$\chi_{c2}(1P)$

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

See the Review on "$\psi(2S)$ and χ_c branching ratios" before the $\chi_{c0}(1P)$ Listings.

$\chi_{c2}(1P)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
3556.26± 0.11 OUR AVERAGE					
3559.9 ± 2.9		EISENSTEIN	01	CLE2	$e^+e^- \to e^+e^-\chi_{c2}$
3556.4 ± 0.7		BAI	99B	BES	$\psi(2S) \to \gamma X$
3556.24± 0.07±0.09	585	[1] ARMSTRONG	92	E760	$\overline{p}p \to e^+e^-\gamma$
3556.9 ± 0.4 ±0.5	50	BAGLIN	86B	SPEC	$\overline{p}p \to e^+e^-X$
3557.8 ± 0.2 ±4		[2] GAISER	86	CBAL	$\psi(2S) \to \gamma X$
3553.4 ± 2.2	66	[3] LEMOIGNE	82	GOLI	190 π^- Be $\to \gamma 2\mu$
3555.9 ± 0.7		[4] OREGLIA	82	CBAL	$e^+e^- \to J/\psi 2\gamma$
3557 ± 1.5	69	[5] HIMEL	80	MRK2	$e^+e^- \to J/\psi 2\gamma$
3551 ±11	15	BRANDELIK	79B	DASP	$e^+e^- \to J/\psi 2\gamma$
3553 ± 4		[5] BARTEL	78B	CNTR	$e^+e^- \to J/\psi 2\gamma$
3553 ± 4 ±4		[5,6] TANENBAUM	78	MRK1	e^+e^-
3563 ± 7	360	[5] BIDDICK	77	CNTR	$e^+e^- \to \gamma X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3543 ±10	4	WHITAKER	76	MRK1	$e^+e^- \to J/\psi 2\gamma$

[1] Mass central value and systematic error recalculated by us according to Eq. (16) in ARMSTRONG 93B, using the value for the $\psi(2S)$ mass from AULCHENKO 03.
[2] Using mass of $\psi(2S)$ = 3686.0 MeV.
[3] $J/\psi(1S)$ mass constrained to 3097 MeV.
[4] Assuming $\psi(2S)$ mass = 3686 MeV and $J/\psi(1S)$ mass = 3097 MeV.
[5] Mass value shifted by us by amount appropriate for $\psi(2S)$ mass = 3686 MeV and $J/\psi(1S)$ mass = 3097 MeV.
[6] From a simultaneous fit to radiative and hadronic decay channels.

$\chi_{c2}(1P)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
2.25±0.15 OUR FIT					
2.00±0.18 OUR AVERAGE					
1.98±0.17±0.07	585	ARMSTRONG	92	E760	$\overline{p}p \to e^+e^-\gamma$
$2.6 ^{+1.4}_{-1.0}$	50	BAGLIN	86B	SPEC	$\overline{p}p \to e^+e^-X$
$2.8 ^{+2.1}_{-2.0}$		[7] GAISER	86	CBAL	$\psi(2S) \to \gamma X$

[7] Errors correspond to 90% confidence level; authors give only width range.

$\chi_{c2}(1P)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)	Confidence level

Hadronic decays

Γ_1	$2(\pi^+\pi^-)$	(1.21 ± 0.15) %	
Γ_2	$\pi^+\pi^-K^+K^-$	(1.24 ± 0.33) %	
Γ_3	$3(\pi^+\pi^-)$	(1.07 ± 0.24) %	
Γ_4	$\rho^0\pi^+\pi^-$	$(7\ \pm4\ )\times10^{-3}$	
Γ_5	$K^+\overline{K}^*(892)^0\pi^-+$ c.c.	$(4.8\pm2.8)\times10^{-3}$	
Γ_6	$K^*(892)^0\overline{K}^*(892)^0$	$(3.8\pm0.7)\times10^{-3}$	
Γ_7	$\phi\phi$	$(2.4\pm0.9)\times10^{-3}$	
Γ_8	$\pi^+\pi^-$	$(1.77\pm0.27)\times10^{-3}$	
Γ_9	$\pi^0\pi^0$	$(1.1\pm0.7)\times10^{-3}$	
Γ_{10}	$\eta\eta$	$<1.5\times10^{-3}$	90%
Γ_{11}	$K^+K^-K^+K^-$	$(1.8\pm0.5)\times10^{-3}$	
Γ_{12}	$\pi^+\pi^-p\overline{p}$	$(1.7\pm0.4)\times10^{-3}$	
Γ_{13}	K^+K^-	$(9.4\pm2.1)\times10^{-4}$	
Γ_{14}	$K^0_SK^0_S$	$(7.2\pm2.7)\times10^{-4}$	
Γ_{15}	$p\overline{p}$	$(7.0\pm0.7)\times10^{-5}$	
Γ_{16}	$\Lambda\overline{\Lambda}$	$(3.4\pm1.7)\times10^{-4}$	
Γ_{17}	$J/\psi(1S)\pi^+\pi^-\pi^0$	<1.5 %	90%
Γ_{18}	$K^0_SK^+\pi^-+$ c.c.	$<1.3\times10^{-3}$	90%

Radiative decays

Γ_{19}	$\gamma J/\psi(1S)$	(17.8 ± 0.8) %	
Γ_{20}	$\gamma\gamma$	$(2.40\pm0.22)\times10^{-4}$	

