

$\chi_{c1}(3872)$

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

also known as $X(3872)$

This state shows properties different from a conventional $q\bar{q}$ state. A candidate for an exotic structure. See the review on non- $q\bar{q}$ states.

First observed by CHOI 03 in $B \rightarrow K\pi^+\pi^- J/\psi(1S)$ decays as a narrow peak in the invariant mass distribution of the $\pi^+\pi^- J/\psi(1S)$ final state. Isovector hypothesis excluded by AUBERT 05B and CHOI 11.

AAIJ 13Q perform a full five-dimensional amplitude analysis of the angular correlations between the decay products in $B^+ \rightarrow \chi_{c1}(3872)K^+$ decays, where $\chi_{c1}(3872) \rightarrow J/\psi\pi^+\pi^-$ and $J/\psi \rightarrow \mu^+\mu^-$, which unambiguously gives the $J^{PC} = 1^{++}$ assignment under the assumption that the $\pi^+\pi^-$ and J/ψ are in an S -wave. AAIJ 15AO extend this analysis with more data to limit D -wave contributions to $< 4\%$ at 95% CL.

See the review on "Spectroscopy of Mesons Containing Two Heavy Quarks."

 $\chi_{c1}(3872)$ MASS FROM $J/\psi X$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
3871.65 ± 0.06	OUR AVERAGE			
3871.64 ± 0.06 ± 0.01	19.8k	¹ AAIJ	20S LHCB	$B^+ \rightarrow J/\psi\pi^+\pi^- K^+$
3871.9 ± 0.7 ± 0.2	20	ABLIKIM	14 BES3	$e^+e^- \rightarrow J/\psi\pi^+\pi^-\gamma$
3871.95 ± 0.48 ± 0.12	0.6k	AAIJ	12H LHCB	$p\bar{p} \rightarrow J/\psi\pi^+\pi^- X$
3871.85 ± 0.27 ± 0.19	170	² CHOI	11 BELL	$B \rightarrow K\pi^+\pi^- J/\psi$
3873 + 1.8 - 1.6 ± 1.3	27	³ DEL-AMO-SA..10B	BABR	$B \rightarrow \omega J/\psi K$
3871.61 ± 0.16 ± 0.19	6k	^{3,4} AALTONEN	09AU CDF2	$p\bar{p} \rightarrow J/\psi\pi^+\pi^- X$
3871.4 ± 0.6 ± 0.1	93.4	AUBERT	08Y BABR	$B^+ \rightarrow K^+ J/\psi\pi^+\pi^-$
3868.7 ± 1.5 ± 0.4	9.4	AUBERT	08Y BABR	$B^0 \rightarrow K_S^0 J/\psi\pi^+\pi^-$
3871.8 ± 3.1 ± 3.0	522	^{3,5} ABAZOV	04F D0	$p\bar{p} \rightarrow J/\psi\pi^+\pi^- X$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
3871.695 ± 0.067 ± 0.068	15.6k	⁶ AAIJ	20AD LHCB	$p\bar{p} \rightarrow J/\psi\pi^+\pi^- X$
3871.59 ± 0.06 ± 0.03	4.2k	⁷ AAIJ	20S LHCB	$B^+ \rightarrow J/\psi\pi^+\pi^- K^+$
3873.3 ± 1.1 ± 1.0	45	⁸ ABLIKIM	19V BES	$e^+e^- \rightarrow \gamma\omega J/\psi$
3860.0 ± 10.4	13.6	^{3,9} AGHASYAN	18A COMP	$\gamma^* N \rightarrow X\pi^\pm N'$
3868.6 ± 1.2 ± 0.2	8	¹⁰ AUBERT	06 BABR	$B^0 \rightarrow K_S^0 J/\psi\pi^+\pi^-$

3871.3	± 0.6	± 0.1	61	¹⁰ AUBERT	06	BABR	$B^- \rightarrow K^- J/\psi \pi^+ \pi^-$
3873.4	± 1.4		25	¹¹ AUBERT	05R	BABR	$B^+ \rightarrow K^+ J/\psi \pi^+ \pi^-$
3871.3	± 0.7	± 0.4	730	^{3,12} ACOSTA	04	CDF2	$\rho \bar{p} \rightarrow J/\psi \pi^+ \pi^- X$
3872.0	± 0.6	± 0.5	36	¹³ CHOI	03	BELL	$B \rightarrow K \pi^+ \pi^- J/\psi$
3836	± 13		58	^{3,14} ANTONIAZZI	94	E705	$300 \pi^\pm L_i \rightarrow J/\psi \pi^+ \pi^- X$

¹ Calculated from $m_{\chi_{c1}(3872)} - m_{\psi(2S)} = 185.54 \pm 0.06$ MeV obtained by combining the data with $\chi_{c1}(3872)$ produced in B^+ decays from AAIJ 20S and inclusive b -hadron decays from AAIJ 20AD and using $m_{\psi(2S)} = 3686.097$ MeV. Breit-Wigner parametrization.

