

X(3915)

$$I^G(J^{PC}) = 0^+(0 \text{ or } 2^{++})$$

was $\chi_{c0}(3915)$

The experimental analysis prefers $J^{PC} = 0^{++}$. However, a re-analysis presented in ZHOU 15C shows that if helicity-2 dominance assumption is abandoned and a sizable helicity-0 component is allowed, a $J^{PC} = 2^{++}$ assignment is possible.

X(3915) MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
3918.4 ± 1.9 OUR AVERAGE				
3919.4 ± 2.2 ± 1.6	59 ± 10	LEES	12AD BABR	$e^+e^- \rightarrow e^+e^-\omega J/\psi$
3919.1 ⁺ ₋ 3.8 ± 3.4 ± 2.0		DEL-AMO-SA..10B	BABR	$B \rightarrow \omega J/\psi K$
3915 ± 3 ± 2	49 ± 15	UEHARA	10 BELL	10.6 $e^+e^- \rightarrow e^+e^-\omega J/\psi$
3943 ± 11 ± 13	58 ± 11	¹ CHOI	05 BELL	$B \rightarrow \omega J/\psi K$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3914.6 ⁺ ₋ 3.8 ± 3.4 ± 2.0		¹ AUBERT	08W BABR	Superseded by DEL-AMO-SANCHEZ 10B
¹ $\omega J/\psi$ threshold enhancement fitted as an S-wave Breit-Wigner resonance.				

X(3915) WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
20 ± 5 OUR AVERAGE	Error includes scale factor of 1.1.			
13 ± 6 ± 3	59 ± 10	LEES	12ADBABR	$e^+e^- \rightarrow e^+e^-\omega J/\psi$
31 ⁺ ₋ 10 ± 8 ± 5		DEL-AMO-SA..10B	BABR	$B \rightarrow \omega J/\psi K$
17 ± 10 ± 3	49 ± 15	UEHARA	10 BELL	10.6 $e^+e^- \rightarrow e^+e^-\omega J/\psi$
87 ± 22 ± 26	58 ± 11	² CHOI	05 BELL	$B \rightarrow \omega J/\psi K$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
34 ⁺ ₋ 12 ± 8 ± 5		² AUBERT	08W BABR	Superseded by DEL-AMO-SANCHEZ 10B
² $\omega J/\psi$ threshold enhancement fitted as an S-wave Breit-Wigner resonance.				

X(3915) DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $\omega J/\psi$	seen
Γ_2 $\overline{D}^{*0} D^0$	
Γ_3 $\pi^+ \pi^- \eta_c(1S)$	not seen
Γ_4 $\eta_c \eta$	not seen
Γ_5 $\eta_c \pi^0$	not seen
Γ_6 $K \overline{K}$	not seen
Γ_7 $\gamma \gamma$	seen

X(3915) $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$\Gamma(\omega J/\psi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_1\Gamma_7/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
54 ± 9	OUR AVERAGE			
52 ± 10 ± 3	59 ± 10	³ LEES	12AD BABR	$e^+e^- \rightarrow e^+e^-\omega J/\psi$
61 ± 17 ± 8	49 ± 15	³ UEHARA	10 BELL	10.6 $e^+e^- \rightarrow e^+e^-\omega J/\psi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
18 ± 5 ± 2	49 ± 15	⁴ UEHARA	10 BELL	10.6 $e^+e^- \rightarrow e^+e^-\omega J/\psi$
³ For $J^P = 0^+$.				
⁴ For $J^P = 2^+$, helicity-2.				

