

Reference = ABLIKIM 16N; PR D93 112011
Verifier code = BES3

PLEASE READ NOW

*PLEASE
REPLY
WITHIN
ONE WEEK*

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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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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LIGHT UNFLAVORED MESONS
(S = C = B = 0)

For $I = 1$ (π, b, ρ, a): $u\bar{d}, (u\bar{u}-d\bar{d})/\sqrt{2}, d\bar{u};$
for $I = 0$ ($\eta, \eta', h, h', \omega, \phi, f, f'$): $c_1(u\bar{u} + d\bar{d}) + c_2(s\bar{s})$

$\eta(2225)$

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

OMITTED FROM SUMMARY TABLE
Seen in $J/\psi \rightarrow \gamma \phi \phi$. Possibly seen in $B \rightarrow \phi \phi K$ by LEES 11A.

$\eta(2225)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
2221 ⁺¹³ ₋₁₀ OUR AVERAGE				
YOUR DATA 2216 ⁺⁴⁺²¹ ₋₅₋₁₁		¹ ABLIKIM	16N BES3	$J/\psi \rightarrow \gamma K^+ K^- K^+ K^-$
2240 ⁺³⁰⁺³⁰ ₋₂₀₋₂₀	196 ± 19	ABLIKIM	08I BES	$J/\psi \rightarrow \gamma K^+ K^- K_S^0 K_L^0$
2230 ± 25 ± 15		BAI	90B MRK3	$J/\psi \rightarrow \gamma K^+ K^- K^+ K^-$
2214 ± 20 ± 13		BAI	90B MRK3	$J/\psi \rightarrow \gamma K^+ K^- K_S^0 K_L^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 2220		BISELLO	86B DM2	$J/\psi \rightarrow \gamma K^+ K^- K^+ K^-$
YOUR NOTE	¹ From a partial wave analysis of $J/\psi \rightarrow \gamma \phi \phi$ that also finds significant signals for for $\eta(2100)$, 0^-+ phase space, $f_0(2100)$, $f_2(2010)$, $f_2(2300)$, $f_2(2340)$, and a previously unseen 0^-+ state $X(2500)$ ($M = 2470^{+15+101}_{-19-23}$ MeV, $\Gamma = 230^{+64+56}_{-35-33}$ MeV).			

$\eta(2225)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
185 ⁺⁴⁰ ₋₂₀ OUR AVERAGE				
YOUR DATA 185 ⁺¹²⁺⁴³ ₋₁₄₋₁₇		¹ ABLIKIM	16N BES3	$J/\psi \rightarrow \gamma K^+ K^- K^+ K^-$
190 ± 30 ⁺⁶⁰ ₋₄₀	196 ± 19	ABLIKIM	08I BES	$J/\psi \rightarrow \gamma K^+ K^- K_S^0 K_L^0$
150 ⁺³⁰⁰ ₋₆₀ ± 60		BAI	90B MRK3	$J/\psi \rightarrow \gamma K^+ K^- K^+ K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 80		BISELLO	86B DM2	$J/\psi \rightarrow \gamma K^+ K^- K^+ K^-$
YOUR NOTE	¹ From a partial wave analysis of $J/\psi \rightarrow \gamma \phi \phi$ that also finds significant signals for for $\eta(2100)$, 0^-+ phase space, $f_0(2100)$, $f_2(2010)$, $f_2(2300)$, $f_2(2340)$, and a previously unseen 0^-+ state $X(2500)$ ($M = 2470^{+15+101}_{-19-23}$ MeV, $\Gamma = 230^{+64+56}_{-35-33}$ MeV).			

$\eta(2225)$ REFERENCES

YOUR PAPER	ABLIKIM	16N	PR D93 112011	M. Ablikim	(BES III Collab.)
	LEES	11A	PR D84 012001	J.P. Lees <i>et al.</i>	(BABAR Collab.)
	ABLIKIM	08I	PL B662 330	M. Ablikim <i>et al.</i>	(BES Collab.)
	BAI	90B	PRL 65 1309	Z. Bai <i>et al.</i>	(Mark III Collab.)
	BISELLO	86B	PL B179 294	D. Bisello <i>et al.</i>	(DM2 Collab.)

OTHER LIGHT MESONS

Further States

OMITTED FROM SUMMARY TABLE
This section contains states observed by a single group or states poorly established that thus need confirmation.