² The mass difference for the $\chi_{c1}(3872)$ produced in B^+ and B^0 decays is $(-0.71 \pm 0.96 \pm 0.19)$ MeV.

³ Width consistent with detector resolution.

⁴ A possible equal mixture of two states with a mass difference greater than 3.6 MeV/ c^2 is excluded at 95% CL.

⁵ Calculated from the corresponding $m_{\chi_{c1}(3872)} - m_{J/\psi}$ using $m_{J/\psi} = 3096.916$ MeV.

⁶ Using $\chi_{c1}(3872)$ produced in inclusive b -hadron decays and $m_{\psi(2S)} = 3686.097 \pm 0.010$ MeV. Breit-Wigner parametrization. Superseded by the combined value in AAIJ 20S.

⁷ Using Breit-Wigner parametrization. Superseded by the combined value in AAIJ 20S.

⁸ Fit with fixed width and including two resonances, $\chi_{c0}(3915)$ and $X(3960)$.

⁹ Could be a different state.

¹⁰ Calculated from the corresponding $m_{\chi_{c1}(3872)} - m_{\psi(2S)}$ using $m_{\psi(2S)} = 3686.093$ MeV. Superseded by AUBERT 08Y.

¹¹ Calculated from the corresponding $m_{\chi_{c1}(3872)} - m_{\psi(2S)}$ using $m_{\psi(2S)} = 3685.96$ MeV. Superseded by AUBERT 06.

¹² Superseded by AALTONEN 09AU.

¹³ Superseded by CHOI 11.

¹⁴ A lower mass value can be due to an incorrect momentum scale for soft pions.

$\chi_{c1}(3872)$ MASS FROM $\bar{D}^{*0} D^0$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$3872.9^{+0.6+0.4}_{-0.4-0.5}$	50	^{1,2} AUSHEV	10	BELL $B \rightarrow \bar{D}^{*0} D^0 K$
$3875.1^{+0.7}_{-0.5} \pm 0.5$	33 ± 6	² AUBERT	08B	BABR $B \rightarrow \bar{D}^{*0} D^0 K$
$3875.2 \pm 0.7^{+0.9}_{-1.8}$	24 ± 6	^{2,3} GOKHROO	06	BELL $B \rightarrow D^0 \bar{D}^0 \pi^0 K$

¹ Calculated from the measured $m_{\chi_{c1}(3872)} - m_{D^{*0}} - m_{\bar{D}^0} = 1.1^{+0.6+0.1}_{-0.4-0.3}$ MeV.

² Experiments report $D^{*0} \bar{D}^0$ invariant mass above $D^{*0} \bar{D}^0$ threshold because D^{*0} decay products are kinematically constrained to the D^{*0} mass, even though the D^{*0} may decay off-shell.

³ Superseded by AUSHEV 10.

$m_{\chi_{c1}(3872)} - m_{J/\psi}$

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
$774.9 \pm 3.1 \pm 3.0$	522	ABAZOV	04F	D0 $\rho \bar{p} \rightarrow J/\psi \pi^+ \pi^- X$

$m_{\chi_{c1}(3872)} - m_{\psi(2S)}$

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$185.598 \pm 0.067 \pm 0.068$	15.6k	¹ AAIJ	20AD LHCB	$pp \rightarrow J/\psi \pi^+ \pi^- X$
185.54 ± 0.06	19.8k	² AAIJ	20S LHCB	$pp \rightarrow J/\psi \pi^+ \pi^- X$
187.4 ± 1.4	25	³ AUBERT	05R BABR	$B^+ \rightarrow K^+ J/\psi \pi^+ \pi^-$

¹ Using $\chi_{c1}(3872)$ produced in inclusive b -hadron decays. Breit-Wigner parametrization. Superseded by the combined value in AAIJ 20S.

² Combining $m_{\chi_{c1}(3872)} - m_{\psi(2S)} = 185.49 \pm 0.06 \pm 0.03$ MeV from AAIJ 20S and the measured mass difference from AAIJ 20AD. Breit-Wigner parametrization.

³ Superseded by AUBERT 06.

 $\chi_{c1}(3872)$ WIDTH

VALUE (MeV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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1.19 ± 0.21 OUR AVERAGE Error includes scale factor of 1.1.

