAGE=EB

[2] Using mass of $\psi(2S) = 3686.00$ MeV. NODE=M026M;LINKAGE=BG

[3] From a simultaneous fit of five decay modes of the η_c. NODE=M026M;LINKAGE=AK

[4] Average of several decay modes. NODE=M026M;LINKAGE=A

[5] Using an η_c width of 13.2 MeV. NODE=M026M;LINKAGE=C1

[6] Weighted average of the $\psi(2S)$ and $J/\psi(1S)$ samples. NODE=M026M;LINKAGE=KZ

[7] From the fit of the kaon momentum spectrum. Systematic errors not evaluated. NODE=M026M;LINKAGE=AU

[8] Superseded by ASNER 04. NODE=M026M;LINKAGE=NN

[9] $\eta_c \to \phi\phi$. NODE=M026M;LINKAGE=B

[10] Mass adjusted by us to correspond to $J/\psi(1S)$ mass = 3097 MeV. NODE=M026M;LINKAGE=M

$\eta_c(1S)$ WIDTH

NODE=M026210

VALUE (MeV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT	
26.7± 3.0 OUR AVERAGE Error includes scale factor of 2.0. See the ideogram below.							NODE=M026W
YOUR DATA 28.1± 3.2±2.2		7.5k	UEHARA	08	BELL	$\gamma\gamma \to \eta_c \to$ hadrons	
$48\ ^{+\ 8}_{-\ 7}\ \pm 5$		195	WU	06	BELL	$B^+ \to p\bar{p}K^+$	
40 ±19 ±5		20	WU	06	BELL	$B^+ \to \Lambda\bar{\Lambda}K^+$	OCCUR=2
24.8± 3.4±3.5		592	ASNER	04	CLEO	$\gamma\gamma \to \eta_c \to K^0_S K^\pm\pi^\mp$	
34.3± 2.3±0.9		2547 ± 90	AUBERT	04D	BABR	$\gamma\gamma \to \eta_c(1S) \to K\overline{K}\pi$	
$20.4^{+\ 7.7}_{-\ 6.7}\pm 2.0$		190	AMBROGIANI	03	E835	$\bar{p}p \to \eta_c \to \gamma\gamma$	
17.0± 3.7±7.4			[11] BAI	03	BES	$J/\psi \to \gamma\eta_c$	
29 ± 8 ±6		182 ± 25	FANG	03	BELL	$B \to \eta_c K$	
11.0± 8.1±4.1			[12] BAI	00F	BES	$J/\psi \to \gamma\eta_c$ and $\psi(2S) \to \gamma\eta_c$	
$23.9^{+12.6}_{-\ 7.1}$			ARMSTRONG	95F	E760	$\bar{p}p \to \gamma\gamma$	
$7.0^{+\ 7.5}_{-\ 7.0}$		12	BAGLIN	87B	SPEC	$\bar{p}p \to \gamma\gamma$	
$10.1^{+33.0}_{-\ 8.2}$		23	[13] BALTRUSAIT...	86	MRK3	$J/\psi \to \gamma p\bar{p}$	
11.5± 4.5			GAISER	86	CBAL	$J/\psi \to \gamma$X, $\psi(2S) \to \gamma$X	
• • • We do not use the following data for averages, fits, limits, etc. • • •							
27.0± 5.8±1.4			[14] BRANDENB...	00B	CLE2	$\gamma\gamma \to \eta_c \to K^\pm K^0_S \pi^\mp$	
< 40	90	18	HIMEL	80B	MRK2	e^+e^-	
< 20	90		PARTRIDGE	80B	CBAL	e^+e^-	

[11] From a simultaneous fit of five decay modes of the η_c. NODE=M026W;LINKAGE=AK

[12] From a fit to the 4-prong invariant mass in $\psi(2S) \to \gamma\eta_c$ and $J/\psi(1S) \to \gamma\eta_c$ decays. NODE=M026W;LINKAGE=KZ

[13] Positive and negative errors correspond to 90% confidence level. NODE=M026W;LINKAGE=L

[14] Superseded by ASNER 04. NODE=M026W;LINKAGE=NN

$\eta_c(1S)$ Γ(i)Γ(γγ)/Γ(total) NODE=M026220

$\Gamma(\pi^+\pi^-K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{19}\Gamma_{28}/\Gamma$ NODE=M026G15

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT	NODE=M026G15
27 ± 6 OUR AVERAGE						
YOUR DATA 25.7± 3.2± 4.9	2019 ± 248	UEHARA	08	BELL	$\gamma\gamma \to \eta_c \to K^+K^-\pi^+\pi^-$	
280 ±100 ±60	42	[31] ABDALLAH	03J	DLPH	$\gamma\gamma \to \pi^+\pi^-K^+K^-$	
170 ± 80 ±20	13.9 ± 6.6	ALBRECHT	94H	ARG	$\gamma\gamma \to \pi^+\pi^-K^+K^-$	

$\Gamma(K^*(892)\overline{K}^*(892)) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_4\Gamma_{28}/\Gamma$ NODE=M026G08

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT	NODE=M026G08
YOUR DATA **32.4±4.2±5.8**	882± 115	UEHARA	08	BELL	$\gamma\gamma \to \eta_c \to K^+K^-\pi^+\pi^-$	

$\Gamma(f_2(1270)f_2'(1525)) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{16}\Gamma_{28}/\Gamma$ NODE=M026G20

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT	NODE=M026G20
YOUR DATA **49± 9±13**	1128± 206	UEHARA	08	BELL	$\gamma\gamma \to \eta_c \to K^+K^-\pi^+\pi^-$	

$\Gamma(2(K^+K^-)) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{21}\Gamma_{28}/\Gamma$ NODE=M026G27

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT	NODE=M026G27
5.8± 1.9 OUR AVERAGE						
YOUR DATA 5.6± 1.1± 1.6	216 ± 42	UEHARA	08	BELL	$\gamma\gamma \to \eta_c \to 2(K^+K^-)$	
350 ±90 ±60	46	[32] ABDALLAH	03J	DLPH	$\gamma\gamma \to 2(K^+K^-)$	
231 ±90 ±23	9.1 ± 3.3	[33] ALBRECHT	94H	ARG	$\gamma\gamma \to 2(K^+K^-)$	

$\Gamma(\phi\phi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_7\Gamma_{28}/\Gamma$ NODE=M026G07

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT	NODE=M026G07
YOUR DATA **6.8±1.2±1.3**	132± 23	UEHARA	08	BELL	$\gamma\gamma \to \eta_c \to 2(K^+K^-)$	

$\Gamma(2(\pi^+\pi^-)) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{22}\Gamma_{28}/\Gamma$

NODE=M026G11
NODE=M026G11

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
42 ± 6 OUR AVERAGE					
YOUR DATA 40.7± 3.7± 5.3	5381 ± 49	UEHARA	08	BELL	$\gamma\gamma \to \eta_c \to 2(\pi^+\pi^-)$
180 ±70 ±20	21.4 ± 8.6	ALBRECHT	94H	ARG	$\gamma\gamma \to 2(\pi^+\pi^-)$

$\Gamma(\rho\rho) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_2\Gamma_{28}/\Gamma$

NODE=M026G09
NODE=M026G09

VALUE (eV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
YOUR DATA <39	90	< 1556	UEHARA	08	BELL	$\gamma\gamma \to \eta_c \to 2(\pi^+\pi^-)$

