

$\chi_{c0}(2P)$   
was  $X(3915)$

$$J^{PC} = 0^+(0^{++})$$

### $\chi_{c0}(2P)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>3918.4 ± 1.9 OUR AVERAGE</b>				
3919.4 ± 2.2 ± 1.6	59 ± 10	LEES	12AD BABR	$e^+e^- \rightarrow e^+e^-\omega J/\psi$
3919.1 <sup>+</sup> <sub>-</sub> 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	<sup>1</sup> CHOI	05 BELL	$B \rightarrow \omega J/\psi K$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
3914.6 <sup>+</sup> <sub>-</sub> 3.8 ± 3.4 ± 2.0		<sup>1</sup> AUBERT	08W BABR	Superseded by DEL-AMO-SANCHEZ 10B
<sup>1</sup> $\omega J/\psi$ threshold enhancement fitted as an S-wave Breit-Wigner resonance.				

### $\chi_{c0}(2P)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>20 ± 5 OUR AVERAGE</b> Error includes scale factor of 1.1.				
13 ± 6 ± 3	59 ± 10	LEES	12AD BABR	$e^+e^- \rightarrow e^+e^-\omega J/\psi$
31 <sup>+</sup> <sub>-</sub> 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	<sup>2</sup> CHOI	05 BELL	$B \rightarrow \omega J/\psi K$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
34 <sup>+</sup> <sub>-</sub> 12 ± 8 ± 5		<sup>2</sup> AUBERT	08W BABR	Superseded by DEL-AMO-SANCHEZ 10B
<sup>2</sup> $\omega J/\psi$ threshold enhancement fitted as an S-wave Breit-Wigner resonance.				

### $\chi_{c0}(2P)$ DECAY MODES

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $\omega J/\psi$	seen
$\Gamma_2$ $\bar{D}^{*0} D^0$	
$\Gamma_3$ $\pi^+ \pi^- \eta_c(1S)$	not seen
$\Gamma_4$ $\gamma\gamma$	seen

### $\chi_{c0}(2P) \Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

#### $\Gamma(\omega J/\psi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_1\Gamma_4/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
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#### **54 ± 9 OUR AVERAGE**

52 ± 10 ± 3	59 ± 10	<sup>3</sup> LEES	12AD BABR	$e^+e^- \rightarrow e^+e^-\omega J/\psi$
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61 ± 17 ± 8	49 ± 15	<sup>3</sup> UEHARA	10 BELL	10.6 $e^+e^- \rightarrow e^+e^-\omega J/\psi$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

18 ± 5 ± 2	49 ± 15	<sup>4</sup> UEHARA	10 BELL	10.6 $e^+e^- \rightarrow e^+e^-\omega J/\psi$
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<sup>3</sup> For  $J^P = 0^+$ .

<sup>4</sup> For  $J^P = 2^+$ , helicity-2.

#### $\Gamma(\pi^+\pi^-\eta_c(1S)) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_3\Gamma_4/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
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<16	90	LEES	12AE BABR	$e^+e^- \rightarrow e^+e^-\pi^+\pi^-\eta_c$
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### $\chi_{c0}(2P)$ BRANCHING RATIOS

#### $\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_4/\Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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seen	59 ± 10	LEES	12AD BABR	$e^+e^- \rightarrow e^+e^-\omega J/\psi$
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seen		UEHARA	10 BELL	10.6 $e^+e^- \rightarrow e^+e^-\omega J/\psi$
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#### $\Gamma(\omega J/\psi)/\Gamma(\bar{D}^{*0}D^0)$ $\Gamma_1/\Gamma_2$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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>0.71	90	<sup>5</sup> AUSHEV	10 BELL	$B \rightarrow \bar{D}^{*0}D^0 K$
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<sup>5</sup> 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  $B(B \rightarrow X(3915)K) \times B(X(3915) \rightarrow \omega J/\psi) = (0.51 \pm 0.11) \times 10^{-4}$ .

#### $\Gamma(\omega J/\psi)/\Gamma_{\text{total}}$ $\Gamma_1/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
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seen	<sup>6</sup> DEL-AMO-SA...10B	BABR	$B \rightarrow \omega J/\psi K$
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seen	<sup>7</sup> CHOI	05 BELL	$B \rightarrow \omega J/\psi K$
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<sup>6</sup> 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  $B(B^0 \rightarrow X(3915)K^0) \times B(X(3915) \rightarrow J/\psi\omega) = (2.1 \pm 0.9 \pm 0.3) \times 10^{-5}$ .

<sup>7</sup> CHOI 05 reports  $B(B \rightarrow X(3915)K) \times B(X(3915) \rightarrow J/\psi\omega) = (7.1 \pm 1.3 \pm 3.1) \times 10^{-5}$ .

### $\chi_{c0}(2P)$ REFERENCES

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.)