$1.39 \pm 0.24 \pm 0.10$	15.6k	¹ AAIJ	20AD LHCB	$pp \rightarrow J/\psi \pi^+ \pi^- X$
$0.96^{+0.19}_{-0.18} \pm 0.21$	4.2k	² AAIJ	20S LHCB	$B^+ \rightarrow J/\psi \pi^+ \pi^- K^+$

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

<2.4	90	ABLIKIM	14 BES3	$e^+ e^- \rightarrow J/\psi \pi^+ \pi^- \gamma$
<1.2	90	CHOI	11 BELL	$B \rightarrow K \pi^+ \pi^- J/\psi$
<3.3	90	AUBERT	08Y BABR	$B^+ \rightarrow K^+ J/\psi \pi^+ \pi^-$
<4.1	90	69 AUBERT	06 BABR	$B \rightarrow K \pi^+ \pi^- J/\psi$
<2.3	90	36 ³ CHOI	03 BELL	$B \rightarrow K \pi^+ \pi^- J/\psi$

¹ Using $\chi_{c1}(3872)$ produced in inclusive b -hadron decays. Breit-Wigner parametrization.

² Using Breit-Wigner parametrization. Partially overlapping dataset with that of AAIJ 20AD.

³ Superseded by CHOI 11.

 $\chi_{c1}(3872)$ WIDTH FROM $\bar{D}^{*0} D^0$ MODE

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$3.9^{+2.8+0.2}_{-1.4-1.1}$	50	¹ AUSHEV	10 BELL	$B \rightarrow \bar{D}^{*0} D^0 K$
$3.0^{+1.9}_{-1.4} \pm 0.9$	33 ± 6	AUBERT	08B BABR	$B \rightarrow \bar{D}^{*0} D^0 K$

¹ With a measured value of $B(B \rightarrow \chi_{c1}(3872) K) \times B(\chi_{c1}(3872) \rightarrow D^{*0} \bar{D}^0) = (0.80 \pm 0.20 \pm 0.10) \times 10^{-4}$, assumed to be equal for both charged and neutral modes.

 $\chi_{c1}(3872)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1 $e^+ e^-$	< 2.8 $\times 10^{-6}$	90%
Γ_2 $\pi^+ \pi^- J/\psi(1S)$	(3.8 ± 1.2) %	
Γ_3 $\pi^+ \pi^- \pi^0 J/\psi(1S)$	not seen	
Γ_4 $\omega \eta_c(1S)$	< 33 %	90%
Γ_5 $\omega J/\psi(1S)$	(4.3 ± 2.1) %	

Γ_6	$\phi\phi$	not seen		
Γ_7	$D^0\bar{D}^0\pi^0$	(49 $\begin{smallmatrix} +18 \\ -20 \end{smallmatrix}$) %		
Γ_8	$\bar{D}^{*0}D^0$	(37 \pm 9) %		
Γ_9	$\gamma\gamma$	< 11	%	90%
Γ_{10}	$D^0\bar{D}^0$	< 29	%	90%
Γ_{11}	D^+D^-	< 19	%	90%
Γ_{12}	$\pi^0\chi_{c2}$	< 4	%	90%
Γ_{13}	$\pi^0\chi_{c1}$	(3.4 \pm 1.6) %		
Γ_{14}	$\pi^0\chi_{c0}$	< 70	%	90%
Γ_{15}	$\pi^+\pi^-\eta_c(1S)$	< 14	%	90%
Γ_{16}	$\pi^+\pi^-\chi_{c1}$	< 7	$\times 10^{-3}$	90%
Γ_{17}	$\rho\bar{\rho}$	< 2.4	$\times 10^{-5}$	95%

Radiative decays

Γ_{18}	γD^+D^-	< 4	%	90%
Γ_{19}	$\gamma\bar{D}^0D^0$	< 6	%	90%
Γ_{20}	$\gamma J/\psi$	(8 \pm 4) $\times 10^{-3}$		
Γ_{21}	$\gamma\chi_{c1}$	< 9	$\times 10^{-3}$	90%
Γ_{22}	$\gamma\chi_{c2}$	< 3.2	%	90%
Γ_{23}	$\gamma\psi(2S)$	(4.5 \pm 2.0) %		

C-violating decays

Γ_{24}	$\eta J/\psi$	< 1.8	%	90%
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$\chi_{c1}(3872)$ PARTIAL WIDTHS

$\Gamma(e^+e^-)$ Γ_1

<u>VALUE (eV)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 4.3	90	¹ ABLIKIM	15v BES3	4.0–4.4 $e^+e^- \rightarrow \pi^+\pi^- J/\psi$
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< 280	90	² YUAN	04 RVUE	$e^+e^- \rightarrow \pi^+\pi^- J/\psi$
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¹ ABLIKIM 15v reports this limit from the measurement of $\Gamma(\chi_{c1}(3872) \rightarrow \pi^+\pi^- J/\psi(1S)) \times \Gamma(\chi_{c1}(3872) \rightarrow e^+e^-) / \Gamma < 0.13$ eV using $\Gamma(\chi_{c1}(3872) \rightarrow \pi^+\pi^- J/\psi(1S)) / \Gamma = 3\%$.