$\Gamma(\pi^+\pi^-\eta_c(1S)) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_3\Gamma_7/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
<16	90	LEES	12AE BABR	$e^+e^- \rightarrow e^+e^-\pi^+\pi^-\eta_c$

$\Gamma(K\bar{K}) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_6\Gamma_7/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
<1.96	90	UEHARA	13 BELL	$\gamma\gamma \rightarrow K_S^0 K_S^0$

X(3915) BRANCHING RATIOS

$\Gamma(\omega J/\psi)/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
seen	⁵ DEL-AMO-SA...10B	BABR	$B \rightarrow \omega J/\psi K$
seen	⁶ CHOI	05 BELL	$B \rightarrow \omega J/\psi K$
⁵ DEL-AMO-SANCHEZ 10B reports $B(B^\pm \rightarrow X(3915)K^\pm) \times B(X(3915) \rightarrow J/\psi\omega) = (3.0^{+0.7+0.5}_{-0.6-0.3}) \times 10^{-5}$ and $B(B^0 \rightarrow X(3915)K^0) \times B(X(3915) \rightarrow J/\psi\omega) = (2.1 \pm 0.9 \pm 0.3) \times 10^{-5}$.			
⁶ CHOI 05 reports $B(B \rightarrow X(3915)K) \times B(X(3915) \rightarrow J/\psi\omega) = (7.1 \pm 1.3 \pm 3.1) \times 10^{-5}$.			

$\Gamma(\omega J/\psi)/\Gamma(\bar{D}^{*0}D^0)$ Γ_1/Γ_2

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
>0.71	90	⁷ AUSHEV	10 BELL	$B \rightarrow \bar{D}^{*0}D^0 K$
⁷ By combining the upper limit $B(B \rightarrow X(3915)K) \times B(X(3915) \rightarrow D^{*0}\bar{D}^0) < 0.67 \times 10^{-4}$ from AUSHEV 10 with the average of CHOI 05 and AUBERT 08W measurements $B(B \rightarrow X(3915)K) \times B(X(3915) \rightarrow \omega J/\psi) = (0.51 \pm 0.11) \times 10^{-4}$.				

$\Gamma(\eta_c\eta)/\Gamma_{\text{total}}$ Γ_4/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
not seen	⁸ VINOKUROVA 15	BELL	$B^+ \rightarrow K^+\eta_c\eta$
⁸ VINOKUROVA 15 reports $B(B^+ \rightarrow K^+X(3915)^0) \times B(X \rightarrow \eta_c\eta) < 3.3 \times 10^{-5}$ at 90% CL.			

$\Gamma(\eta_c\pi^0)/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
not seen	⁹ VINOKUROVA 15	BELL	$B^+ \rightarrow K^+\eta_c\pi^0$
⁹ VINOKUROVA 15 reports $B(B^+ \rightarrow K^+X(3915)^0) \times B(X \rightarrow \eta_c\pi^0) < 1.8 \times 10^{-5}$ at 90% CL.			

$\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$				Γ_7/Γ
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
seen	59 ± 10	LEES	12AD BABR	$e^+e^- \rightarrow e^+e^-\omega J/\psi$
seen		UEHARA	10 BELL	$10.6 e^+e^- \rightarrow e^+e^-\omega J/\psi$

X(3915) REFERENCES

VINOKUROVA	15	JHEP 1506 132	A. Vinokurova <i>et al.</i>	(BELLE Collab.)
Also		JHEP 1702 088 (errat.)	A. Vinokurava <i>et al.</i>	(BELLE Collab.)
ZHOU	15C	PRL 115 022001	Z.-Y. Zhou, Z. Xiao, H.-Q. Zhou	(BEIJT, NANJ)
UEHARA	13	PTEP 2013 123C01	S. Uehara <i>et al.</i>	(BELLE Collab.)
LEES	12AD	PR D86 072002	J.P. Lees <i>et al.</i>	(BABAR Collab.)
LEES	12AE	PR D86 092005	J.P. Lees <i>et al.</i>	(BABAR Collab.)
AUSHEV	10	PR D81 031103	T. Aushev <i>et al.</i>	(BELLE Collab.)
DEL-AMO-SA...	10B	PR D82 011101	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
UEHARA	10	PRL 104 092001	S. Uehara <i>et al.</i>	(BELLE Collab.)
AUBERT	08W	PRL 101 082001	B. Aubert <i>et al.</i>	(BABAR Collab.)
CHOI	05	PRL 94 182002	S.-K. Choi <i>et al.</i>	(BELLE Collab.)