$\Gamma(f_2(1270)f_2(1270)) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{15}\Gamma_{28}/\Gamma$

NODE=M026G19
NODE=M026G19

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **69±17±12**	3182± 766	UEHARA	08	BELL	$\gamma\gamma \to \eta_c \to 2(\pi^+\pi^-)$

[31] Calculated by us from the value reported in ABDALLAH 03J, which uses $B(\eta_c \to \pi^+\pi^- K^+ K^-) = (2.0 \pm 0.7)\%$. NODE=M026G;LINKAGE=CC

[32] Calculated by us from the value reported in ABDALLAH 03J, which uses $B(\eta_c \to) 2(K^+ K^-) = (2.1 \pm 1.2)\%$. NODE=M026G;LINKAGE=DD

[33] Incudes all topological modes except $\eta_c \to \phi\phi$. NODE=M026G;LINKAGE=EE

$\eta_c(1S)$ REFERENCES

NODE=M026

YOUR PAPER	UEHARA	08	EPJ C53 1	S. Uehara *et al.*	(BELLE Collab.)
	ABE	07	PRL 98 082001	K. Abe *et al.*	(BELLE Collab.)
	AUBERT	06E	PRL 96 052002	B. Aubert *et al.*	(BABAR Collab.)
	WU	06	PRL 97 162003	C.-H. Wu *et al.*	(BELLE Collab.)
	ABE	04G	PR D70 071102	K. Abe *et al.*	(BELLE Collab.)
	ASNER	04	PRL 92 142001	D.M. Asner *et al.*	(CLEO Collab.)
	AUBERT	04D	PRL 92 142002	B. Aubert *et al.*	(BABAR Collab.)
	ABDALLAH	03J	EPJ C31 481	J. Abdallah *et al.*	(DELPHI Collab.)
	AMBROGIANI	03	PL B566 45	M. Ambrogiani *et al.*	(FNAL E835 Collab.)
	BAI	03	PL B555 174	J.Z. Bai *et al.*	(BES Collab.)
	FANG	03	PRL 90 071801	F. Fang *et al.*	(BELLE Collab.)
	ABE,K	02	PRL 89 142001	K. Abe *et al.*	(BELLE Collab.)
	BAI	00F	PR D62 072001	J.Z. Bai *et al.*	(BES Collab.)
	BRANDENB...	00B	PRL 85 3095	G. Brandenburg *et al.*	(CLEO Collab.)
	BAI	99B	PR D60 072001	J.Z. Bai *et al.*	(BES Collab.)
	ABREU	98O	PL B441 479	P. Abreu *et al.*	(DELPHI Collab.)
	ARMSTRONG	95F	PR D52 4839	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)
	ALBRECHT	94H	PL B338 390	H. Albrecht *et al.*	(ARGUS Collab.)
	BISELLO	91	NP B350 1	D. Bisello *et al.*	(DM2 Collab.)
	BAI	90B	PRL 65 1309	Z. Bai *et al.*	(Mark III Collab.)
	BAGLIN	87B	PL B187 191	C. Baglin *et al.*	(R704 Collab.)
	BALTRUSAIT...	86	PR D33 629	R.M. Baltrusaitis *et al.*	(Mark III Collab.)
	GAISER	86	PR D34 711	J. Gaiser *et al.*	(Crystal Ball Collab.)
	BALTRUSAIT...	84	PRL 52 2126	R.M. Baltrusaitis *et al.*	(CIT, UCSC+) JP
	HIMEL	80B	PRL 45 1146	T.M. Himel *et al.*	(SLAC, LBL, UCB)
	PARTRIDGE	80B	PRL 45 1150	R. Partridge *et al.*	(CIT, HARV, PRIN+)

REFID=52064 REFID=51627 REFID=51059 REFID=51472 REFID=50182 REFID=49745 REFID=49746 REFID=49625 REFID=49465 REFID=49185 REFID=49206 REFID=49188 REFID=48546 REFID=48553 REFID=47385 REFID=46553 REFID=44623 REFID=44098 REFID=41668 REFID=41354 REFID=40018 REFID=22009 REFID=22012 REFID=22006 REFID=22003 REFID=22004

NODE=M056

$\chi_{c0}(1P)$

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

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

NODE=M056205

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
3414.75± 0.31 OUR AVERAGE					
YOUR DATA 3414.2 ± 0.5 ±2.3	5.4k	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to$ hadrons
3406 ± 7 ±6	230	[1] ABE	07	BELL	$e^+e^- \to J/\psi(c\overline{c})$
3414.21± 0.39±0.27		ABLIKIM	05G	BES2	$\psi(2S) \to \gamma\chi_{c0}$
3414.7 $^{+0.7}_{-0.6}$ ±0.2		[2] ANDREOTTI	03	E835	$\overline{p}p \to \chi_{c0} \to \pi^0\pi^0$
3415.5 ± 0.4 ±0.4	392	[3] BAGNASCO	02	E835	$\overline{p}p \to \chi_{c0} \to J/\psi\gamma$
3417.4 $^{+1.8}_{-1.9}$ ±0.2		[2] AMBROGIANI	99B	E835	$\overline{p}p \to e^+e^-\gamma$
3414.1 ± 0.6 ±0.8		BAI	99B	BES	$\psi(2S) \to \gamma$X
3417.8 ± 0.4 ±4		[2] GAISER	86	CBAL	$\psi(2S) \to \gamma$X
3416 ± 3 ±4		[4] TANENBAUM	78	MRK1	e^+e^-

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

3416.5 ± 3.0	EISENSTEIN	01	CLE2	$e^+e^- \to e^+e^-\chi_{c0}$	
3422 ±10	[4] BARTEL	78B	CNTR	$e^+e^- \to J/\psi 2\gamma$	
3415 ± 9	[4] BIDDICK	77	CNTR	$e^+e^- \to \gamma X$	

[1] From a fit of the J/ψ recoil mass spectrum. Supersedes ABE,K 02 and ABE 04G. NODE=M056M;LINKAGE=EB
[2] Using mass of $\psi(2S) = 3686.0$ MeV. NODE=M056M;LINKAGE=C
[3] Recalculated by ANDREOTTI 05A, using the value of $\psi(2S)$ mass from AULCHENKO 03. NODE=M056M;LINKAGE=NW
[4] Mass value shifted by us by amount appropriate for $\psi(2S)$ mass = 3686 MeV and $J/\psi(1S)$ mass = 3097 MeV. NODE=M056M;LINKAGE=D

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

NODE=M056210

NODE=M056W

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
10.5±0.8 OUR AVERAGE Error includes scale factor of 1.1.					
YOUR DATA 10.6±1.9±2.6	5.4k	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to$ hadrons
$12.6^{+1.5}_{-1.6}{}^{+0.9}_{-1.1}$		ABLIKIM	05G	BES2	$\psi(2S) \to \gamma\chi_{c0}$
$8.6^{+1.7}_{-1.3}$±0.1		ANDREOTTI	03	E835	$\overline{p}p \to \chi_{c0} \to \pi^0\pi^0$
9.7±1.0	392	[5] BAGNASCO	02	E835	$\overline{p}p \to \chi_{c0} \to J/\psi\gamma$
$16.6^{+5.2}_{-3.7}$±0.1		AMBROGIANI	99B	E835	$\overline{p}p \to e^+e^-\gamma$
14.3±2.0±3.0		BAI	98I	BES	$\psi(2S) \to \gamma\pi^+\pi^-$
13.5±3.3±4.2		GAISER	86	CBAL	$\psi(2S) \to \gamma X, \gamma\pi^0\pi^0$