² Using BAI 98E data on $e^+e^- \rightarrow \pi^+\pi^-\ell^+\ell^-$. Assuming that $\Gamma(\pi^+\pi^- J/\psi)$ of $\chi_{c1}(3872)$ is the same as that of $\psi(2S)$ (85.4 keV).

$\Gamma(\gamma\gamma) \times \Gamma(\pi^+\pi^- J/\psi(1S)) / \Gamma_{\text{total}}$ $\Gamma_9\Gamma_2/\Gamma$

$\chi_{c1}(3872) \Gamma(i)\Gamma(e^+e^-) / \Gamma(\text{total})$

$\Gamma(\pi^+\pi^- J/\psi(1S)) \times \Gamma(e^+e^-) / \Gamma_{\text{total}}$ $\Gamma_2\Gamma_1/\Gamma$

<u>VALUE (eV)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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< 0.13	90	ABLIKIM	15v BES3	4.0–4.4 $e^+e^- \rightarrow \pi^+\pi^- J/\psi$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 6.2	90	^{1,2} AUBERT	05D	BABR	$10.6 e^+ e^- \rightarrow K^+ K^- \pi^+ \pi^- \gamma$
< 8.3	90	² DOBBS	05	CLE3	$e^+ e^- \rightarrow \pi^+ \pi^- J/\psi$
<10	90	³ YUAN	04	RVUE	$e^+ e^- \rightarrow \pi^+ \pi^- J/\psi$

¹ Using $B(\chi_{c1}(3872) \rightarrow J/\psi \pi^+ \pi^-) \cdot B(J/\psi \rightarrow \mu^+ \mu^-) \cdot \Gamma(\chi_{c1}(3872) \rightarrow e^+ e^-) < 0.37$ eV from AUBERT 05D and $B(J/\psi \rightarrow \mu^+ \mu^-) = 0.0588 \pm 0.0010$ from the PDG 04.

² Assuming $\chi_{c1}(3872)$ has $J^{PC} = 1^{--}$.

³ Using BAI 98E data on $e^+ e^- \rightarrow \pi^+ \pi^- \ell^+ \ell^-$. From theoretical calculation of the production cross section and using $B(J/\psi \rightarrow \mu^+ \mu^-) = (5.88 \pm 0.10)\%$.

$\chi_{c1}(3872) \Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$\Gamma(\pi^+ \pi^- J/\psi(1S)) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$					$\Gamma_2 \Gamma_9 / \Gamma$
<u>VALUE (eV)</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>

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

$5.5^{+4.1}_{-3.8} \pm 0.7$	3	¹ TERAMOTO	21	BELL	$e^+ e^- \rightarrow \gamma^* \gamma$ at $\gamma(\text{nS})$
<12.9	90	² DOBBS	05	CLE3	$e^+ e^- \rightarrow \pi^+ \pi^- J/\psi \gamma$

¹ Measured in single-tag two-photon production assuming Q^2 dependence of a $c\bar{c}$ meson model. Here, $\Gamma(\chi_{c1}(3872) \rightarrow \gamma\gamma)$ is the reduced two-photon decay width, $\tilde{\Gamma}_{\gamma\gamma}$.

² Assuming $\chi_{c1}(3872)$ has positive C parity and spin 0.

$\Gamma(\omega J/\psi(1S)) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$					$\Gamma_5 \Gamma_9 / \Gamma$
<u>VALUE (eV)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	

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

<1.7	90	¹ LEES	12AD	BABR	$e^+ e^- \rightarrow e^+ e^- \omega J/\psi$
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¹ Assuming $\chi_{c1}(3872)$ has spin 2.

$\Gamma(\pi^+ \pi^- \eta_c(1S)) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$					$\Gamma_{15} \Gamma_9 / \Gamma$
<u>VALUE (eV)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<11.1	90	LEES	12AE	BABR	$e^+ e^- \rightarrow e^+ e^- \pi^+ \pi^- \eta_c$

$\chi_{c1}(3872)$ BRANCHING RATIOS

$\Gamma(\pi^+ \pi^- J/\psi(1S))/\Gamma_{\text{total}}$					Γ_2/Γ
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.038 ± 0.012					OUR AVERAGE
$0.038 \pm 0.002 \pm 0.012$		¹ AAIJ	20S	LHCB	$B^+ \rightarrow J/\psi \pi^+ \pi^- K^+$
$0.041 \pm 0.005 \pm 0.013$		² CHOI	11	BELL	$B^+ \rightarrow \pi^+ \pi^- J/\psi K^+$
$0.040 \pm 0.008 \pm 0.013$	93	^{3,4} AUBERT	08Y	BABR	$B \rightarrow \chi_{c1}(3872) K$

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

seen	151	⁵ BALA	15	BELL	$B \rightarrow \chi_{c1}(3872) K \pi$
$0.061 \pm 0.020 \pm 0.020$	30	⁶ AUBERT	05R	BABR	$B^+ \rightarrow K^+ \pi^+ \pi^- J/\psi$
$0.065 \pm 0.014 \pm 0.021$	36	⁷ CHOI	03	BELL	$B^+ \rightarrow K^+ \pi^+ \pi^- J/\psi$

