$X(3915)$

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

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	$e^+ e^- \to e^+ e^- \omega J/\psi$
$3919.1^{+3.8}_{-3.4} \pm 2.0$		DEL-AMO-SA...	10B	BABR	$B \to \omega J/\psi K$
3915 ± 3 ± 2	49 ± 15	UEHARA	10	BELL	10.6 $e^+ e^- \to e^+ e^- \omega J/\psi$
3943 ±11 ±13	58 ± 11	[1] CHOI	05	BELL	$B \to \omega J/\psi K$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$3914.6^{+3.8}_{-3.4} \pm 2.0$		[1] AUBERT	08W	BABR	Superseded by DEL-AMO-SANCHEZ 10B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	12AD	BABR	$e^+ e^- \to e^+ e^- \omega J/\psi$
$31^{+10}_{-8} \pm 5$		DEL-AMO-SA...	10B	BABR	$B \to \omega J/\psi K$
17±10± 3	49 ± 15	UEHARA	10	BELL	10.6 $e^+ e^- \to e^+ e^- \omega J/\psi$
87±22±26	58 ± 11	[2] CHOI	05	BELL	$B \to \omega J/\psi K$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$34^{+12}_{-8} \pm 5$		[2] AUBERT	08W	BABR	Superseded by DEL-AMO-SANCHEZ 10B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

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

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

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.

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

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

$\Gamma(K\overline{K}) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_6\Gamma_7/\Gamma$

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

$X(3915)$ BRANCHING RATIOS

$\Gamma(\omega J/\psi)/\Gamma_{total}$ — 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 $B(B^\pm \rightarrow X(3915) K^\pm) \times B(X(3915) \rightarrow J/\psi\omega) = (3.0^{+0.7}_{-0.6}{}^{+0.5}_{-0.3}) \times 10^{-5}$ 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 $B(B \rightarrow X(3915) K) \times B(X(3915) \rightarrow J/\psi\omega) = (7.1 \pm 1.3 \pm 3.1) \times 10^{-5}$.

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
>0.71	90	[7] AUSHEV	10	BELL	$B \rightarrow \overline{D}^{*0} D^0 K$

[7] By combining the upper limit $B(B \rightarrow X(3915) K) \times B(X(3915) \rightarrow D^{*0}\overline{D}^0) < 0.67 \times 10^{-4}$ from AUSHEV 10 with the average of CHOI 05 and AUBERT 08W measurements $B(B \rightarrow X(3915) K) \times B(X(3915) \rightarrow \omega J/\psi) = (0.51 \pm 0.11) \times 10^{-4}$.

$\Gamma(\eta_c \eta)/\Gamma_{total}$ — 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.

$\Gamma(\eta_c \pi^0)/\Gamma_{total}$ — 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.

$\Gamma(\gamma\gamma)/\Gamma_{total}$ Γ_7/Γ

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