

Reference = DOBBS 14; PL B739 90
Verifier code = SETH

PLEASE READ NOW

*PLEASE
REPLY
WITHIN
ONE WEEK*

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Kamal K Seth

EMAIL: kseth@northwestern.edu

July 21, 2016

Dear Colleague,

- (1) Please check the results of your experiment carefully. They are marked.
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- (4) IMPORTANT!! Please tell WHICH papers you are verifying. We have lots of requests out.
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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 $\bar{c}$ MESONS

$\psi(2S)$

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

See the Review on " $\psi(2S)$ and χ_c branching ratios" before the $\chi_{c0}(1P)$ Listings.

NODE=MXXX025

NODE=M071

NODE=M071

ψ(2S) BRANCHING RATIOS

NODE=M071235

NODE=M071310

NODE=M071R25
NODE=M071R25

NODE=M071R25;LINKAGE=A

NODE=M071R28
NODE=M071R28NODE=M071R28;LINKAGE=A
NODE=M071R28;LINKAGE=AU

NODE=M071R28;LINKAGE=PP

NODE=M071R47
NODE=M071R47

NODE=M071R47;LINKAGE=A

NODE=M071R51
NODE=M071R51NODE=M071R51;LINKAGE=A
NODE=M071R51;LINKAGE=PP

HADRONIC DECAYS

 $\Gamma(p\bar{p})/\Gamma_{\text{total}}$
 Γ_{19}/Γ

VALUE (units 10^{-4})

EVTS

DOCUMENT ID

TECN

COMMENT

3.00±0.13 OUR AVERAGE

Error includes scale factor of 1.1.

YOUR DATA	3.08±0.05±0.18	4.5k	¹ DOBBS	14		$e^+e^- \rightarrow \psi(2S) \rightarrow p\bar{p}$
	3.36±0.09±0.25	1.6k	ABLIKIM	07C	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow p\bar{p}$
	2.87±0.12±0.15	557	PEDLAR	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow p\bar{p}$
	1.4 ±0.8	4	BRANDELIK	79C	DASP	$e^+e^- \rightarrow \psi(2S) \rightarrow p\bar{p}$
	2.3 ±0.7		FELDMAN	77	MRK1	$e^+e^- \rightarrow \psi(2S) \rightarrow p\bar{p}$

YOUR NOTE ¹ Using CLEO-c data but not authored by the CLEO Collaboration.

 $\Gamma(\Lambda\bar{\Lambda})/\Gamma_{\text{total}}$
 Γ_{26}/Γ

VALUE (units 10^{-4})

CL% EVTS

DOCUMENT ID

TECN

COMMENT

3.57±0.18 OUR AVERAGE

YOUR DATA	3.75±0.09±0.23	1.9k	¹ DOBBS	14		$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	3.39±0.20±0.32	337	ABLIKIM	07C	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	6.4 ±1.8 ±0.1		² AUBERT	07BD	BABR	$10.6 e^+e^- \rightarrow \Lambda\bar{\Lambda}\gamma$
	3.28±0.23±0.25	208	PEDLAR	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	1.81±0.20±0.27	80	³ BAI	01	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	< 4	90	FELDMAN	77	MRK1	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

YOUR NOTE ¹ Using CLEO-c data but not authored by the CLEO Collaboration.
² AUBERT 07BD reports $[\Gamma(\psi(2S) \rightarrow \Lambda\bar{\Lambda})/\Gamma_{\text{total}}] \times [\Gamma(\psi(2S) \rightarrow e^+e^-)] = (15 \pm 4 \pm 1) \times 10^{-4}$ keV which we divide by our best value $\Gamma(\psi(2S) \rightarrow e^+e^-) = 2.34 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value.

³ Estimated using $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.310 \pm 0.028$.

 $\Gamma(\Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}$
 Γ_{30}/Γ

VALUE (units 10^{-4})

EVTS

DOCUMENT ID

TECN

COMMENT

2.51±0.21 OUR AVERAGE

YOUR DATA	2.51±0.15±0.16	281	¹ DOBBS	14		$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	2.57±0.44±0.68	35	PEDLAR	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

YOUR NOTE ¹ Using CLEO-c data but not authored by the CLEO Collaboration.