¹ AAIJ 20S reports $[\Gamma(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi(1S))/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] = (7.95 \pm 0.15 \pm 0.33) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = (2.1 \pm 0.7) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² CHOI 11 reports $[\Gamma(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi(1S))/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] = (8.63 \pm 0.82 \pm 0.52) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = (2.1 \pm 0.7) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

³ AUBERT 08Y reports $[\Gamma(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi(1S))/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] = (8.4 \pm 1.5 \pm 0.7) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = (2.1 \pm 0.7) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

⁴ superseded by LEES 20C

⁵ BALA 15 reports $B(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi) \times B(B^0 \rightarrow \chi_{c1}(3872) K^+ \pi^-) = (7.9 \pm 1.3 \pm 0.4) \times 10^{-6}$ and $B(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi) \times B(B^+ \rightarrow \chi_{c1}(3872) K^0 \pi^+) = (10.6 \pm 3.0 \pm 0.9) \times 10^{-6}$.

⁶ Superseded by AUBERT 08Y. AUBERT 05R reports $[\Gamma(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi(1S))/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] = (1.28 \pm 0.41) \times 10^{-5}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = (2.1 \pm 0.7) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

⁷ CHOI 03 reports $[\Gamma(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- J/\psi(1S))/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] / [B(B^+ \rightarrow \psi(2S) K^+)] / [B(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)] = 0.063 \pm 0.012 \pm 0.007$ which we multiply or divide by our best values $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = (2.1 \pm 0.7) \times 10^{-4}$, $B(B^+ \rightarrow \psi(2S) K^+) = (6.24 \pm 0.20) \times 10^{-4}$, $B(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) = (34.68 \pm 0.30) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

$\Gamma(\pi^+ \pi^- \pi^0 J/\psi(1S))/\Gamma_{\text{total}}$

Γ_3/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
not seen	¹ WANG 11B	BELL	$\Upsilon(2S) \rightarrow \gamma X$
not seen	² SHEN 10A	BELL	$\Upsilon(1S) \rightarrow \gamma X$

¹ WANG 11B reports $B(\Upsilon(2S) \rightarrow \gamma \chi_{c1}(3872)) \times B(\chi_{c1} \rightarrow \pi^+ \pi^- \pi^0 J/\psi) < 2.4 \times 10^{-6}$ at 95% CL.

² SHEN 10A reports $B(\Upsilon(1S) \rightarrow \gamma \chi_{c1}(3872)) \times B(\chi_{c1} \rightarrow \pi^+ \pi^- \pi^0 J/\psi) < 2.8 \times 10^{-6}$ at 95% CL.

$\Gamma(\omega \eta_c(1S))/\Gamma_{\text{total}}$

Γ_4/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.33	90	¹ VINOKUROVA 15	BELL	$B^+ \rightarrow \omega \eta_c K^+$

¹ VINOKUROVA 15 reports $[\Gamma(\chi_{c1}(3872) \rightarrow \omega \eta_c(1S))/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] < 6.9 \times 10^{-5}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = 2.1 \times 10^{-4}$.

$\Gamma(\omega J/\psi(1S))/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.029 \pm 0.011 \pm 0.009$	21 ± 7	¹ DEL-AMO-SA..10B	BABR	$B^+ \rightarrow \omega J/\psi K^+$
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¹ DEL-AMO-SANCHEZ 10B reports $[\Gamma(\chi_{c1}(3872) \rightarrow \omega J/\psi(1S))/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] = (6 \pm 2 \pm 1) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = (2.1 \pm 0.7) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. DEL-AMO-SANCHEZ 10B also reports $B(B^0 \rightarrow \chi_{c1}(3872) K^0) \times B(\chi_{c1}(3872) \rightarrow J/\psi \omega) = (6 \pm 3 \pm 1) \times 10^{-6}$.

 $\Gamma(\omega J/\psi(1S))/\Gamma(\pi^+ \pi^- J/\psi(1S))$ Γ_5/Γ_2

VALUE	DOCUMENT ID	TECN	COMMENT
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1.1 ± 0.4 OUR AVERAGE Error includes scale factor of 1.7.

$1.6^{+0.4}_{-0.3} \pm 0.2$	¹ ABLIKIM	19V	BES	$e^+ e^- \rightarrow \gamma \omega J/\psi$
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0.8 ± 0.3	² DEL-AMO-SA..10B	BABR	$B \rightarrow \omega J/\psi K$
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¹ Fit with fixed width and including two resonances, $\chi_{c0}(3915)$ and $X(3960)$.

