Reference = AAIJ 14AH; NP B886 665
Verifier code = LHCB

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.

Vincenzo Vagnoni

EMAIL: vincenzo.vagnoni@bo.infn.it

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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$c\overline{c}$ MESONS

$X(3872)$ $I^G(J^{PC}) = 0^+(1^{++})$

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.

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".

$X(3872)$ BRANCHING RATIOS

$\Gamma(\gamma\psi(2S))/\Gamma_{\text{total}}$ Γ_{13}/Γ

	VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
YOUR DATA	seen	36 ± 9	[1] AAIJ	14AH LHCB	$B^+ \to \gamma\psi(2S)K^+$
	>0.030	25 ± 7	[2] AUBERT	09B BABR	$B^+ \to \gamma\psi(2S)K^+$

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

	not seen		[3] BHARDWAJ	11 BELL	$B^+ \to \gamma\psi(2S)K^+$

YOUR NOTE
[1] From 36.4 ± 9 events of $X(3872) \to J/\psi\gamma$ decays with a statistical significance of 4.4σ.
[2] AUBERT 09B reports $[\Gamma(X(3872) \to \gamma\psi(2S))/\Gamma_{\text{total}}] \times [B(B^+ \to X(3872)K^+)] = (9.5 \pm 2.7 \pm 0.6) \times 10^{-6}$ which we divide by our best value $B(B^+ \to X(3872)K^+) < 3.2 \times 10^{-4}$.
[3] BHARDWAJ 11 reports $B(B^+ \to K^+ X(3872)) \times B(X \to \gamma\psi(2S)) < 3.45 \times 10^{-6}$ at 90% CL.

$\Gamma(\gamma\psi(2S))/\Gamma(\gamma J/\psi)$ Γ_{13}/Γ_{12}

	VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
	2.6 ±0.6 OUR AVERAGE					
YOUR DATA	$2.46 \pm 0.64 \pm 0.29$		36 ± 9	[1] AAIJ	14AH LHCB	$B^+ \to \gamma\psi(2S)K^+$
	3.4 ± 1.4			AUBERT	09B BABR	$B^+ \to \gamma c\overline{c}K'$

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

	<2.1	90		BHARDWAJ	11 BELL	$B^+ \to \gamma\psi(2S)K^+$

YOUR NOTE
[1] From 36.4 ± 9 events of $X(3872) \to J/\psi\gamma$ decays with a statistical significance of 4.4σ.

$X(3872)$ REFERENCES

YOUR PAPER	AAIJ	15AO	PR D92 011102	R. Aaij *et al.*	(LHCb Collab.)
	AAIJ	14AH	NP B886 665	R. Aaij *et al.*	(LHCb Collab.)
	AAIJ	13Q	PRL 110 222001	R. Aaij *et al.*	(LHCb Collab.) JP
	BHARDWAJ	11	PRL 107 091803	V. Bhardwaj *et al.*	(BELLE Collab.)
	CHOI	11	PR D84 052004	S.-K. Choi *et al.*	(BELLE Collab.)
	AUBERT	09B	PRL 102 132001	B. Aubert *et al.*	(BABAR Collab.)
	AUBERT	05B	PR D71 031501	B. Aubert *et al.*	(BABAR Collab.)
	CHOI	03	PRL 91 262001	S.-K. Choi *et al.*	(BELLE Collab.)