 $\Gamma(\Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}$
 Γ_{31}/Γ

VALUE (units 10^{-4})

EVTS

DOCUMENT ID

TECN

COMMENT

2.32±0.16 OUR AVERAGE

YOUR DATA	2.25±0.11±0.16	439	¹ DOBBS	14		$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	2.35±0.36±0.32	59	ABLIKIM	07C	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	2.63±0.35±0.21	58	PEDLAR	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

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

	1.2 ±0.4 ±0.4	8	² BAI	01	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
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YOUR NOTE ¹ Using CLEO-c data but not authored by the CLEO Collaboration.

² Estimated using $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.310 \pm 0.028$.

$\Gamma(\Xi^- \Xi^+)/\Gamma_{total}$ Γ_{33}/Γ

VALUE (units 10⁻⁴) CL% EVTS DOCUMENT ID TECN COMMENT

2.64±0.18 OUR AVERAGE

YOUR DATA	2.66±0.12±0.20	548	¹ DOBBS	14		$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	3.03±0.40±0.32	67	ABLIKIM	07C	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	2.38±0.30±0.21	63	PEDLAR	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

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

	0.94±0.27±0.15	12	² BAI	01	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	<2	90	FELDMAN	77	MRK1	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

YOUR NOTE	¹ Using CLEO-c data but not authored by the CLEO Collaboration.					
	² Estimated using $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.310 \pm 0.028$.					

NODE=M071R29
NODE=M071R29

NODE=M071R29;LINKAGE=A
NODE=M071R29;LINKAGE=PP

$\Gamma(\Xi^0 \Xi^0)/\Gamma_{total}$ Γ_{34}/Γ

VALUE (units 10⁻⁴) EVTS DOCUMENT ID TECN COMMENT

2.07±0.23 OUR AVERAGE

YOUR DATA	2.02±0.19±0.15	112	¹ DOBBS	14		$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	2.75±0.64±0.61	19	PEDLAR	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

YOUR NOTE	¹ Using CLEO-c data but not authored by the CLEO Collaboration.					
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NODE=M071R48
NODE=M071R48

NODE=M071R48;LINKAGE=A

$\Gamma(\Omega^- \bar{\Omega}^+)/\Gamma_{total}$ Γ_{40}/Γ

VALUE (units 10⁻⁴) CL% EVTS DOCUMENT ID TECN COMMENT

0.47±0.09±0.05

YOUR DATA		27	¹ DOBBS	14		$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	• • • We do not use the following data for averages, fits, limits, etc. • • •					
	<1.5	90	ABLIKIM	12Q	BES2	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	<1.6	90	PEDLAR	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$
	<0.73	90	² BAI	01	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow \text{hadrons}$

YOUR NOTE	¹ Using CLEO-c data but not authored by the CLEO Collaboration.					
	² Estimated using $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.310 \pm 0.028$.					

NODE=M071R54
NODE=M071R54

NODE=M071R54;LINKAGE=A
NODE=M071R54;LINKAGE=PP

$\psi(2S)$ REFERENCES

YOUR PAPER	DOBBS	14	PL B739 90	S. Dobbs <i>et al.</i>	(NWES, WAYN)
	ABLIKIM	12Q	CPC 36 1040	M. Ablikim <i>et al.</i>	(BES II Collab.)
	ABLIKIM	07C	PL B648 149	M. Ablikim <i>et al.</i>	(BES Collab.)
	AUBERT	07BD	PR D76 092006	B. Aubert <i>et al.</i>	(BABAR Collab.)
	PEDLAR	05	PR D72 051108	T.K. Pedlar <i>et al.</i>	(CLEO Collab.)
	BAI	01	PR D63 032002	J.Z. Bai <i>et al.</i>	(BES Collab.)
	BRANDELIK	79C	ZPHY C1 233	R. Brandelik <i>et al.</i>	(DASP Collab.)
	FELDMAN	77	PRPL 33C 285	G.J. Feldman, M.L. Perl	(LBL, SLAC)