² Statistical and systematic errors added in quadrature. Uses the values of $B(B \rightarrow \chi_{c1}(3872) K) \times B(\chi_{c1}(3872) \rightarrow J/\psi \pi^+ \pi^-)$ reported in AUBERT 08Y, taking into account the common systematics.

 $\Gamma(\phi\phi)/\Gamma_{\text{total}}$ Γ_6/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
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not seen ¹ AAIJ 17BB LHCb pp at 7, 8 TeV

¹ AAIJ 17BB reports $B(b \rightarrow \chi_{c1}(3872) \text{ anything}) \times B(\chi_{c1}(3872) \rightarrow \phi\phi) < 4.5 \times 10^{-7}$ at 95% CL.

 $\Gamma(D^0 \bar{D}^0 \pi^0)/\Gamma_{\text{total}}$ Γ_7/Γ

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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$0.49^{+0.18}_{-0.20} \pm 0.16$	17	¹ GOKHROO	06	BELL	$B^+ \rightarrow D^0 \bar{D}^0 \pi^0 K^+$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 0.29	90	² CHISTOV	04	BELL	Sup. by GOKHROO 06
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¹ GOKHROO 06 reports $[\Gamma(\chi_{c1}(3872) \rightarrow D^0 \bar{D}^0 \pi^0)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] = (1.02 \pm 0.31^{+0.21}_{-0.29}) \times 10^{-4}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = (2.1 \pm 0.7) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² CHISTOV 04 reports $[\Gamma(\chi_{c1}(3872) \rightarrow D^0 \bar{D}^0 \pi^0)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] < 0.6 \times 10^{-4}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = 2.1 \times 10^{-4}$.

 $\Gamma(D^0 \bar{D}^0 \pi^0)/\Gamma(\pi^+ \pi^- J/\psi(1S))$ Γ_7/Γ_2

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 1.16	90	ABLIKIM	20W	BES3	$e^+ e^- \rightarrow \gamma \chi_{c1}(3872)$
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$\Gamma(\bar{D}^{*0} D^0)/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.37±0.09±0.12	41^{+9}_{-8}	¹ AUSHEV	10	BELL $B^+ \rightarrow D^{*0} \bar{D}^0 K^+$

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

$0.80 \pm 0.28 \pm 0.26$	27 ± 6	² AUBERT	08B	BABR $B^+ \rightarrow \bar{D}^{*0} D^0 K^+$
¹ AUSHEV 10 reports $[\Gamma(\chi_{c1}(3872) \rightarrow \bar{D}^{*0} D^0)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] = (0.77 \pm 0.16 \pm 0.10) \times 10^{-4}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = (2.1 \pm 0.7) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.				
² AUBERT 08B reports $[\Gamma(\chi_{c1}(3872) \rightarrow \bar{D}^{*0} D^0)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] = (1.67 \pm 0.36 \pm 0.47) \times 10^{-4}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = (2.1 \pm 0.7) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.				

 $\Gamma(\bar{D}^{*0} D^0)/\Gamma(\pi^+ \pi^- J/\psi(1S))$ Γ_8/Γ_2

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
11.77±3.09	50	ABLIKIM	20W	BES3 $e^+ e^- \rightarrow \gamma \chi_{c1}(3872)$

 $\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ Γ_9/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.11	90	¹ WICHT	08	BELL $e^+ e^- \rightarrow \gamma(4S)$

¹ WICHT 08 reports $[\Gamma(\chi_{c1}(3872) \rightarrow \gamma\gamma)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] < 2.4 \times 10^{-5}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = 2.1 \times 10^{-4}$.

 $\Gamma(D^0 \bar{D}^0)/\Gamma_{\text{total}}$ Γ_{10}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.29	90	¹ CHISTOV	04	BELL $B \rightarrow K D^0 \bar{D}^0$

¹ CHISTOV 04 reports $[\Gamma(\chi_{c1}(3872) \rightarrow D^0 \bar{D}^0)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] < 6 \times 10^{-5}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = 2.1 \times 10^{-4}$.

 $\Gamma(D^+ D^-)/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.19	90	¹ CHISTOV	04	BELL $B \rightarrow K D^+ D^-$

¹ CHISTOV 04 reports $[\Gamma(\chi_{c1}(3872) \rightarrow D^+ D^-)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] < 4 \times 10^{-5}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = 2.1 \times 10^{-4}$.

 $\Gamma(\pi^0 \chi_{c2})/\Gamma(\pi^+ \pi^- J/\psi(1S))$ Γ_{12}/Γ_2

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<1.1	90	ABLIKIM	19U	BES3 $e^+ e^- \rightarrow \gamma \chi_{c1}(3872)$

 $\Gamma(\pi^0 \chi_{c1})/\Gamma_{\text{total}}$ Γ_{13}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.04	90	¹ BHARDWAJ	19	BELL $B^\pm \rightarrow \pi^0 \chi_{c1} K^\pm$

¹ BHARDWAJ 19 reports $[\Gamma(\chi_{c1}(3872) \rightarrow \pi^0 \chi_{c1})/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] < 8.1 \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = 2.1 \times 10^{-4}$.

