

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

PLEASE READ NOW



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.

Xiao-Rui Lyu

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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,

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$c\bar{c}$ MESONS

NODE=MXXX025

NODE=M193

$X(4140)$

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

NODE=M193

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

$X(4140)$ BRANCHING RATIOS

NODE=M193225

$\Gamma(J/\psi\phi)/\Gamma_{\text{total}}$					Γ_1/Γ
VALUE	EVTs	DOCUMENT ID	TECN	COMMENT	
seen	1.9k	¹ ABAZOV	15M D0	$p\bar{p} \rightarrow J/\psi \phi + \text{anything}$	
seen	52	² ABAZOV	14A D0	$B^+ \rightarrow J/\psi \phi K^+$	
seen	0.3k	³ CHATRCHYAN	14M CMS	$B^+ \rightarrow J/\psi \phi K^+$	
seen	14	⁴ AALTONEN	09AH CDF	$B^+ \rightarrow J/\psi \phi K^+$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
YOUR DATA not seen		⁵ ABLIKIM	15 BES3	$e^+e^- \rightarrow \gamma \phi J/\psi$	
not seen		⁶ AAIJ	12AA LHCb	$pp \rightarrow B^+ X$ at 7 TeV	

NODE=M193R01;LINKAGE=D
NODE=M193R01;LINKAGE=A

NODE=M193R01;LINKAGE=C

NODE=M193R01;LINKAGE=AA
NODE=M193R01;LINKAGE=B

NODE=M193R01;LINKAGE=AI

- YOUR NOTE

¹ Statistical significance of more than 6σ .

² ABAZOV 14A reports $B(B^+ \rightarrow X(4140) K^+ \rightarrow J/\psi \phi K^+)/B(B^+ \rightarrow J/\psi \phi K^+) = (19 \pm 7 \pm 4)\%$ with 3.1σ significance.

³ From a fit assuming an S -wave relativistic Breit-Wigner shape above a three-body phase-space non-resonant component with statistical significance of more than 5σ .

⁴ Statistical significance of 3.8σ .

⁵ Reported $\sigma(e^+e^- \rightarrow \gamma X(4140)) \cdot B(X(4140) \rightarrow J/\psi \phi) < 0.35, 0.28$, and 0.33 pb at $4.23, 4.26$, and 4.36 GeV , respectively, at 90% CL.

⁶ Reported $B(B^+ \rightarrow X(4140) K^+) \cdot B(X(4140) \rightarrow J/\psi \phi)/B(B^+ \rightarrow J/\psi \phi K^+) < 0.07$ at 90% CL.

$X(4140)$ REFERENCES

NODE=M193

YOUR PAPER

ABAZOV	15M	PRL 115 232001	V.M. Abazov <i>et al.</i>	(D0 Collab.)
ABLIKIM	15	PR D91 032002	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABAZOV	14A	PR D89 012004	V.M. Abazov <i>et al.</i>	(D0 Collab.)
CHATRCHYAN	14M	PL B734 261	S. Chatrchyan <i>et al.</i>	(CMS Collab.)
AAIJ	12AA	PR D85 091103	R. Aaij <i>et al.</i>	(LHCb Collab.)
SHEN	10	PRL 104 112004	C.P. Shen <i>et al.</i>	(BELLE Collab.)
AALTONEN	09AH	PRL 102 242002	T. Aaltonen <i>et al.</i>	(CDF Collab.)

REFID=56957
REFID=56368
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REFID=52968