[5] Recalculated by ANDREOTTI 05A. NODE=M056W;LINKAGE=AN

$\chi_{c0}(1P)$ PARTIAL WIDTHS

NODE=M056217

$\chi_{c0}(1P)$ Γ(i)Γ($\gamma\gamma$)/Γ(total)

NODE=M056224

$\Gamma(2(\pi^+\pi^-)) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_1\Gamma_{52}/\Gamma$

NODE=M056G2

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
49 ±10 OUR AVERAGE Error includes scale factor of 1.8.					
YOUR DATA 44.7± 3.6±4.9	3.6k	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to 2(\pi^+\pi^-)$
75 ±13 ±8		EISENSTEIN	01	CLE2	$e^+e^- \to e^+e^-\chi_{c0}$

NODE=M056G2

$\Gamma(\rho\rho) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_2\Gamma_{52}/\Gamma$

NODE=M056G07

VALUE (eV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
YOUR DATA <12	90	<252	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to 2(\pi^+\pi^-)$

NODE=M056G07

$\Gamma(\pi^+\pi^-K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_4\Gamma_{52}/\Gamma$

NODE=M056G08

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **38.8±3.7±4.7**	1.7k	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to K^+K^-\pi^+\pi^-$

NODE=M056G08

$\Gamma(K^0K^+\pi^- + c.c.) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{33}\Gamma_{52}/\Gamma$

NODE=M056G09

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **16.7±6.1±3.0**	495 ± 182	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to K^+K^-\pi^+\pi^-$

NODE=M056G09

$\Gamma(K^*(892)^0\overline{K}^*(892)^0) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{18}\Gamma_{52}/\Gamma$

NODE=M056G10

VALUE (eV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
YOUR DATA <6	90	<148	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to K^+K^-\pi^+\pi^-$

NODE=M056G10

$\Gamma(K^+K^-K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{37}\Gamma_{52}/\Gamma$

NODE=M056G11

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **7.9±1.3±1.1**	215 ± 36	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to 2(K^+K^-)$

NODE=M056G11

$\Gamma(\phi\phi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{40}\Gamma_{52}/\Gamma$

NODE=M056G12

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **2.3±0.9±0.4**	23.6 ± 9.6	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to 2(K^+K^-)$

NODE=M056G12

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

NODE=M056

YOUR PAPER	UEHARA	08	EPJ C53 1	S. Uehara *et al.*	(BELLE Collab.)	REFID=52064
	ABE	07	PRL 98 082001	K. Abe *et al.*	(BELLE Collab.)	REFID=51627
	ABLIKIM	05G	PR D71 092002	M. Ablikim *et al.*	(BES Collab.)	REFID=50756
	ANDREOTTI	05A	NP B717 34	M. Andreotti *et al.*	(FNAL E835 Collab.)	REFID=50769
	ABE	04G	PR D70 071102	K. Abe *et al.*	(BELLE Collab.)	REFID=50182
	ANDREOTTI	03	PRL 91 091801	M. Andreotti *et al.*	(FNAL E835 Collab.)	REFID=49578
	AULCHENKO	03	PL B573 63	V.M. Aulchenko *et al.*	(KEDR Collab.)	REFID=49579
	ABE,K	02	PRL 89 142001	K. Abe *et al.*	(BELLE Collab.)	REFID=49188
	BAGNASCO	02	PL B533 237	S. Bagnasco *et al.*	(FNAL E835 Collab.)	REFID=48833
	EISENSTEIN	01	PRL 87 061801	B.I. Eisenstein *et al.*	(CLEO Collab.)	REFID=48344
	AMBROGIANI	99B	PRL 83 2902	M. Ambrogiani *et al.*	(FNAL E835 Collab.)	REFID=47389
	BAI	99B	PR D60 072001	J.Z. Bai *et al.*	(BES Collab.)	REFID=47385
	BAI	98I	PRL 81 3091	J.Z. Bai *et al.*	(BES Collab.)	REFID=46343
	GAISER	86	PR D34 711	J. Gaiser *et al.*	(Crystal Ball Collab.)	REFID=22012
	BARTEL	78B	PL 79B 492	W. Bartel *et al.*	(DESY, HEIDP)	REFID=22111
	TANENBAUM	78	PR D17 1731	W.M. Tanenbaum *et al.*	(SLAC, LBL)	REFID=22112
	Also		Private Comm.	G. Trilling	(LBL, UCB)	REFID=22113
	BIDDICK	77	PRL 38 1324	C.J. Biddick *et al.*	(UCSD, UMD, PAVI+)	REFID=22059

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

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

NODE=M057205

NODE=M057M

VALUE (MeV)			*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
3556.20 ± 0.09 OUR AVERAGE							
YOUR DATA 3555.3	± 0.6	±2.2	2.5k	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to$ hadrons
3555.70	± 0.59	±0.39		ABLIKIM	05G	BES2	$\psi(2S) \to \gamma\chi_{c2}$
3556.173	± 0.123	±0.020		ANDREOTTI	05A	E835	$p\bar{p} \to e^+e^-\gamma$
3559.9	± 2.9			EISENSTEIN	01	CLE2	$e^+e^- \to e^+e^-\chi_{c2}$
3556.4	± 0.7			BAI	99B	BES	$\psi(2S) \to \gamma$X
3556.22	± 0.131	±0.020	585	[1] ARMSTRONG	92	E760	$\bar{p}p \to e^+e^-\gamma$
3556.9	± 0.4	±0.5	50	BAGLIN	86B	SPEC	$\bar{p}p \to e^+e^-$X
3557.8	± 0.2	±4		[2] GAISER	86	CBAL	$\psi(2S) \to \gamma$X
3553.4	± 2.2		66	[3] LEMOIGNE	82	GOLI	185 π^-Be $\to \gamma\mu^+\mu^-$A
3555.9	± 0.7			[4] OREGLIA	82	CBAL	$e^+e^- \to J/\psi 2\gamma$
3557	± 1.5		69	[5] HIMEL	80	MRK2	$e^+e^- \to J/\psi 2\gamma$
3551	±11		15	BRANDELIK	79B	DASP	$e^+e^- \to J/\psi 2\gamma$
3553	± 4			[5] BARTEL	78B	CNTR	$e^+e^- \to J/\psi 2\gamma$
3553	± 4	±4		[5,6] TANENBAUM	78	MRK1	e^+e^-
3563	± 7		360	[5] BIDDICK	77	CNTR	$e^+e^- \to \gamma$X
• • • We do not use the following data for averages, fits, limits, etc. • • •							
3543	±10		4	WHITAKER	76	MRK1	$e^+e^- \to J/\psi 2\gamma$

[1] Recalculated by ANDREOTTI 05A, using the value of $\psi(2S)$ mass from AULCHENKO 03. NODE=M057M;LINKAGE=NW

[2] Using mass of $\psi(2S) = 3686.0$ MeV. NODE=M057M;LINKAGE=C

[3] $J/\psi(1S)$ mass constrained to 3097 MeV. NODE=M057M;LINKAGE=P

[4] Assuming $\psi(2S)$ mass = 3686 MeV and $J/\psi(1S)$ mass = 3097 MeV. NODE=M057M;LINKAGE=E