$\Gamma(\pi^0 \chi_{c1})/\Gamma(\pi^+ \pi^- J/\psi(1S))$ Γ_{13}/Γ_2

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
$88^{+33}_{-27} \pm 10$	10.8	ABLIKIM	19U BES3	$e^+ e^- \rightarrow \gamma \chi_{c1}(3872)$

$\Gamma(\pi^0 \chi_{c0})/\Gamma(\pi^+ \pi^- J/\psi(1S))$ Γ_{14}/Γ_2

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<19	90	ABLIKIM	19U BES3	$e^+ e^- \rightarrow \gamma \chi_{c1}(3872)$

$\Gamma(\pi^+ \pi^- \eta_c(1S))/\Gamma_{total}$ Γ_{15}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.14	90	¹ VINOKUROVA 15	BELL	$B^+ \rightarrow \pi^+ \pi^- \eta_c K^+$

¹ VINOKUROVA 15 reports $[\Gamma(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- \eta_c(1S))/\Gamma_{total}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] < 3.0 \times 10^{-5}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = 2.1 \times 10^{-4}$.

$\Gamma(\pi^+ \pi^- \chi_{c1})/\Gamma_{total}$ Γ_{16}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<7 \times 10^{-3}$	90	¹ BHARDWAJ 16	BELL	$B^+ \rightarrow \pi^+ \pi^- \chi_{c1} K^+$

¹ BHARDWAJ 16 reports $[\Gamma(\chi_{c1}(3872) \rightarrow \pi^+ \pi^- \chi_{c1})/\Gamma_{total}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] < 1.5 \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = 2.1 \times 10^{-4}$.

$\Gamma(p\bar{p})/\Gamma_{total}$ Γ_{17}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2.4 \times 10^{-5}$	95	¹ AAIJ 17AD	LHCB	$B^+ \rightarrow p\bar{p}K^+$

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

$<8 \times 10^{-5}$	95	² AAIJ 13S	LHCB	$B^+ \rightarrow p\bar{p}K^+$
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¹ AAIJ 17AD reports $[\Gamma(\chi_{c1}(3872) \rightarrow p\bar{p})/\Gamma_{total}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] < 0.5 \times 10^{-8}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = 2.1 \times 10^{-4}$.

² AAIJ 13S reports $[\Gamma(\chi_{c1}(3872) \rightarrow p\bar{p})/\Gamma_{total}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] < 1.7 \times 10^{-8}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = 2.1 \times 10^{-4}$.

———— Radiative decays ————

$\Gamma(\gamma D^+ D^-)/\Gamma(\pi^+ \pi^- J/\psi(1S))$ Γ_{18}/Γ_2

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.99	90	ABLIKIM	20W BES3	$e^+ e^- \rightarrow \gamma \chi_{c1}(3872)$

$\Gamma(\gamma \bar{D}^0 D^0)/\Gamma(\pi^+ \pi^- J/\psi(1S))$ Γ_{19}/Γ_2

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<1.58	90	ABLIKIM	20W BES3	$e^+ e^- \rightarrow \gamma \chi_{c1}(3872)$

$\Gamma(\gamma J/\psi)/\Gamma_{total}$ Γ_{20}/Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
$0.0085^{+0.0024}_{-0.0022} \pm 0.0027$		¹ BHARDWAJ 11	BELL	$B^\pm \rightarrow \gamma J/\psi K^\pm$

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

0.013 ± 0.004 ± 0.004 20 ² AUBERT 09B BABR $B^+ \rightarrow \gamma J/\psi K^+$
 0.016 ± 0.005 ± 0.005 19 ³ AUBERT, BE 06M BABR $B^+ \rightarrow \gamma J/\psi K^+$

¹ BHARDWAJ 11 reports $[\Gamma(\chi_{c1}(3872) \rightarrow \gamma J/\psi)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)]$
 = $(1.78_{-0.44}^{+0.48} \pm 0.12) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = (2.1 \pm 0.7) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² AUBERT 09B reports $[\Gamma(\chi_{c1}(3872) \rightarrow \gamma J/\psi)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)]$
 = $(2.8 \pm 0.8 \pm 0.1) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = (2.1 \pm 0.7) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

³ Superseded by AUBERT 09B. AUBERT, BE 06M reports $[\Gamma(\chi_{c1}(3872) \rightarrow \gamma J/\psi)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)] = (3.3 \pm 1.0 \pm 0.3) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = (2.1 \pm 0.7) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\gamma J/\psi)/\Gamma(\pi^+ \pi^- J/\psi(1S))$ Γ_{20}/Γ_2

VALUE	DOCUMENT ID	TECN	COMMENT
0.79 ± 0.28	ABLIKIM	20W BES3	$e^+ e^- \rightarrow \gamma \chi_{c1}(3872)$

$\Gamma(\gamma \chi_{c1})/\Gamma_{\text{total}}$ Γ_{21}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 9 × 10⁻³	90	¹ BHARDWAJ 13	BELL	$B^\pm \rightarrow \chi_{c1} \gamma K^\pm$

¹ BHARDWAJ 13 reports $[\Gamma(\chi_{c1}(3872) \rightarrow \gamma \chi_{c1})/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)]$
 < 1.9×10^{-6} which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = 2.1 \times 10^{-4}$.

