Reference = ANASHIN 14; PL B738 391
Verifier code = EIDELMAN

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

Simon Eidelman

EMAIL: simon.eidelman@cern.ch

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
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=M026

$\eta_c(1S)$

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

$\eta_c(1S)$ MASS

NODE=M026M

NODE=M026M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT	
	2983.4 ± 0.5 OUR AVERAGE		Error includes scale factor of 1.2.				
	2982.2 ± 1.5 ± 0.1	2.0k	[1] AAIJ	15BI	LHCB	$pp \to \eta_c(1S)X$	
YOUR DATA	2983.5 ± 1.4 $^{+1.6}_{-3.6}$		[2] ANASHIN	14	KEDR	$J/\psi \to \gamma\eta_c$	
	2979.8 ± 0.8 ± 3.5	4.5k	[3,4] LEES	14E	BABR	$\gamma\gamma \to K^+K^-\pi^0$	
	2984.1 ± 1.1 ± 2.1	900	[3,4,5] LEES	14E	BABR	$\gamma\gamma \to K^+K^-\eta$	OCCUR=2
	2984.3 ± 0.6 ± 0.6		[6,7] ABLIKIM	12F	BES3	$\psi(2S) \to \gamma\eta_c$	
	2984.49 ± 1.16 ± 0.52	832	[3] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma$ hadrons	
	2982.7 ± 1.8 ± 2.2	486	ZHANG	12A	BELL	$e^+e^- \to e^+e^-\eta'\pi^+\pi^-$	
	2984.5 ± 0.8 ± 3.1	11k	DEL-AMO-SA...	11M	BABR	$\gamma\gamma \to K^+K^-\pi^+\pi^-\pi^0$	
	2985.4 ± 1.5 $^{+0.5}_{-2.0}$	920	[7] VINOKUROVA	11	BELL	$B^\pm \to K^\pm(K^0_S K^\pm\pi^\mp)$	
	2982.2 ± 0.4 ± 1.6	14k	[8] LEES	10	BABR	10.6 $e^+e^- \to e^+e^-K^0_S K^\pm\pi^\mp$	
	2985.8 ± 1.5 ± 3.1	0.9k	AUBERT	08AB	BABR	$B \to \eta_c(1S)K^{(*)} \to K\overline{K}\pi K^{(*)}$	
	2986.1 ± 1.0 ± 2.5	7.5k	UEHARA	08	BELL	$\gamma\gamma \to \eta_c \to$ hadrons	
	2970 ± 5 ± 6	501	[9] 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	$B^+ \to \Lambda\overline{\Lambda}K^+$	OCCUR=2
	2981.8 ± 1.3 ± 1.5	592	ASNER	04	CLEO	$\gamma\gamma \to \eta_c \to K^0_S K^\pm\pi^\mp$	
	2984.1 ± 2.1 ± 1.0	190	[10] AMBROGIANI	03	E835	$\overline{p}p \to \eta_c \to \gamma\gamma$	
	• • • We do not use the following data for averages, fits, limits, etc. • • •						
	2982.5 ± 0.4 ± 1.4	12k	[11] DEL-AMO-SA...	11M	BABR	$\gamma\gamma \to K^0_S K^\pm\pi^\mp$	OCCUR=2
	2982.2 ± 0.6		[12] MITCHELL	09	CLEO	$e^+e^- \to \gamma X$	
	2982 ± 5	270	[13] AUBERT	06E	BABR	$B^\pm \to K^\pm X_{c\overline{c}}$	
	2982.5 ± 1.1 ± 0.9	2.5k	[14] AUBERT	04D	BABR	$\gamma\gamma \to \eta_c(1S) \to K\overline{K}\pi$	
	2977.5 ± 1.0 ± 1.2		[12,15] BAI	03	BES	$J/\psi \to \gamma\eta_c$	
	2979.6 ± 2.3 ± 1.6	180	[16] FANG	03	BELL	$B \to \eta_c K$	
	2976.3 ± 2.3 ± 1.2		[12,17] BAI	00F	BES	$J/\psi,\ \psi(2S) \to \gamma\eta_c$	
	2976.6 ± 2.9 ± 1.3	140	[12,18] BAI	00F	BES	$J/\psi \to \gamma\eta_c$	OCCUR=2
	2980.4 ± 2.3 ± 0.6		[19] BRANDENB...	00B	CLE2	$\gamma\gamma \to \eta_c \to K^\pm K^0_S\pi^\mp$	
	2975.8 ± 3.9 ± 1.2		[18] 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		[12,20] BISELLO	91	DM2	$J/\psi \to \eta_c\gamma$	
	2969 ± 4 ± 4	80	[12] BAI	90B	MRK3	$J/\psi \to \gamma K^+K^-K^+K^-$	
	2956 ±12 ±12		[12] BAI	90B	MRK3	$J/\psi \to \gamma K^+K^-K^0_S K^0_L$	OCCUR=3
	2982.6 $^{+2.7}_{-2.3}$	12	BAGLIN	87B	SPEC	$\overline{p}p \to \gamma\gamma$	
	2980.2 ± 1.6		[12,20] BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c\gamma$	
	2984 ± 2.3 ± 4.0		[12] GAISER	86	CBAL	$J/\psi \to \gamma X$, $\psi(2S) \to \gamma X$	
	2976 ± 8		[12,21] BALTRUSAIT...	84	MRK3	$J/\psi \to 2\phi\gamma$	
	2982 ± 8	18	[22] HIMEL	80B	MRK2	e^+e^-	
	2980 ± 9		[22] PARTRIDGE	80B	CBAL	e^+e^-	