NODE=MXXX005

NODE=MXXX005

NODE=M115

NODE=M115

NODE=M115M

NODE=M115M

OCCUR=2

NODE=M115M;LINKAGE=B

NODE=M115W

NODE=M115W

NODE=M115W;LINKAGE=A

NODE=M115

REFID=57512
REFID=16595
REFID=52255
REFID=41354
REFID=22101

NODE=MXXX015

NODE=M300

NODE=M300

QUANTUM NUMBERS, MASSES, WIDTHS, AND BRANCHING RATIOS

$\eta(2100)$		$J^G(J^{PC}) = 0^+(0^{-+})$				
MASS (MeV)	WIDTH (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT	
YOUR DATA						
2050 ⁺³⁰⁺⁷⁵ ₋₂₄₋₂₆	250 ⁺³⁶⁺¹⁸¹ ₋₃₀₋₁₆₄		35 ABLIKIM	16N BES3	$J/\psi \rightarrow \gamma K^+ K^- K^+ K^-$	
2103±50	187 ± 75	586	36 BISELLO	89B DM2	$J/\psi \rightarrow 4\pi\gamma$	
YOUR NOTE	35 From a partial wave analysis of $J/\psi \rightarrow \gamma\phi\phi$, for which the primary signal is $\eta(2225) \rightarrow \phi\phi$, and that also finds significant signals for for 0^{-+} phase space, $f_0(2100)$, $f_2(2010)$, $f_2(2300)$, $f_2(2340)$, and a previously unseen 0^{-+} state $X(2500)$ ($M = 2470^{+15+101}_{-19-23}$ MeV, $\Gamma = 230^{+64+56}_{-35-33}$ MeV).					
	36 ASTON 81B sees no peak, has 850 events in Ajinenko+Barth bins. ARESTOV 80 sees no peak.					

NODE=M300J48
NODE=M300J48

NODE=M300J48;LINKAGE=A

NODE=M300J;LINKAGE=A1

REFERENCES for Further States

YOUR PAPER	ABLIKIM	16N	PR D93 112011	M. Ablikim	(BES III Collab.)
	BISELLO	89B	PR D39 701	G. Busetto <i>et al.</i>	(DM2 Collab.)
	ASTON	81B	NP B189 205	D. Aston <i>et al.</i>	(BONN, CERN, EPOL, GLAS+)
	ARESTOV	80	IHEP 80-165	Y.I. Arestov <i>et al.</i>	(SERP)

NODE=M300

REFID=57512
REFID=40575
REFID=11553
REFID=22312

$c\bar{c}$ MESONS

NODE=MXXX025

$J/\psi(1S)$	$J^G(J^{PC}) = 0^-(1^{--})$
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NODE=M070

$J/\psi(1S)$ BRANCHING RATIOS

NODE=M070230

RADIATIVE DECAYS

NODE=M070310

$\Gamma(\gamma\eta(2225))/\Gamma_{\text{total}}$		Γ_{204}/Γ	
VALUE (units 10^{-4})	EVTs	DOCUMENT ID	TECN COMMENT
3.14 ^{+0.50} _{-0.19}	OUR AVERAGE		
YOUR DATA			
2.40±0.10 ^{+2.47} _{-0.18}		1,2 ABLIKIM	16N BES3 $J/\psi \rightarrow \gamma K^+ K^- K^+ K^-$
4.4 ±0.4 ±0.8	196	2 ABLIKIM	08I BES $J/\psi \rightarrow \gamma K^+ K^- K_S^0 K_L^0$
3.3 ±0.8 ±0.5		2 BAI	90B MRK3 $J/\psi \rightarrow \gamma K^+ K^- K^+ K^-$
2.7 ±0.6 ±0.6		2 BAI	90B MRK3 $J/\psi \rightarrow \gamma K^+ K^- K_S^0 K_L^0$
2.4 ^{+1.5} _{-1.0}		3,4 BISELLO	89B DM2 $J/\psi \rightarrow 4\pi\gamma$
YOUR NOTE	1 From a partial wave analysis of $J/\psi \rightarrow \gamma\phi\phi$ that also finds significant signals for for $\eta(2100)$, 0^{-+} phase space, $f_0(2100)$, $f_2(2010)$, $f_2(2300)$, $f_2(2340)$, and a previously unseen 0^{-+} state $X(2500)$ ($M = 2470^{+15+101}_{-19-23}$ MeV, $\Gamma = 230^{+64+56}_{-35-33}$ MeV).		
YOUR NOTE	2 Includes unknown branching fraction to $\phi\phi$. 3 Estimated by us from various fits. 4 Includes unknown branching fraction to $\rho^0\rho^0$.		

OCCUR=2

NODE=M070S21;LINKAGE=C

NODE=M070S21;LINKAGE=U
NODE=M070S21;LINKAGE=A
NODE=M070S21;LINKAGE=B

$J/\psi(1S)$ REFERENCES

NODE=M070

YOUR PAPER	ABLIKIM	16N	PR D93 112011	M. Ablikim	(BES III Collab.)
	ABLIKIM	08I	PL B662 330	M. Ablikim <i>et al.</i>	(BES Collab.)
	BAI	90B	PRL 65 1309	Z. Bai <i>et al.</i>	(Mark III Collab.)
	BISELLO	89B	PR D39 701	G. Busetto <i>et al.</i>	(DM2 Collab.)

REFID=57512
REFID=52255
REFID=41354
REFID=40575