[5] Mass value shifted by us by amount appropriate for $\psi(2S)$ mass = 3686 MeV and $J/\psi(1S)$ mass = 3097 MeV. NODE=M057M;LINKAGE=D

[6] From a simultaneous fit to radiative and hadronic decay channels. NODE=M057M;LINKAGE=M

$\chi_{c2}(1P)$ PARTIAL WIDTHS

NODE=M057220

$\chi_{c2}(1P)$ Γ(i)Γ(γγ)/Γ(total)

NODE=M057224

$\Gamma(2(\pi^+\pi^-)) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ **$\Gamma_1\Gamma_{38}/\Gamma$**

NODE=M057G3

VALUE (eV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
5.2 ±0.7 OUR AVERAGE					
YOUR DATA 5.01±0.44±0.55	1597±138	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to 2(\pi^+\pi^-)$
6.4 ±1.8 ±0.8		EISENSTEIN	01	CLE2	$e^+e^- \to e^+e^-\chi_{c2}$

NODE=M057G3

$\Gamma(\rho^0\pi^+\pi^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ **$\Gamma_{10}\Gamma_{38}/\Gamma$**

NODE=M057G07

VALUE (eV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA **3.2±1.9±0.5**	986 ± 578	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to 2(\pi^+\pi^-)$

NODE=M057G07

$\Gamma(\rho\rho) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_2\Gamma_{38}/\Gamma$

NODE=M057G08
NODE=M057G08

VALUE (eV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
YOUR DATA <7.8	90	<598	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to 2(\pi^+\pi^-)$

$\Gamma(\pi^+\pi^- K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_3\Gamma_{38}/\Gamma$

NODE=M057G09
NODE=M057G09

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **4.42±0.42±0.53**	780 ± 74	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to K^+K^-\pi^+\pi^-$

$\Gamma(K^*(892)^0\overline{K}^*(892)^0) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_6\Gamma_{38}/\Gamma$

NODE=M057G10
NODE=M057G10

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **0.8±0.17±0.27**	151 ± 30	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to K^+K^-\pi^+\pi^-$

$\Gamma(K^+K^-K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{24}\Gamma_{38}/\Gamma$

NODE=M057G11
NODE=M057G11

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **1.10±0.21±0.15**	126 ± 24	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to 2(K^+K^-)$

$\Gamma(\phi\phi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_7\Gamma_{38}/\Gamma$

NODE=M057G12
NODE=M057G12

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **0.58±0.18±0.16**	26.5 ± 8.1	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to 2(K^+K^-)$

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

NODE=M057

YOUR PAPER	UEHARA	08	EPJ C53 1	S. Uehara *et al.*	(BELLE Collab.)
	ABLIKIM	05G	PR D71 092002	M. Ablikim *et al.*	(BES Collab.)
	ANDREOTTI	05A	NP B717 34	M. Andreotti *et al.*	(FNAL E835 Collab.)
	AULCHENKO	03	PL B573 63	V.M. Aulchenko *et al.*	(KEDR Collab.)
	EISENSTEIN	01	PRL 87 061801	B.I. Eisenstein *et al.*	(CLEO Collab.)
	BAI	99B	PR D60 072001	J.Z. Bai *et al.*	(BES Collab.)
	ARMSTRONG	92	NP B373 35	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)
	Also		PRL 68 1468	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)
	BAGLIN	86B	PL B172 455	C. Baglin	(LAPP, CERN, GENO, LYON, OSLO+)
	GAISER	86	PR D34 711	J. Gaiser *et al.*	(Crystal Ball Collab.)
	LEMOIGNE	82	PL 113B 509	Y. Lemoigne *et al.*	(SACL, LOIC, SHMP+)
	OREGLIA	82	PR D25 2259	M.J. Oreglia *et al.*	(SLAC, CIT, HARV+)
	Also		Private Comm.	M.J. Oreglia	(EFI)
	HIMEL	80	PRL 44 920	T. Himel *et al.*	(LBL, SLAC)
	Also		Private Comm.	G. Trilling	(LBL, UCB)
	BRANDELIK	79B	NP B160 426	R. Brandelik *et al.*	(DASP Collab.)
	BARTEL	78B	PL 79B 492	W. Bartel *et al.*	(DESY, HEIDP)
	TANENBAUM	78	PR D17 1731	W.M. Tanenbaum *et al.*	(SLAC, LBL)
	Also		Private Comm.	G. Trilling	(LBL, UCB)
	BIDDICK	77	PRL 38 1324	C.J. Biddick *et al.*	(UCSD, UMD, PAVI+)
	WHITAKER	76	PRL 37 1596	J.S. Whitaker *et al.*	(SLAC, LBL)

REFID=52064
REFID=50756
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REFID=22119
REFID=22113
REFID=22115
REFID=22111
REFID=22112
REFID=22113
REFID=22059
REFID=22151

NODE=M059

$\eta_c(2S)$

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

Quantum numbers are quark model predictions.

NODE=M059

$\eta_c(2S)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(total)$

NODE=M059218

$\Gamma(2\pi^+2\pi^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_3\Gamma_7/\Gamma$

NODE=M059G01
NODE=M059G01

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA **<6.5**	90	UEHARA	08	BELL	$\gamma\gamma \to \eta_c(2S) \to 2(\pi^+\pi^-)$

$\Gamma(K^+K^-\pi^+\pi^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_4\Gamma_7/\Gamma$

NODE=M059G02
NODE=M059G02

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA **<5.0**	90	UEHARA	08	BELL	$\gamma\gamma \to \eta_c(2S) \to K^+K^-\pi^+\pi^-$

$\Gamma(2K^+2K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_5\Gamma_7/\Gamma$

NODE=M059G03
NODE=M059G03

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA **<2.9**	90	UEHARA	08	BELL	$\gamma\gamma \to \eta_c(2S) \to 2(K^+K^-)$

$\eta_c(2S)$ BRANCHING RATIOS

NODE=M059220

$\Gamma(2\pi^+2\pi^-)/\Gamma_{total}$ Γ_3/Γ

NODE=M059R01
NODE=M059R01

VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA **not seen**	UEHARA	08	BELL	$\gamma\gamma \to \eta_c(2S)$

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

NODE=M059R02
NODE=M059R02

VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA **not seen**	UEHARA	08	BELL	$\gamma\gamma \to \eta_c(2S)$

$\Gamma(2K^+2K^-)/\Gamma_{total}$ Γ_5/Γ

NODE=M059R03
NODE=M059R03

VALUE	DOCUMENT ID		TECN	COMMENT
YOUR DATA **not seen**	UEHARA	08	BELL	$\gamma\gamma \to \eta_c(2S)$

$\eta_c(2S)$ REFERENCES

NODE=M059

YOUR PAPER UEHARA 08 EPJ C53 1 S. Uehara *et al.* (BELLE Collab.) REFID=52064

Reference = TAJIMA 07A; PRL 99 211601
Verifier code = BELLE

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

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tom Browder

EMAIL: teb@phys.hawaii.edu

April 10, 2008

Dear Colleague,

The attached sheets from the "Review of Particle Physics" Particle Listings contain information from your experiment that was recently added to our database. There may be other papers that we have not yet added; please inform us of any such journal papers if they have been accepted for publication. You are the *only* author of this paper to whom this request is being sent, so please forward this to another author if appropriate.