[1] AAIJ 15BI reports $m_{J/\psi} - m_{\eta_c(1S)} = 114.7 \pm 1.5 \pm 0.1$ MeV from a sample of $\eta_c(1S)$ and J/ψ produced in b-hadron decays. We have used current value of $m_{J/\psi} = 3096.900 \pm 0.006$ MeV to arrive at the quoted $m_{\eta_c(1S)}$ result. NODE=M026M;LINKAGE=D

YOUR NOTE

[2] Taking into account an asymmetric photon lineshape. NODE=M026M;LINKAGE=E

[3] With floating width. NODE=M026M;LINKAGE=AL

[4] Ignoring possible interference with the non-resonant 0^- amplitude. NODE=M026M;LINKAGE=LS

[5] Using both, $\eta \to \gamma\gamma$ and $\eta \to \pi^+\pi^-\pi^0$ decays. NODE=M026M;LINKAGE=EL

[6] From a simultaneous fit to six decay modes of the η_c. NODE=M026M;LINKAGE=BL

[7] Accounts for interference with non-resonant continuum. NODE=M026M;LINKAGE=VA

[8] Taking into account interference with the non-resonant $J^P = 0^-$ amplitude. NODE=M026M;LINKAGE=LE

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

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

[11] Not independent from the measurements reported by LEES 10. NODE=M026M;LINKAGE=DE

[12] MITCHELL 09 observes a significant asymmetry in the lineshapes of $\psi(2S) \to \gamma\eta_c$ and $J/\psi \to \gamma\eta_c$ transitions. If ignored, this asymmetry could lead to significant bias whenever the mass and width are measured in $\psi(2S)$ or J/ψ radiative decays. NODE=M026M;LINKAGE=MI

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

[14] Superseded by LEES 10. NODE=M026M;LINKAGE=UB

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

[16] Superseded by VINOKUROVA 11. NODE=M026M;LINKAGE=FA

[17] Weighted average of the $\psi(2S)$ and $J/\psi(1S)$ samples. Using an η_c width of 13.2 MeV. NODE=M026M;LINKAGE=KZ

[18] Average of several decay modes. Using an η_c width of 13.2 MeV. NODE=M026M;LINKAGE=C1