NODE=M071

REFID=56333
REFID=54864
REFID=51636
REFID=52050
REFID=50808
REFID=48003
REFID=22114
REFID=22062

Reference = XIAO 13; PR D87 057501
Verifier code = SETH

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Russian Federation

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c $\bar{c}$ MESONS

$\psi(4160)$

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

NODE=MXXX025

NODE=M025

ψ(4160) BRANCHING RATIOS

NODE=M025225

$$\Gamma(\gamma X(3872) \rightarrow \gamma J/\psi \pi^+ \pi^-) / \Gamma_{\text{total}} \quad \Gamma_{34} / \Gamma$$

NODE=M025R34
NODE=M025R34

	<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>	
YOUR DATA	$<0.68 \times 10^{-4}$	90	23 XIAO	13	$\psi(4160) \rightarrow \gamma J/\psi \pi^+ \pi^-$
YOUR NOTE	23 Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.				

NODE=M025R34;LINKAGE=A

$$\Gamma(\gamma X(3915) \rightarrow \gamma J/\psi \pi^+ \pi^-) / \Gamma_{\text{total}} \quad \Gamma_{35} / \Gamma$$

NODE=M025R35
NODE=M025R35

	<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>	
YOUR DATA	$<1.36 \times 10^{-4}$	90	24 XIAO	13	$\psi(4160) \rightarrow \gamma J/\psi \pi^+ \pi^-$
YOUR NOTE	24 Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.				

NODE=M025R35;LINKAGE=A

$$\Gamma(\gamma X(3930) \rightarrow \gamma J/\psi \pi^+ \pi^-) / \Gamma_{\text{total}} \quad \Gamma_{36} / \Gamma$$

NODE=M025R36
NODE=M025R36

	<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>	
YOUR DATA	$<1.18 \times 10^{-4}$	90	25 XIAO	13	$\psi(4160) \rightarrow \gamma J/\psi \pi^+ \pi^-$
YOUR NOTE	25 Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.				

NODE=M025R36;LINKAGE=A

$$\Gamma(\gamma X(3940) \rightarrow \gamma J/\psi \pi^+ \pi^-) / \Gamma_{\text{total}} \quad \Gamma_{37} / \Gamma$$

NODE=M025R37
NODE=M025R37

	<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>	
YOUR DATA	$<1.47 \times 10^{-4}$	90	26 XIAO	13	$\psi(4160) \rightarrow \gamma J/\psi \pi^+ \pi^-$
YOUR NOTE	26 Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.				

NODE=M025R37;LINKAGE=A

$$\Gamma(\gamma X(3872) \rightarrow \gamma \gamma J/\psi) / \Gamma_{\text{total}} \quad \Gamma_{38} / \Gamma$$

NODE=M025R38
NODE=M025R38

	<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>	
YOUR DATA	$<1.05 \times 10^{-4}$	90	27 XIAO	13	$\psi(4160) \rightarrow \gamma \gamma J/\psi$
YOUR NOTE	27 Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.				

NODE=M025R38;LINKAGE=A

$$\Gamma(\gamma X(3915) \rightarrow \gamma \gamma J/\psi) / \Gamma_{\text{total}} \quad \Gamma_{39} / \Gamma$$

NODE=M025R39
NODE=M025R39

	<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>	
YOUR DATA	$<1.26 \times 10^{-4}$	90	28 XIAO	13	$\psi(4160) \rightarrow \gamma \gamma J/\psi$
YOUR NOTE	28 Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.				

NODE=M025R39;LINKAGE=A

$$\Gamma(\gamma X(3930) \rightarrow \gamma \gamma J/\psi) / \Gamma_{\text{total}} \quad \Gamma_{40} / \Gamma$$

NODE=M025R40
NODE=M025R40

	<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>	
YOUR DATA	$<0.88 \times 10^{-4}$	90	29 XIAO	13	$\psi(4160) \rightarrow \gamma \gamma J/\psi$
YOUR NOTE	29 Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.				