We ask you to check the information marked "YOUR DATA" and "YOUR PAPER," note any necessary changes, and return the corrected sheets to us. In particular:

(1) Return the sheets to us *even if no change is needed*, marking them in that case "OK."

(2) Please feel free to comment on our treatment of other data listed on these sheets. We appreciate suggestions for improvements.

(3) You may respond by electronic mail, but then be sure to include the "Reference" above and the **NAME** of the particle, the **PROPERTY**, and the **PROPERTY NODE** on which you are commenting. (The "**PROPERTY NODE**" is the code given on the right-hand side of the data, *e.g.,* "`NODE=S043M`.")

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

Sincerely,

Michael Doser
CERN, European Organization for Nuclear Rese
CH-1211 Genève 23
Switzerland

PHONE: 41-(22)-767–6552
FAX: 41-(22)-767–8955
EMAIL: michael.doser@cern.ch

$b\overline{b}$ MESONS

NODE=MXXX030

NODE=M047

$\Upsilon(4S)$ or $\Upsilon(10580)$

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

$\Upsilon(4S)$ BRANCHING RATIOS

NODE=M047230

$B\overline{B}$ DECAYS

NODE=M047BBD

NODE=M047BBD

The ratio of branching fraction to charged and neutral B mesons is often derived assuming isospin invariance in the decays, and relies on the knowledge of the B^+/B^0 lifetime ratio. "OUR EVALUATION" is obtained based on averages of rescaled data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account the common dependence of the measurement on the value of the lifetime ratio.

$\Gamma(J/\psi K^0_S(J/\psi, \eta_c)K^0_S)/\Gamma_{total}$ **Γ_5/Γ**

NODE=M047R16

Forbidden by CP invariance.

NODE=M047R16

NODE=M047R16

	VALUE (units 10^{-7})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
YOUR DATA	**<4**	90	[10] TAJIMA	07A	BELL	$\Upsilon(4S) \rightarrow B^0\overline{B}^0$

[10] $\Upsilon(4S)$ with $CP = +1$ decays to the final state with $CP = -1$.

NODE=M047R16;LINKAGE=TA

$\Upsilon(4S)$ REFERENCES

NODE=M047

YOUR PAPER TAJIMA 07A PRL 99 211601 O. Tajima *et al.* (BELLE Collab.)

REFID=52066

Reference = PAKHLOVA 08; PR D77 011103R
Verifier code = BELLE

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Sincerely,

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Switzerland

PHONE: 41-(22)-767–6552
FAX: 41-(22)-767–8955
EMAIL: michael.doser@cern.ch

$c\overline{c}$ MESONS

NODE=MXXX025

$\psi(3770)$

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

NODE=M053

$\psi(3770)$ BRANCHING RATIOS

NODE=M053230

$\Gamma(D^0\overline{D}^0)/\Gamma(D^+D^-)$ **Γ_2/Γ_3**

NODE=M053R5
NODE=M053R5

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.260±0.021 OUR AVERAGE					
YOUR DATA 1.39 ±0.31 ±0.12		PAKHLOVA	08	BELL	10.6 $e^+e^- \to D\overline{D}\gamma$
1.78 ±0.33 ±0.24		AUBERT	07BE	BABR	$e^+e^- \to D\overline{D}\gamma$
1.258±0.016±0.014		DOBBS	07	CLEO	$e^+e^- \to D\overline{D}$
1.27 ±0.12 ±0.08		ABLIKIM	06L	BES2	$e^+e^- \to D\overline{D}$
2.43 ±1.50 ±0.43	34	[11] CHISTOV	04	BELL	$B^+ \to \psi(3770)K^+$

[11] See ADLER 88C for older measurements of this quantity.

NODE=M053R5;LINKAGE=CH

$\psi(3770)$ REFERENCES

NODE=M053

YOUR PAPER	PAKHLOVA	08	PR D77 011103R	G. Pakhlova *et al.*	(BELLE Collab.)	REFID=52132
	AUBERT	07BE	PR D76 111105R	B. Aubert *et al.*	(BABAR Collab.)	REFID=52074
	DOBBS	07	PR D76 112001	S. Dobbs *et al.*	(CLEO Collab.)	REFID=52075
	ABLIKIM	06L	PRL 97 121801	M. Ablikim *et al.*	(BES Collab.)	REFID=51129
	CHISTOV	04	PRL 93 051803	R. Chistov *et al.*	(BELLE Collab.)	REFID=50002
	ADLER	88C	PRL 60 89	J. Adler *et al.*	(Mark III Collab.)	REFID=40361

Reference = BALAGURA 08; PR D77 032001R
Verifier code = BELLE

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

NODE=MXXX040

$D_s^+ = c\overline{s}$, $D_s^- = \overline{c}s$, similarly for D_s^*'s

NODE=MXXX040

NODE=M121

$D_{s1}(2536)^\pm$

$I(J^P) = 0(1^+)$
J, P need confirmation.

Seen in $D^*(2010)^+ K^0$ and $D_s^+ \pi^+ \pi^-$. Not seen in $D^+ K^0$ or $D^0 K^+$. $J^P = 1^+$ assignment strongly favored.

NODE=M121

$D_{s1}(2536)^+$ BRANCHING RATIOS

NODE=M121220

$\Gamma((D^*(2010)^+ K^0)_{S-wave})/\Gamma(D^*(2010)^+ K^0)$ **Γ_2/Γ_1**

NODE=M121R8
NODE=M121R8

	VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**0.72±0.05±0.01**	5485	BALAGURA	08	BELL	10.6 $e^+ e^-$ → hadrons

$\Gamma(D^+ \pi^- K^+)/\Gamma(D^*(2010)^+ K^0)$ **Γ_4/Γ_1**

NODE=M121R9
NODE=M121R9

	VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**3.27±0.18±0.37**	1264	BALAGURA	08	BELL	10.6 $e^+ e^-$ → hadrons

$D_{s1}(2536)^\pm$ REFERENCES

NODE=M121

YOUR PAPER BALAGURA 08 PR D77 032001R V. Balagura *et al.* (BELLE Collab.) REFID=52133

Reference = PAKHLOVA 08A; PRL 100 062001
Verifier code = BELLE

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$c\bar{c}$ MESONS

NODE=MXXX025

NODE=M073

$\psi(4415)$

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

$\psi(4415)$ MASS

NODE=M073205

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
4421 ± 4 OUR ESTIMATE					
4413 ± 5 OUR AVERAGE					
4415.1 ± 7.9	[1]	ABLIKIM	08D	BES2	$e^+e^- \to$ hadrons
YOUR DATA 4411 ± 7		PAKHLOVA	08A	BELL	$e^+e^- \to D^0D^-\pi^+$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4425 ± 6	[2]	SETH	05A	RVUE	$e^+e^- \to$ hadrons
4429 ± 9	[3]	SETH	05A	RVUE	$e^+e^- \to$ hadrons
4417 ±10		BRANDELIK	78C	DASP	e^+e^-
4414 ± 7		SIEGRIST	76	MRK1	e^+e^-