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

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

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

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

$\eta_c(1S)$ WIDTH

NODE=M026W

NODE=M026W

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT	
31.9± 1.0 OUR AVERAGE		Error includes scale factor of 1.2.				
YOUR DATA						
$27.2 \pm 3.1^{+5.4}_{-2.6}$		[1] ANASHIN	14	KEDR	$J/\psi \to \gamma\eta_c$	
$25.2 \pm 2.6 \pm 2.4$	4.5k	[2,3] LEES	14E	BABR	$\gamma\gamma \to K^+K^-\pi^0$	
$34.8 \pm 3.1 \pm 4.0$	900	[2,3,4] LEES	14E	BABR	$\gamma\gamma \to K^+K^-\eta$	OCCUR=2
$32.0 \pm 1.2 \pm 1.0$		[5,6] ABLIKIM	12F	BES3	$\psi(2S) \to \gamma\eta_c$	
$36.4 \pm 3.2 \pm 1.7$	832	[2] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma$ hadrons	
$37.8^{+5.8}_{-5.3} \pm 3.1$	486	ZHANG	12A	BELL	$e^+e^- \to e^+e^-\eta'\pi^+\pi^-$	
$36.2 \pm 2.8 \pm 3.0$	11k	DEL-AMO-SA...	11M	BABR	$\gamma\gamma \to K^+K^-\pi^+\pi^-\pi^0$	
$35.1 \pm 3.1^{+1.0}_{-1.6}$	920	[6] VINOKUROVA	11	BELL	$B^\pm \to K^\pm(K^0_S K^\pm\pi^\mp)$	
$31.7 \pm 1.2 \pm 0.8$	14k	[7] LEES	10	BABR	10.6 $e^+e^- \to e^+e^-K^0_S K^\pm\pi^\mp$	
$36.3^{+3.7}_{-3.6} \pm 4.4$	0.9k	AUBERT	08AB	BABR	$B \to \eta_c(1S)K^{(*)} \to K\overline{K}\pi K^{(*)}$	
$28.1 \pm 3.2 \pm 2.2$	7.5k	UEHARA	08	BELL	$\gamma\gamma \to \eta_c \to$ hadrons	
$48 \; {}^{+8}_{-7} \; \pm 5$	195	WU	06	BELL	$B^+ \to p\overline{p}K^+$	
$40 \pm 19 \pm 5$	20	WU	06	BELL	$B^+ \to \Lambda\overline{\Lambda}K^+$	OCCUR=2
$24.8 \pm 3.4 \pm 3.5$	592	ASNER	04	CLEO	$\gamma\gamma \to \eta_c \to K^0_S K^\pm\pi^\mp$	
$20.4^{+7.7}_{-6.7} \pm 2.0$	190	AMBROGIANI	03	E835	$\overline{p}p \to \eta_c \to \gamma\gamma$	
$23.9^{+12.6}_{-7.1}$		ARMSTRONG	95F	E760	$\overline{p}p \to \gamma\gamma$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$32.1 \pm 1.1 \pm 1.3$	12k	[8] DEL-AMO-SA...	11M	BABR	$\gamma\gamma \to K^0_S K^\pm\pi^\mp$	OCCUR=2
$34.3 \pm 2.3 \pm 0.9$	2.5k	[9] AUBERT	04D	BABR	$\gamma\gamma \to \eta_c(1S) \to K\overline{K}\pi$	
$17.0 \pm 3.7 \pm 7.4$		[10] BAI	03	BES	$J/\psi \to \gamma\eta_c$	
$29 \pm 8 \pm 6$	180	[11] FANG	03	BELL	$B \to \eta_c K$	
$11.0 \pm 8.1 \pm 4.1$		[12] BAI	00F	BES	$J/\psi \to \gamma\eta_c$ and $\psi(2S) \to \gamma\eta_c$	
$27.0 \pm 5.8 \pm 1.4$		[13] BRANDENB...	00B	CLE2	$\gamma\gamma \to \eta_c \to K^\pm K^0_S\pi^\mp$	
$7.0^{+7.5}_{-7.0}$	12	BAGLIN	87B	SPEC	$\overline{p}p \to \gamma\gamma$	
$10.1^{+33.0}_{-8.2}$	23	[14] BALTRUSAIT...	86	MRK3	$J/\psi \to \gamma p\overline{p}$	

