

Reference = SHEN 16; PR D93 112013
Verifier code = BELLE

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.

Karim Trabelsi

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March 20, 2017

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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$b\bar{b}$ MESONS

$\Upsilon(1S)$

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

NODE=MXXX030

NODE=M049

$\Upsilon(1S)$ BRANCHING RATIOS

NODE=M049225

 $\Gamma(J/\psi(1S) \text{ anything})/\Gamma_{\text{total}}$
 Γ_7/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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5.4 $\pm$ 0.4 OUR AVERAGE Error includes scale factor of 1.5.

YOUR DATA	5.25 $\pm$ 0.13 $\pm$ 0.25	3k	SHEN	16	BELL	$e^+e^- \rightarrow J/\psi X$
	6.4 $\pm$ 0.4 $\pm$ 0.6	730	BRIERE	04	CLEO	$e^+e^- \rightarrow J/\psi X$
	11 $\pm$ 4 $\pm$ 2	14	FULTON	89	CLEO	$e^+e^- \rightarrow \mu^+\mu^- X$

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

<6.8	90	ALBRECHT	92J	ARG	$e^+e^- \rightarrow e^+e^- X, \mu^+\mu^- X$
<17	90	MASCHMANN	90	CBAL	$e^+e^- \rightarrow \text{hadrons}$
<200	90	NICZYPORUK	83	LENA	

¹⁴ Using $B((J/\psi) \rightarrow \mu^+\mu^-) = (6.9 \pm 0.9)\%$.

NODE=M049R12

NODE=M049R12

NODE=M049R12;LINKAGE=K

 $\Gamma(X(4350) \text{ anything}, X \rightarrow J/\psi(1S)\phi)/\Gamma_{\text{total}}$
 Γ_{15}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	<8.1 $\times 10^{-6}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow J/\psi K^+ K^- X$
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NODE=M049P05

NODE=M049P05

 $\Gamma(X(3900)^\pm \text{ anything}, X \rightarrow J/\psi(1S)\pi^\pm)/\Gamma_{\text{total}}$
 Γ_{16}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	<1.3 $\times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow J/\psi \pi^\pm X$
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NODE=M049P06

NODE=M049P06

 $\Gamma(X(4200)^\pm \text{ anything}, X \rightarrow J/\psi(1S)\pi^\pm)/\Gamma_{\text{total}}$
 Γ_{17}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	<6.0 $\times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow J/\psi \pi^\pm X$
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NODE=M049P07

NODE=M049P07

 $\Gamma(X(4430)^\pm \text{ anything}, X \rightarrow J/\psi(1S)\pi^\pm)/\Gamma_{\text{total}}$
 Γ_{18}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	<4.9 $\times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow J/\psi \pi^\pm X$
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NODE=M049P08

NODE=M049P08

 $\Gamma(X_{cs}^\pm \text{ anything}, X \rightarrow J/\psi K^\pm)/\Gamma_{\text{total}}$
 Γ_{19}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	<5.7 $\times 10^{-6}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow J/\psi K^- X$
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NODE=M049P11

NODE=M049P11

 $\Gamma(X(3872) \text{ anything}, X \rightarrow J/\psi(1S)\pi^+\pi^-)/\Gamma_{\text{total}}$
 Γ_{20}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	<9.5 $\times 10^{-6}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow J/\psi \pi^+ \pi^- X$
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NODE=M049R00

NODE=M049R00

 $\Gamma(X(4260) \text{ anything}, X \rightarrow J/\psi(1S)\pi^+\pi^-)/\Gamma_{\text{total}}$
 Γ_{21}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	<3.8 $\times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow J/\psi \pi^+ \pi^- X$
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NODE=M049R99

NODE=M049R99

 $\Gamma(X(4260) \text{ anything}, X \rightarrow J/\psi(1S)K^+K^-)/\Gamma_{\text{total}}$
 Γ_{22}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	<7.5 $\times 10^{-6}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow J/\psi K^+ K^- X$
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NODE=M049P03

NODE=M049P03

 $\Gamma(X(4140) \text{ anything}, X \rightarrow J/\psi(1S)\phi)/\Gamma_{\text{total}}$
 Γ_{23}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	<5.2 $\times 10^{-6}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow J/\psi K^+ K^- X$
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NODE=M049P04

NODE=M049P04

 $\Gamma(\psi(2S) \text{ anything})/\Gamma_{\text{total}}$
 Γ_{27}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	1.23 $\pm$ 0.17 $\pm$ 0.11	215	SHEN	16	BELL	$e^+e^- \rightarrow \psi(2S) X$
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NODE=M049P12

NODE=M049P12

$$\Gamma(X(4260) \text{ anything}, X \rightarrow \psi(2S)\pi^+\pi^-)/\Gamma_{\text{total}} \quad \Gamma_{35}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	$<7.9 \times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow \psi(2S)\pi^+\pi^- X$	
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NODE=M049P00
NODE=M049P00

$$\Gamma(X(4360) \text{ anything}, X \rightarrow \psi(2S)\pi^+\pi^-)/\Gamma_{\text{total}} \quad \Gamma_{36}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	$<5.2 \times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow \psi(2S)\pi^+\pi^- X$	
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NODE=M049P01
NODE=M049P01

$$\Gamma(X(4660) \text{ anything}, X \rightarrow \psi(2S)\pi^+\pi^-)/\Gamma_{\text{total}} \quad \Gamma_{37}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	$<2.2 \times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow \psi(2S)\pi^+\pi^- X$	
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NODE=M049P02
NODE=M049P02

$$\Gamma(X(4050)^\pm \text{ anything}, X \rightarrow \psi(2S)\pi^\pm)/\Gamma_{\text{total}} \quad \Gamma_{38}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	$<8.8 \times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow \psi(2S)\pi^\pm X$	
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NODE=M049P09
NODE=M049P09

$$\Gamma(X(4430)^\pm \text{ anything}, X \rightarrow \psi(2S)\pi^\pm)/\Gamma_{\text{total}} \quad \Gamma_{39}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	$<6.7 \times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow \psi(2S)\pi^\pm X$	
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NODE=M049P10
NODE=M049P10

$\Upsilon(1S)$ REFERENCES

NODE=M049

YOUR PAPER

SHEN	16	PR D93 112013	C.P. Shen <i>et al.</i>	(BELLE Collab.)
BRIERE	04	PR D70 072001	R.A. Briere <i>et al.</i>	(CLEO Collab.)
ALBRECHT	92J	ZPHY C55 25	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
MASCHMANN	90	ZPHY C46 555	W.S. Maschmann <i>et al.</i>	(Crystal Ball Collab.)
FULTON	89	PL B224 445	R. Fulton <i>et al.</i>	(CLEO Collab.)
NICZYPORUK	83	ZPHY C17 197	B. Niczyporuk <i>et al.</i>	(LENA Collab.)

REFID=57515
REFID=50183
REFID=42167
REFID=41224
REFID=40918
REFID=12488