NODE=M073M
→ NOT CHECKED ←
OCCUR=2

[1] Reanalysis of data presented in BAI 02C. From a global fit over the center-of-mass energy region 3.7–5.0 GeV covering the $\psi(3770)$, $\psi(4040)$, $\psi(4160)$, and $\psi(4415)$ resonances. Phase angle fixed in the fit to $\delta = (234 \pm 88)^\circ$.
NODE=M073M;LINKAGE=AB

[2] From a fit to Crystal Ball (OSTERHELD 86) data.
NODE=M073M;LINKAGE=ST

[3] From a fit to BES (BAI 02C) data.
NODE=M073M;LINKAGE=SE

$\psi(4415)$ WIDTH

NODE=M073210

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
62 ±20 OUR ESTIMATE					
74 ±14 OUR AVERAGE					
71.5±19.0	[4]	ABLIKIM	08D	BES2	$e^+e^- \to$ hadrons
YOUR DATA 77 ±20		PAKHLOVA	08A	BELL	$e^+e^- \to D^0D^-\pi^+$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
119 ±16	[5]	SETH	05A	RVUE	$e^+e^- \to$ hadrons
118 ±35	[6]	SETH	05A	RVUE	$e^+e^- \to$ hadrons
66 ±15		BRANDELIK	78C	DASP	e^+e^-
33 ±10		SIEGRIST	76	MRK1	e^+e^-

NODE=M073W
→ NOT CHECKED ←
OCCUR=2

[4] Reanalysis of data presented in BAI 02C. From a global fit over the center-of-mass energy region 3.7–5.0 GeV covering the $\psi(3770)$, $\psi(4040)$, $\psi(4160)$, and $\psi(4415)$ resonances. Phase angle fixed in the fit to $\delta = (234 \pm 88)^\circ$.
NODE=M073W;LINKAGE=AB

[5] From a fit to Crystal Ball (OSTERHELD 86) data.
NODE=M073W;LINKAGE=ST

[6] From a fit to BES (BAI 02C) data.
NODE=M073W;LINKAGE=SE

$\psi(4415)$ BRANCHING RATIOS

NODE=M073225

$\Gamma(D^0\overline{D}_2^*(2460)^0 \to D^0D^-\pi^+)/\Gamma_{total}$ **Γ_4/Γ**

NODE=M073R3

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
YOUR DATA **10.5±2.4±3.8**	[10] PAKHLOVA	08A	BELL	$e^+e^- \to D^0D^-\pi^+$

NODE=M073R3
NODE=M073R3

[10] Using 4421 ± 4 MeV for the mass and 62 ± 20 MeV for the width of $\psi(4415)$.
NODE=M073R3;LINKAGE=PA

$\Gamma((D^0D^-\pi^+)_{non-res})/\Gamma(D^0\overline{D}_2^*(2460)^0 \to D^0D^-\pi^+)$ **Γ_3/Γ_4**

NODE=M073R4

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA **<0.22**	90	[11] PAKHLOVA	08A	BELL	$e^+e^- \to D^0D^-\pi^+$

NODE=M073R4
NODE=M073R4

[11] Using 4421 ± 4 MeV for the mass and 62 ± 20 MeV for the width of $\psi(4415)$.
NODE=M073R4;LINKAGE=PA

$\psi(4415)$ REFERENCES

NODE=M073

ABLIKIM	08D	PL B660 315	M. Ablikim *et al.*	(BES Collab.)	REFID=52142
YOUR PAPER PAKHLOVA	08A	PRL 100 062001	G. Pakhlova *et al.*	(BELLE Collab.)	REFID=52134
SETH	05A	PR D72 017501	K.K. Seth		REFID=50813
BAI	02C	PRL 88 101802	J.Z. Bai *et al.*	(BES Collab.)	REFID=50506
OSTERHELD	86	SLAC-PUB-4160	A. Osterheld *et al.*	(SLAC Crystal Ball Collab.)	REFID=51064
BRANDELIK	78C	PL 76B 361	R. Brandelik *et al.*	(DASP Collab.)	REFID=22232
SIEGRIST	76	PRL 36 700	J.L. Siegrist *et al.*	(LBL, SLAC)	REFID=22243

Reference = YUAN 08; PR D77 011105R
Verifier code = BELLE

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$c\bar{c}$ MESONS

NODE=MXXX025

$X(4260)$

NODE=M074

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

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 $B^- \to K^-\pi^+\pi^- J/\psi$. See also the mini-review under the $X(3872)$. (See the index for the page number.)

NODE=M074

$X(4260)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(total)$

NODE=M074230

$\Gamma(J/\psi K^+K^-) \times \Gamma(e^+e^-)/\Gamma_{total}$ **$\Gamma_4\Gamma_1/\Gamma$**

NODE=M074G3

VALUE (eV)	*CL%*	*DOCUMENT ID*	*TECN*	*COMMENT*

NODE=M074G3

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

YOUR DATA	<1.2	90	[8] YUAN	08	BELL	$e^+e^- \to \gamma K^+K^- J/\psi$

[8] From a fit of the broad $K^+K^- J/\psi$ enhancement including a coherent $X(4260)$ amplitude with mass and width from YUAN 07.

NODE=M074G3;LINKAGE=YU

$X(4260)$ REFERENCES

NODE=M074

YOUR PAPER	YUAN	08	PR D77 011105R	C.Z. Yuan *et al.*	(BELLE Collab.)	REFID=52135
	YUAN	07	PRL 99 182004	C.Z. Yuan *et al.*	(BELLE Collab.)	REFID=51960
	AUBERT	06	PR D73 011101R	B. Aubert *et al.*	(BABAR Collab.)	REFID=51017
	COAN	06	PRL 96 162003	T.E. Coan *et al.*	(CLEO Collab.)	REFID=51075
	HE	06B	PR D74 091104R	Q. He *et al.*	(CLEO Collab.)	REFID=51523
	AUBERT,B	05I	PRL 95 142001	B. Aubert *et al.*	(BABAR Collab.)	REFID=50776

Reference = BRODZICKA 08; PRL 100 092001
Verifier code = BELLE

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

NODE=MXXX040

$D_s^+ = c\overline{s}$, $D_s^- = \overline{c}s$, similarly for D_s^*'s

NODE=MXXX040

NODE=M182

$D_{s1}(2700)^\pm$

$I(J^P) = 0(1^-)$

OMITTED FROM SUMMARY TABLE

$D_{s1}(2700)^+$ MASS

NODE=M182205

NODE=M182M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
2690±7 OUR AVERAGE Error includes scale factor of 1.4.					
YOUR DATA $2708 \pm 9^{+11}_{-10}$	182	BRODZICKA	08	BELL	$B^+ \to D^0 \overline{D}^0 K^+$
$2688 \pm 4 \pm 3$		AUBERT,BE	06E	BABR	10.6 $e^+e^- \to DKX$

$D_{s1}(2700)^+$ WIDTH

NODE=M182210

NODE=M182W

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
110±27 OUR AVERAGE					
YOUR DATA $108 \pm 23^{+36}_{-31}$	182	BRODZICKA	08	BELL	$B^+ \to D^0 \overline{D}^0 K^+$
$112 \pm 7 \pm 36$		AUBERT,BE	06E	BABR	10.6 $e^+e^- \to DKX$

$D_{s1}(2700)^\pm$ REFERENCES

NODE=M182

YOUR PAPER	BRODZICKA 08	PRL 100 092001	J. Brodzicka *et al.*	(BELLE Collab.)	REFID=52144
	AUBERT,BE 06E	PRL 97 222001	B. Aubert *et al.*	(BABAR Collab.)	REFID=51512

$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M053

$\psi(3770)$

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

$\psi(3770)$ MASS

NODE=M053205

From $m_{\psi(2S)}$ and mass difference below.