11.5± 4.5			GAISER	86	CBAL	$J/\psi \rightarrow \gamma X$, $\psi(2S) \rightarrow \gamma X$
< 40	90% CL	18	HIMEL	80B	MRK2	e^+e^-
< 20	90% CL		PARTRIDGE	80B	CBAL	e^+e^-

YOUR NOTE

[1] Taking into account an asymmetric photon lineshape. NODE=M026W;LINKAGE=A
[2] With floating mass. NODE=M026W;LINKAGE=AL
[3] Ignoring possible interference with the non-resonant 0^- amplitude. NODE=M026W;LINKAGE=LS
[4] Using both, $\eta \rightarrow \gamma\gamma$ and $\eta \rightarrow \pi^+\pi^-\pi^0$ decays. NODE=M026W;LINKAGE=EL
[5] From a simultaneous fit to six decay modes of the η_c. NODE=M026W;LINKAGE=BL
[6] Accounts for interference with non-resonant continuum. NODE=M026W;LINKAGE=VA
[7] Taking into account interference with the non-resonant $J^P = 0^-$ amplitude. NODE=M026W;LINKAGE=LE
[8] Not independent from the measurements reported by LEES 10. NODE=M026W;LINKAGE=DE
[9] Superseded by LEES 10. NODE=M026W;LINKAGE=UB
[10] From a simultaneous fit of five decay modes of the η_c. NODE=M026W;LINKAGE=AK
[11] Superseded by VINOKUROVA 11. NODE=M026W;LINKAGE=FA
[12] From a fit to the 4-prong invariant mass in $\psi(2S) \rightarrow \gamma\eta_c$ and $J/\psi(1S) \rightarrow \gamma\eta_c$ decays. NODE=M026W;LINKAGE=KZ
[13] Superseded by ASNER 04. NODE=M026W;LINKAGE=NN
[14] Positive and negative errors correspond to 90% confidence level. NODE=M026W;LINKAGE=L

$\eta_c(1S)$ REFERENCES

NODE=M026

YOUR PAPER

AAIJ	15BI	EPJ C75 311	R. Aaij *et al.*	(LHCb Collab.)	REFID=57147
ANASHIN	14	PL B738 391	V.V. Anashin *et al.*	(KEDR Collab.)	REFID=56130
LEES	14E	PR D89 112004	J.P. Lees *et al.*	(BABAR Collab.)	REFID=55937
ABLIKIM	12F	PRL 108 222002	M. Ablikim *et al.*	(BES III Collab.)	REFID=54271
ABLIKIM	12N	PR D86 092009	M. Ablikim *et al.*	(BES III Collab.)	REFID=54741
ZHANG	12A	PR D86 052002	C.C. Zhang *et al.*	(BELLE Collab.)	REFID=54763
DEL-AMO-SA...	11M	PR D84 012004	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=16751
VINOKUROVA	11	PL B706 139	A. Vinokurova *et al.*	(BELLE Collab.)	REFID=53927
LEES	10	PR D81 052010	J.P. Lees *et al.*	(BABAR Collab.)	REFID=53236
MITCHELL	09	PRL 102 011801	R.E. Mitchell *et al.*	(CLEO Collab.)	REFID=52676
AUBERT	08AB	PR D78 012006	B. Aubert *et al.*	(BABAR Collab.)	REFID=52267
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
AUBERT	06E	PRL 96 052002	B. Aubert *et al.*	(BABAR Collab.)	REFID=51059
WU	06	PRL 97 162003	C.-H. Wu *et al.*	(BELLE Collab.)	REFID=51472
ABE	04G	PR D70 071102	K. Abe *et al.*	(BELLE Collab.)	REFID=50182
ASNER	04	PRL 92 142001	D.M. Asner *et al.*	(CLEO Collab.)	REFID=49745
AUBERT	04D	PRL 92 142002	B. Aubert *et al.*	(BABAR Collab.)	REFID=49746
AMBROGIANI	03	PL B566 45	M. Ambrogiani *et al.*	(FNAL E835 Collab.)	REFID=49465
BAI	03	PL B555 174	J.Z. Bai *et al.*	(BES Collab.)	REFID=49185
FANG	03	PRL 90 071801	F. Fang *et al.*	(BELLE Collab.)	REFID=49206
ABE,K	02	PRL 89 142001	K. Abe *et al.*	(BELLE Collab.)	REFID=49188
BAI	00F	PR D62 072001	J.Z. Bai *et al.*	(BES Collab.)	REFID=48546
BRANDENB...	00B	PRL 85 3095	G. Brandenburg *et al.*	(CLEO Collab.)	REFID=48553
BAI	99B	PR D60 072001	J.Z. Bai *et al.*	(BES Collab.)	REFID=47385
ABREU	98O	PL B441 479	P. Abreu *et al.*	(DELPHI Collab.)	REFID=46553
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
BAI	90B	PRL 65 1309	Z. Bai *et al.*	(Mark III Collab.)	REFID=41354
BAGLIN	87B	PL B187 191	C. Baglin *et al.*	(R704 Collab.)	REFID=40018
BALTRUSAIT...	86	PR D33 629	R.M. Baltrusaitis *et al.*	(Mark III Collab.)	REFID=22009
GAISER	86	PR D34 711	J. Gaiser *et al.*	(Crystal Ball Collab.)	REFID=22012
BALTRUSAIT...	84	PRL 52 2126	R.M. Baltrusaitis *et al.*	(CIT, UCSC+) JP	REFID=22006
HIMEL	80B	PRL 45 1146	T.M. Himel *et al.*	(SLAC, LBL, UCB)	REFID=22003
PARTRIDGE	80B	PRL 45 1150	R. Partridge *et al.*	(CIT, HARV, PRIN+)	REFID=22004