NODE=M025R40;LINKAGE=A

$$\Gamma(\gamma X(3940) \rightarrow \gamma \gamma J/\psi) / \Gamma_{\text{total}} \quad \Gamma_{41} / \Gamma$$

NODE=M025R41
NODE=M025R41

	<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>	
YOUR DATA	$<1.79 \times 10^{-4}$	90	30 XIAO	13	$\psi(4160) \rightarrow \gamma \gamma J/\psi$
YOUR NOTE	30 Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.				

NODE=M025R41;LINKAGE=A

ψ(4160) REFERENCES

NODE=M025

YOUR PAPER	XIAO	13	PR D87 057501	T. Xiao <i>et al.</i>	(NWES, WAYN)
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REFID=55381

Reference = TOMARADZE 15; PR D91 011102
Verifier code = SETH

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RU-630090 Novosibirsk
Russian Federation

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CHARMED MESONS

$(C = \pm 1)$

$D^+ = c\bar{d}, D^0 = c\bar{u}, \bar{D}^0 = \bar{c}u, D^- = \bar{c}d,$ similarly for D^{*} 's

NODE=MXXX035

NODE=MXXX035

NODE=M061

NODE=M061

NODE=M061DM

NODE=M061DM

NODE=M061DM

NODE=M061DM;LINKAGE=A

NODE=M061DM;LINKAGE=G

NODE=M061

REFID=57142
REFID=44374
REFID=43116
REFID=22877
REFID=11434
REFID=11543

$D^*(2007)^0$

$I(J^P) = \frac{1}{2}(1^-)$
 I, J, P need confirmation.

J consistent with 1, value 0 ruled out (NGUYEN 77).

$m_{D^*(2007)^0} - m_{D^0}$

The fit includes $D^\pm, D^0, D_s^\pm, D^{*\pm}, D^{*0}, D_s^{*\pm}, D_1(2420)^0, D_2^*(2460)^0,$
and $D_{s1}(2536)^\pm$ mass and mass difference measurements.

	VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
	142.016±0.030 OUR AVERAGE		Error includes scale factor of 1.5.		
YOUR DATA	142.007±0.015±0.014	10K	² TOMARADZE 15	CLEO	$e^+e^- \rightarrow$ hadrons
	142.2 ±0.3 ±0.2	145	ALBRECHT 95F	ARG	$e^+e^- \rightarrow$ hadrons
	142.12 ±0.05 ±0.05	1176	BORTOLETTO92B	CLE2	$e^+e^- \rightarrow$ hadrons
	● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
	142.2 ±2.0		SADROZINSKI 80	CBAL	$D^{*0} \rightarrow D^0\pi^0$
	142.7 ±1.7		³ GOLDHABER 77	MRK1	e^+e^-
YOUR NOTE	² Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration . This value comes from the average of the results for two decay modes, $D^0 \rightarrow K^- \pi^+$ and $D^0 \rightarrow K^- \pi^+ \pi^- \pi^+$.				
	³ From simultaneous fit to $D^*(2010)^+, D^*(2007)^0, D^+,$ and D^0 .				

$D^*(2007)^0$ REFERENCES

YOUR PAPER	TOMARADZE 15	PR D91 011102	A. Tomaradze <i>et al.</i>	(NWES)
	ALBRECHT 95F	ZPHY C66 63	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
	BORTOLETTO 92B	PRL 69 2046	D. Bortoletto <i>et al.</i>	(CLEO Collab.)
	SADROZINSKI 80	Madison Conf. 681	H.F.W. Sadrozinski <i>et al.</i>	(PRIN, CIT+)
	GOLDHABER 77	PL 69B 503	G. Goldhaber <i>et al.</i>	(Mark I Collab.)
	NGUYEN 77	PRL 39 262	H.K. Nguyen <i>et al.</i>	(LBL, SLAC) J