NODE=M053205

NODE=M053M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
3775.6 ±1.5 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below.					
3772.0 ±1.9		[1] ABLIKIM	08D	BES2	$e^+e^- \to$ hadrons
3775.5 ±2.5 ±0.4	57	AUBERT	08B	BABR	$B \to D\overline{D}K$
YOUR DATA 3776 ±5 ±4	68	BRODZICKA	08	BELL	$B^+ \to D^0\overline{D}^0K^+$
3778.8 ±1.9 ±0.9		AUBERT	07BE	BABR	$e^+e^- \to D\overline{D}\gamma$
3778.4 ±3.0 ±1.3	34	CHISTOV	04	BELL	$B \to D^0\overline{D}^0K$

[1] Reanalysis of data presented in BAI 02C. From a global fit over the center-of-mass energy region 3.7–5.0 GeV covering the $\psi(3770)$, $\psi(4040)$, $\psi(4160)$, and $\psi(4415)$ resonances. Phase angle fixed in the fit to $\delta = 0^\circ$.

NODE=M053M;LINKAGE=AB

$\psi(3770)$ WIDTH

NODE=M053215

NODE=M053W

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
27.6± 1.0 OUR AVERAGE					
30.4± 8.5		[4] ABLIKIM	08D	BES2	$e^+e^- \to$ hadrons
YOUR DATA 27 ±10 ±5	68	BRODZICKA	08	BELL	$B^+ \to D^0\overline{D}^0K^+$
28.5± 1.2±0.2		ABLIKIM	07E	BES2	$e^+e^- \to$ hadrons

23.5± 3.7±0.9	AUBERT	07BE	BABR	$e^+e^- \to D\overline{D}\gamma$	
26.9± 2.4±0.3	ABLIKIM	06L	BES2	$e^+e^- \to$ hadrons	
24 ± 5	SCHINDLER	80	MRK2	e^+e^-	
24 ± 5	BACINO	78	DLCO	e^+e^-	
28 ± 5	RAPIDIS	77	LGW	e^+e^-	

[4] Reanalysis of data presented in BAI 02C. From a global fit over the center-of-mass energy region 3.7–5.0 GeV covering the $\psi(3770)$, $\psi(4040)$, $\psi(4160)$, and $\psi(4415)$ resonances. Phase angle fixed in the fit to $\delta = 0^\circ$.

NODE=M053W;LINKAGE=AB

$\psi(3770)$ REFERENCES

NODE=M053

	ABLIKIM	08D	PL B660 315	M. Ablikim *et al.*	(BES Collab.)	REFID=52142
	AUBERT	08B	PR D77 011102R	B. Aubert *et al.*	(BABAR Collab.)	REFID=52120
YOUR PAPER	BRODZICKA	08	PRL 100 092001	J. Brodzicka *et al.*	(BELLE Collab.)	REFID=52144
	ABLIKIM	07E	PL B652 238	M. Ablikim *et al.*	(BES Collab.)	REFID=51882
	AUBERT	07BE	PR D76 111105R	B. Aubert *et al.*	(BABAR Collab.)	REFID=52074
	ABLIKIM	06L	PRL 97 121801	M. Ablikim *et al.*	(BES Collab.)	REFID=51129
	CHISTOV	04	PRL 93 051803	R. Chistov *et al.*	(BELLE Collab.)	REFID=50002
	BAI	02C	PRL 88 101802	J.Z. Bai *et al.*	(BES Collab.)	REFID=50506
	SCHINDLER	80	PR D21 2716	R.H. Schindler *et al.*	(Mark II Collab.)	REFID=22222
	BACINO	78	PRL 40 671	W.J. Bacino *et al.*	(SLAC, UCLA, UCI)	REFID=11437
	RAPIDIS	77	PRL 39 526	P.A. Rapidis *et al.*	(LGW Collab.)	REFID=22220

Reference = CHEN 08; PRL 100 112001
Verifier code = BELLE

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PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Tom Browder

EMAIL: teb@phys.hawaii.edu

April 10, 2008

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

Sincerely,

Michael Doser
CERN, European Organization for Nuclear Rese
CH-1211 Genève 23
Switzerland

PHONE: 41-(22)-767–6552
FAX: 41-(22)-767–8955
EMAIL: michael.doser@cern.ch

$b\bar{b}$ MESONS

NODE=MXXX030

$\Upsilon(10860)$

NODE=M092

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

$\Upsilon(10860)$ BRANCHING RATIOS

NODE=M092230

$\Gamma(\Upsilon(1S)\pi^+\pi^-)/\Gamma_{total}$ **Γ_{13}/Γ**

NODE=M092R20
NODE=M092R20

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**5.3±0.3±0.5**	325	[6] CHEN	08	BELL	10.87 $e^+e^- \to \Upsilon(1S)\pi^+\pi^-$

$\Gamma(\Upsilon(2S)\pi^+\pi^-)/\Gamma_{total}$ **Γ_{14}/Γ**

NODE=M092R21
NODE=M092R21

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**7.8±0.6±1.1**	186	[6] CHEN	08	BELL	10.87 $e^+e^- \to \Upsilon(2S)\pi^+\pi^-$

$\Gamma(\Upsilon(3S)\pi^+\pi^-)/\Gamma_{total}$ **Γ_{15}/Γ**

NODE=M092R22
NODE=M092R22

	VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$4.8^{+1.8}_{-1.5}\pm0.7$**	10	[6] CHEN	08	BELL	10.87 $e^+e^- \to \Upsilon(3S)\pi^+\pi^-$

$\Gamma(\Upsilon(1S)K^+K^-)/\Gamma_{total}$ **Γ_{16}/Γ**

NODE=M092R23
NODE=M092R23

	VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA	**$6.1^{+1.6}_{-1.4}\pm1.0$**	20	[6] CHEN	08	BELL	10.87 $e^+e^- \to \Upsilon(1S)K^+K^-$

[6] Assuming that the observed events are solely due to the $\Upsilon(5S)$ resonance.

NODE=M092R20;LINKAGE=CH

$\Upsilon(10860)$ REFERENCES

NODE=M092

YOUR PAPER CHEN 08 PRL 100 112001 K.-F. Chen *et al.* (BELLE Collab.)

REFID=52153

Reference = WICHT 08; hep-ex/0608037 (PL B)
Verifier code = BELLE

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EMAIL: michael.doser@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=M002

$\eta'(958)$

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

$\eta'(958)$ BRANCHING RATIOS

NODE=M002230

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

NODE=M002R19
NODE=M002R19

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.97±0.13 OUR AVERAGE					
YOUR DATA $1.99^{+0.31}_{-0.27}\pm0.07$	114	[15] WICHT	08	BELL	$B^\pm \to K^\pm\gamma\gamma$
2.00 ± 0.18		[16] STANTON	80	SPEC	8.45 $\pi^- p \to n\pi^+\pi^- 2\gamma$
$2.5\ \pm0.7$		DUANE	74	MMS	$\pi^- p \to n$MM
1.71 ± 0.33	68	DALPIAZ	72	CNTR	1.6 $\pi^- p \to nX^0$
$2.0\ ^{+0.8}_{-0.6}$	31	HARVEY	71	OSPK	3.65 $\pi^- p \to nX^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.8\ \pm0.2$	6000	[17] APEL	79	NICE	15–40 $\pi^- p \to n2\gamma$

[15] WICHT 08 reports $[B(\eta'(958) \to \gamma\gamma)] \times [B(B^+ \to \eta' K^+)] = (1.40^{+0.16}_{-0.15}{}^{+0.15}_{-0.12}) \times 10^{-6}$. We divide by our best value $B(B^+ \to \eta' K^+) = (7.02 \pm 0.25) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M002R19;LINKAGE=WI

[16] Includes APEL 79 result.