NODE=M070

$J/\psi(1S)$

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

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

NODE=M070230

RADIATIVE DECAYS

NODE=M070310

$\Gamma(\gamma\eta_c(1S))/\Gamma_{total}$ **Γ_{146}/Γ**

NODE=M070R85
NODE=M070R85

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.7 ±0.4 OUR AVERAGE Error includes scale factor of 1.5.					
2.01±0.32±0.02		[1] MITCHELL	09	CLEO	$e^+e^- \rightarrow \gamma X$
1.27±0.36		GAISER	86	CBAL	$J/\psi \rightarrow \gamma X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA seen		ANASHIN	14	KEDR	$J/\psi \rightarrow \gamma\eta_c$
0.79±0.20	273 ± 43	[2] AUBERT	06E	BABR	$B^\pm \rightarrow K^\pm X_{c\bar{c}}$
seen	16	BALTRUSAIT...	84	MRK3	$J/\psi \rightarrow 2\phi\gamma$

[1] MITCHELL 09 reports $(1.98 \pm 0.09 \pm 0.30) \times 10^{-2}$ from a measurement of $[\Gamma(J/\psi(1S) \rightarrow \gamma\eta_c(1S))/\Gamma_{\rm total}] \times [B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)]$ assuming $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (35.04 \pm 0.07 \pm 0.77) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (34.49 \pm 0.30) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M070R85;LINKAGE=MI

[2] Calculated by the authors using an average of $B(J/\psi \rightarrow \gamma\eta_c) \times B(\eta_c \rightarrow K\overline{K}\pi)$ from BALTRUSAITIS 86, BISELLO 91, BAI 04 and $B(\eta_c \rightarrow K\overline{K}\pi) = (8.5 \pm 1.8)\%$ from AUBERT 06E. NODE=M070R85;LINKAGE=AU

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER	ANASHIN	14	PL B738 391	V.V. Anashin *et al.*	(KEDR Collab.)	REFID=56130
	MITCHELL	09	PRL 102 011801	R.E. Mitchell *et al.*	(CLEO Collab.)	REFID=52676
	AUBERT	06E	PRL 96 052002	B. Aubert *et al.*	(BABAR Collab.)	REFID=51059
	BAI	04	PL B578 16	J.Z. Bai *et al.*	(BES Collab.)	REFID=49620
	BISELLO	91	NP B350 1	D. Bisello *et al.*	(DM2 Collab.)	REFID=41668
	BALTRUSAIT...	86	PR D33 629	R.M. Baltrusaitis *et al.*	(Mark III Collab.)	REFID=22009
	GAISER	86	PR D34 711	J. Gaiser *et al.*	(Crystal Ball Collab.)	REFID=22012
	BALTRUSAIT...	84	PRL 52 2126	R.M. Baltrusaitis *et al.*	(CIT, UCSC+)	REFID=22006

