Reference = ABLIKIM 15V; PL B749 414
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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Prospekt Lavrent'eva 11
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Russian Federation

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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