NODE=M002R19;LINKAGE=S

[17] Data is included in STANTON 80 evaluation.

NODE=M002R19;LINKAGE=A

$\eta'(958)$ REFERENCES

NODE=M002

YOUR PAPER	WICHT	08	hep-ex/0608037 (PL B)	J. Wicht *et al.*	(BELLE Collab.)
	STANTON	80	PL B92 353	N.R. Stanton *et al.*	(OSU, CARL, MCGI+)
	APEL	79	PL 83B 131	W.D. Apel, K.H. Augenstein, E. Bertolucci	(KARLK+)
	DUANE	74	PRL 32 425	A. Duane *et al.*	(LOIC, SHMP)
	DALPIAZ	72	PL 42B 377	P.F. Dalpiaz *et al.*	(CERN)
	HARVEY	71	PRL 27 885	E.H. Harvey *et al.*	(MINN, MICH)

REFID=52204
REFID=40294
REFID=20295
REFID=20284
REFID=20278
REFID=20272

$c\overline{c}$ MESONS

NODE=MXXX025

NODE=M026

$\eta_c(1S)$

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

$\eta_c(1S)$ BRANCHING RATIOS

NODE=M026225

RADIATIVE DECAYS

NODE=M026310

$\Gamma(\gamma\gamma)/\Gamma_{total}$ Γ_{28}/Γ

NODE=M026R31
NODE=M026R31

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
YOUR DATA **$2.4\ ^{+1.1}_{-0.8}\ \pm0.3$**		13	[50] WICHT	08	BELL	$B^\pm \to K^\pm\gamma\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$2.80^{+0.67}_{-0.58}\pm1.0$			[51] ARMSTRONG	95F	E760	$\overline{p}p \to \gamma\gamma$
< 9	90		[52] BISELLO	91	DM2	$J/\psi \to \gamma\gamma\gamma$
$6\ ^{+4}_{-3}\ \pm4$			[51] BAGLIN	87B	SPEC	$\overline{p}p \to \gamma\gamma$
<18	90		[53] BLOOM	83	CBAL	$J/\psi \to \eta_c\gamma$

[50] WICHT 08 reports $[B(\eta_c(1S) \to \gamma\gamma)] \times [B(B^+ \to \eta_c K^+)] = (2.2^{+0.9+0.4}_{-0.7-0.2}) \times 10^{-7}$. We divide by our best value $B(B^+ \to \eta_c K^+) = (9.1 \pm 1.3) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026R31;LINKAGE=WI

[51] Not independent from the values of the total and two-photon width quoted by the same experiment.

NODE=M026R31;LINKAGE=AB

[52] The quoted branching ratios use $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 0.0127 \pm 0.0036$. Where relevant, the error in this branching ratio is treated as a common systematic in computing averages.

NODE=M026R31;LINKAGE=E

[53] Using $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 0.0127 \pm 0.0036$.

NODE=M026R31;LINKAGE=C

$\eta_c(1S)$ REFERENCES

NODE=M026

YOUR PAPER	WICHT	08	hep-ex/0608037 (PL B)	J. Wicht *et al.*	(BELLE Collab.)	REFID=52204
	ARMSTRONG	95F	PR D52 4839	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)	REFID=44623
	BISELLO	91	NP B350 1	D. Bisello *et al.*	(DM2 Collab.)	REFID=41668
	BAGLIN	87B	PL B187 191	C. Baglin *et al.*	(R704 Collab.)	REFID=40018
	BLOOM	83	ARNS 33 143	E.D. Bloom, C. Peck	(SLAC, CIT)	REFID=21682

NODE=M070

$J/\psi(1S)$

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

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

NODE=M070230

RADIATIVE DECAYS

NODE=M070310

$\Gamma(\gamma\gamma)/\Gamma_{total}$ **Γ_{152}/Γ**

NODE=M070R80
NODE=M070R80

VALUE (units 10^{-5})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
< 2.2	90	ABLIKIM	07J	BES2	$\Psi(2S) \to J/\psi\pi^+\pi^-$

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

YOUR DATA	<16	90	[126] WICHT	08	BELL	$B^\pm \to K^\pm\gamma\gamma$
	<50	90	BARTEL	77	CNTR	e^+e^-

[126] WICHT 08 reports $[B(J/\psi(1S) \to \gamma\gamma)] \times [B(B^+ \to J/\psi(1S)K^+)] = < 0.16 \times 10^{-6}$. We divide by our best value $B(B^+ \to J/\psi(1S)K^+) = 0.001007$.

NODE=M070R80;LINKAGE=WI

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER	WICHT	08	hep-ex/0608037 (PL B)	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

NODE=M056

$\chi_{c0}(1P)$

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

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

NODE=M056220

RADIATIVE DECAYS

NODE=M056310

$\Gamma(\gamma\gamma)/\Gamma_{total}$ **Γ_{52}/Γ**

NODE=M056R1
NODE=M056R1

VALUE (units 10^{-4})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*

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

YOUR DATA	<8	90	[51] WICHT	08	BELL	$B^\pm \to K^\pm\gamma\gamma$

[51] WICHT 08 reports $[B(\chi_{c0}(1P) \to \gamma\gamma)] \times [B(B^+ \to \chi_{c0}(1P)K^+)] = < 0.11 \times 10^{-6}$. We divide by our best value $B(B^+ \to \chi_{c0}(1P)K^+) = 0.000140$.

NODE=M056R1;LINKAGE=WI

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

NODE=M056

YOUR PAPER	WICHT	08	hep-ex/0608037 (PL B)	J. Wicht *et al.*	(BELLE Collab.)	REFID=52204

NODE=M059

$\eta_c(2S)$

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

Quantum numbers are quark model predictions.

NODE=M059

$\eta_c(2S)$ BRANCHING RATIOS

NODE=M059220

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

NODE=M059R2
NODE=M059R2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
YOUR DATA **<0.0005**	90	[14] WICHT	08	BELL	$B^{\pm} \to K^{\pm}\gamma\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.01	90	LEE	85	CBAL	$\psi' \to$ photons

[14] WICHT 08 reports $[B(\eta_c(2S) \to \gamma\gamma)] \times [B(B^+ \to \eta_c' K^+)] = < 0.18 \times 10^{-6}$. We divide by our best value $B(B^+ \to \eta_c' K^+) = 0.00034$.

NODE=M059R2;LINKAGE=WI

$\eta_c(2S)$ REFERENCES

NODE=M059

YOUR PAPER	WICHT	08	hep-ex/0608037 (PL B)	J. Wicht *et al.*	(BELLE Collab.)	REFID=52204
	LEE	85	SLAC 282	R.A. Lee	(SLAC)	REFID=40589