Reference = ANASHIN 15; PL B749 50
Verifier code = EIDELMAN

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

Simon Eidelman

EMAIL: simon.eidelman@cern.ch

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
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=M070

$J/\psi(1S)$

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

$J/\psi(1S)$ MASS

NODE=M070M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
	3096.900±0.006 OUR AVERAGE					
	3096.66 ±0.19 ±0.02	6.1k	[1] AAIJ	15BI	LHCB	$pp \to J/\psi X$
YOUR DATA	3096.900±0.002±0.006		[2] ANASHIN	15	KEDR	$e^+e^- \to$ hadrons
	3096.89 ±0.09	502	[3] ARTAMONOV	00	OLYA	$e^+e^- \to$ hadrons
	3096.91 ±0.03 ±0.01		[4] ARMSTRONG	93B	E760	$\overline{p}p \to e^+e^-$
	3096.95 ±0.1 ±0.3	193	BAGLIN	87	SPEC	$\overline{p}p \to e^+e^- X$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	3096.917±0.010±0.007		AULCHENKO	03	KEDR	$e^+e^- \to$ hadrons
	3097.5 ±0.3		GRIBUSHIN	96	FMPS	515 π^-Be $\to 2\mu X$
	3098.4 ±2.0	38k	LEMOIGNE	82	GOLI	185 π^-Be $\to \gamma\mu^+\mu^-$A
	3096.93 ±0.09	502	[5] ZHOLENTZ	80	REDE	e^+e^-
	3097.0 ±1		[6] BRANDELIK	79C	DASP	e^+e^-

YOUR NOTE

[1] From a sample of $\eta_c(1S)$ and J/ψ produced in b-hadron decays. NODE=M070M;LINKAGE=B

[2] Supersedes AULCHENKO 03. NODE=M070M;LINKAGE=A

[3] Reanalysis of ZHOLENTZ 80 using new electron mass (COHEN 87) and radiative corrections (KURAEV 85). NODE=M070M;LINKAGE=AR

[4] Mass central value and systematic error recalculated by us according to Eq. (16) in ARMSTRONG 93B, using the value for the $\psi(2S)$ mass from AULCHENKO 03. NODE=M070M;LINKAGE=NW

[5] Superseded by ARTAMONOV 00. NODE=M070M;LINKAGE=RZ

[6] From a simultaneous fit to e^+e^-, $\mu^+\mu^-$ and hadronic channels assuming $\Gamma(e^+e^-) = \Gamma(\mu^+\mu^-)$. NODE=M070M;LINKAGE=F

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER

AAIJ	15BI	EPJ C75 311	R. Aaij *et al.*	(LHCb Collab.)	REFID=57147
ANASHIN	15	PL B749 50	V.V. Anashin *et al.*	(KEDR Collab.)	REFID=56792
AULCHENKO	03	PL B573 63	V.M. Aulchenko *et al.*	(KEDR Collab.)	REFID=49579
ARTAMONOV	00	PL B474 427	A.S. Artamonov *et al.*		REFID=47424
GRIBUSHIN	96	PR D53 4723	A. Gribushin *et al.*	(E672 Collab., E706 Collab.)	REFID=44739
ARMSTRONG	93B	PR D47 772	T.A. Armstrong *et al.*	(FNAL E760 Collab.)	REFID=43307
BAGLIN	87	NP B286 592	C. Baglin *et al.*	(LAPP, CERN, GENO, LYON+)	REFID=40002
COHEN	87	RMP 59 1121	E.R. Cohen, B.N. Taylor	(RISC, NBS)	REFID=11616
KURAEV	85	SJNP 41 466	E.A. Kuraev, V.S. Fadin	(NOVO)	REFID=40033
		Translated from YAF 41 733.			
LEMOIGNE	82	PL 113B 509	Y. Lemoigne *et al.*	(SACL, LOIC, SHMP+)	REFID=22084
ZHOLENTZ	80	PL 96B 214	A.A. Zholents *et al.*	(NOVO)	REFID=10320
Also		SJNP 34 814	A.A. Zholents *et al.*	(NOVO)	REFID=10321
		Translated from YAF 34 1471.			
BRANDELIK	79C	ZPHY C1 233	R. Brandelik *et al.*	(DASP Collab.)	REFID=22114