$\Gamma(\gamma \chi_{c1})/\Gamma(\pi^+ \pi^- J/\psi(1S))$ Γ_{21}/Γ_2

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 0.89	90	CHOI	03 BELL	$B \rightarrow K \pi^+ \pi^- J/\psi$

$\Gamma(\gamma \chi_{c2})/\Gamma_{\text{total}}$ Γ_{22}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 0.032	90	¹ BHARDWAJ 13	BELL	$B^\pm \rightarrow \chi_{c2} \gamma K^\pm$

¹ BHARDWAJ 13 reports $[\Gamma(\chi_{c1}(3872) \rightarrow \gamma \chi_{c2})/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)]$
 < 6.7×10^{-6} which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = 2.1 \times 10^{-4}$.

$\Gamma(\gamma \psi(2S))/\Gamma_{\text{total}}$ Γ_{23}/Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.045 ± 0.013 ± 0.015	25 ± 7	¹ AUBERT	09B BABR	$B^+ \rightarrow \gamma \psi(2S) K^+$

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

seen 36 ± 9 ² AAIJ 14AH LHCB $B^+ \rightarrow \gamma \psi(2S) K^+$
 not seen ³ BHARDWAJ 11 BELL $B^+ \rightarrow \gamma \psi(2S) K^+$

¹ AUBERT 09B reports $[\Gamma(\chi_{c1}(3872) \rightarrow \gamma \psi(2S))/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872) K^+)]$
 = $(9.5 \pm 2.7 \pm 0.6) \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872) K^+) = (2.1 \pm 0.7) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² From 36.4 ± 9.0 events of $\chi_{c1}(3872) \rightarrow J/\psi\gamma$ decays with a statistical significance of 4.4σ .

³ BHARDWAJ 11 reports $B(B^+ \rightarrow K^+ \chi_{c1}(3872)) \times B(\chi_{c1} \rightarrow \gamma\psi(2S)) < 3.45 \times 10^{-6}$ at 90% CL.

$\Gamma(\gamma\psi(2S))/\Gamma(\pi^+\pi^- J/\psi(1S))$ Γ_{23}/Γ_2

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.42	90	ABLIKIM	20W BES3	$e^+e^- \rightarrow \gamma\chi_{c1}(3872)$

$\Gamma(\gamma\psi(2S))/\Gamma(\gamma J/\psi)$ Γ_{23}/Γ_{20}

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
2.6 ± 0.6 OUR AVERAGE					
2.46 ± 0.64 ± 0.29	36 ± 9		¹ AAIJ	14AH LHCb	$B^+ \rightarrow \gamma\psi(2S)K^+$
3.4 ± 1.4			AUBERT	09B BABR	$B^+ \rightarrow \gamma c\bar{c}K'$

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

<2.1 90 BHARDWAJ 11 BELL $B^+ \rightarrow \gamma\psi(2S)K^+$

¹ From 36.4 ± 9.0 events of $\chi_{c1}(3872) \rightarrow J/\psi\gamma$ decays with a statistical significance of 4.4σ .

C-violating decays

$\Gamma(\eta J/\psi)/\Gamma_{\text{total}}$ Γ_{24}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.018	90	^{1,2} IWASHITA	14 BELL	$B \rightarrow K\eta J/\psi$

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

<0.04 90 ³ AUBERT 04Y BABR $B \rightarrow K\eta J/\psi$

¹ IWASHITA 14 reports $[\Gamma(\chi_{c1}(3872) \rightarrow \eta J/\psi)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872)K^+)] < 3.8 \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872)K^+) = 2.1 \times 10^{-4}$.

² IWASHITA 14 also scans the $\eta J/\psi$ mass range 3.8–4.75 GeV and sets upper limits for $B(B^\pm \rightarrow \chi_{c1}(3872)K^\pm) \times B(\chi_{c1}(3872) \rightarrow \eta J/\psi)$ in 5 MeV intervals.

³ AUBERT 04Y reports $[\Gamma(\chi_{c1}(3872) \rightarrow \eta J/\psi)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c1}(3872)K^+)] < 7.7 \times 10^{-6}$ which we divide by our best value $B(B^+ \rightarrow \chi_{c1}(3872)K^+) = 2.1 \times 10^{-4}$.

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