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

$\psi(2S)$ MASS

NODE=M071M

OUR FIT includes measurements of $m_{\psi(2S)}$, $m_{\psi(3770)}$, and $m_{\psi(3770)} - m_{\psi(2S)}$. NODE=M071M

	VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
	3686.097±0.010 OUR AVERAGE					
YOUR DATA	3686.099±0.004±0.009		[1] ANASHIN	15	KEDR	$e^+e^- \to$ hadrons
	3686.12 ±0.06 ±0.10	4k	AAIJ	12H	LHCB	$pp \to J/\psi\pi^+\pi^- X$
	3685.95 ±0.10	413	[2] ARTAMONOV	00	OLYA	$e^+e^- \to$ hadrons
	3685.98 ±0.09 ±0.04		[3] ARMSTRONG	93B	E760	$\overline{p}p \to e^+e^-$

NODE=M071M

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

$3686.114 \pm 0.007^{+0.011}_{-0.016}$		[4] ANASHIN	12	KEDR	$e^+e^- \to$ hadrons
$3686.111 \pm 0.025 \pm 0.009$		AULCHENKO	03	KEDR	$e^+e^- \to$ hadrons
3686.00 ± 0.10	413	[5] ZHOLENTZ	80	OLYA	e^+e^-

YOUR NOTE

[1] Supersedes AULCHENKO 03 and ANASHIN 12. NODE=M071M;LINKAGE=A

[2] Reanalysis of ZHOLENTZ 80 using new electron mass (COHEN 87) and radiative corrections (KURAEV 85). NODE=M071M;LINKAGE=AR

[3] Mass central value and systematic error recalculated by us according to Eq. (16) in ARMSTRONG 93B, using the value for the $J/\psi(1S)$ mass from AULCHENKO 03. NODE=M071M;LINKAGE=NW

[4] From the scans in 2004 and 2006. ANASHIN 12 reports the value $3686.114 \pm 0.007 \pm 0.011^{+0.002}_{-0.012}$ MeV, where the third uncertainty is due to assumptions on the interference between the resonance and hadronic continuum. We combined the two systematic uncertainties. NODE=M071M;LINKAGE=AN

[5] Superseded by ARTAMONOV 00. NODE=M071M;LINKAGE=RZ

$\psi(2S)$ REFERENCES

NODE=M071

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ANASHIN	15	PL B749 50	V.V. Anashin *et al.*	(KEDR Collab.)	REFID=56792
AAIJ	12H	EPJ C72 1972	R. Aaij *et al.*	(LHCb Collab.)	REFID=54056
ANASHIN	12	PL B711 280	V.V. Anashin *et al.*	(KEDR Collab.)	REFID=54038
AULCHENKO	03	PL B573 63	V.M. Aulchenko *et al.*	(KEDR Collab.)	REFID=49579
ARTAMONOV	00	PL B474 427	A.S. Artamonov *et al.*		REFID=47424
ARMSTRONG	93B	PR D47 772	T.A. Armstrong *et al.*	(FNAL E760 Collab.)	REFID=43307
COHEN	87	RMP 59 1121	E.R. Cohen, B.N. Taylor	(RISC, NBS)	REFID=11616
KURAEV	85	SJNP 41 466	E.A. Kuraev, V.S. Fadin	(NOVO)	REFID=40033
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ZHOLENTZ	80	PL 96B 214	A.A. Zholents *et al.*	(NOVO)	REFID=10320
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