$\chi_{c2}(1P)$ PARTIAL WIDTHS

$\chi_{c2}(1P)$ $\Gamma(i)\Gamma(\gamma J/\psi(1S))/\Gamma(\text{total})$

$\Gamma(p\overline{p})\times\Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$ — $\Gamma_{15}\Gamma_{19}/\Gamma$

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
28.2±2.3 OUR FIT				
28.9±2.5 OUR AVERAGE				
28.2±2.6	[8] ARMSTRONG	92	E760	$\overline{p}p\to e^+e^-\gamma$
36 ±8	[8] BAGLIN	86B	SPEC	$\overline{p}p\to e^+e^-X$

$\Gamma(\gamma\gamma)\times\Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$ — $\Gamma_{20}\Gamma_{19}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
96± 11 OUR FIT					
121± 13 OUR AVERAGE					
114± 11± 9	136 ± 13.3	[9] ABE	02T	BELL	$e^+e^-\to e^+e^-\chi_{c2}$
139± 55± 21		[10] ACCIARRI	99E	L3	$e^+e^-\to e^+e^-\chi_{c2}$
242± 65± 51		[11] ACKER..,K...	98	OPAL	$e^+e^-\to e^+e^-\chi_{c2}$
150± 42± 36		[12] DOMINICK	94	CLE2	$e^+e^-\to e^+e^-\chi_{c2}$
470±240±120		[13] BAUER	93	TPC	$e^+e^-\to e^+e^-\chi_{c2}$

$\Gamma(\gamma\gamma) \times \Gamma(2(\pi^+\pi^-))/\Gamma_{total}$ — $\Gamma_{20}\Gamma_1/\Gamma$

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
6.5±1.0 OUR FIT				
6.4±1.8±0.8	EISENSTEIN	01	CLE2	$e^+e^- \to e^+e^-\chi_{c2}$

[8] Calculated by us using B($J/\psi(1S) \to e^+e^-$) = 0.0593 ± 0.0010.

[9] Using B($J/\psi \to \ell^+\ell^-$) = 0.1181 ± 0.0020. All systematic errors added in quadrature.

[10] The value for $\Gamma(\chi_{c2} \to \gamma\gamma)$ reported in ACCIARRI 99E is derived using B($\chi_{c2} \to \gamma J/\psi(1S)$)×B($J/\psi(1S) \to \ell^+\ell^-$) = 0.0162 ± 0.0014. Calculated by us using B($J/\psi(1S) \to \ell^+\ell^-$) = 0.1181 ± 0.0020.

[11] The value for $\Gamma(\chi_{c2} \to \gamma\gamma)$ reported in ACKERSTAFF,K 98 is derived using B($\chi_{c2} \to \gamma J/\psi(1S)$) = 0.135 ± 0.011 and B($J/\psi(1S) \to \ell^+\ell^-$) = 0.1203 ± 0.0038. Calculated by us using B($J/\psi(1S) \to \ell^+\ell^-$) = 0.1181 ± 0.0020.

[12] The value for $\Gamma(\chi_{c2} \to \gamma\gamma)$ reported in DOMINICK 94 is derived using B($\chi_{c2} \to \gamma J/\psi(1S)$)= 0.135 ± 0.011, B($J/\psi(1S) \to e^+e^-$) = 0.0627 ± 0.0020, and B($J/\psi(1S) \to \mu^+\mu^-$) = 0.0597 ± 0.0025. Calculated by us using B($J/\psi(1S) \to \ell^+\ell^-$) = 0.1181 ± 0.0020.

[13] The value for $\Gamma(\chi_{c2} \to \gamma\gamma)$ reported in BAUER 93 is derived using B($\chi_{c2} \to \gamma J/\psi(1S)$)= 0.135 ± 0.011, B($J/\psi(1S) \to e^+e^-$) = 0.0627 ± 0.0020, and B($J/\psi(1S) \to \mu^+\mu^-$) = 0.0597 ± 0.0025. Calculated by us using B($J/\psi(1S) \to \ell^+\ell^-$) = 0.1181 ± 0.0020.

$\chi_{c2}(1P)$ BRANCHING RATIOS

HADRONIC DECAYS

$\Gamma(2(\pi^+\pi^-))/\Gamma_{total}$ — Γ_1/Γ

VALUE	DOCUMENT ID
0.0121±0.0015 OUR FIT	

$\Gamma(\pi^+\pi^-K^+K^-)/\Gamma_{total}$ — Γ_2/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
12.4±3.3 OUR EVALUATION Treating systematic error as correlated.				
12 ±4 OUR AVERAGE Error includes scale factor of 2.1.				
9.4±0.7±2.3	[14] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c2}$
18.7±3.3±1.8	[14] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma(3(\pi^+\pi^-))/\Gamma_{total}$ — Γ_3/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
10.7±2.4 OUR EVALUATION Treating systematic error as correlated.				
10.7±2.4 OUR AVERAGE				
10.7±1.2±2.2	[14] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c2}$
10.8±7.4±1.0	[14] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma(\rho^0\pi^+\pi^-)/\Gamma_{total}$ — Γ_4/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
68±40	[15] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma\left(K^+\overline{K}^*(892)^0\pi^- + \text{c.c.}\right)/\Gamma_{\text{total}}$ — Γ_5/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
48±28	[15] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma\left(K^*(892)^0\overline{K}^*(892)^0\right)/\Gamma_{\text{total}}$ — Γ_6/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
3.8±0.7±0.1	57.5 ± 6.4	[16,17] ABLIKIM	04H	BES	$\psi(2S) \to \gamma K^+ K^- \pi^+ \pi^-$

$\Gamma(\phi\phi)/\Gamma_{\text{total}}$ — Γ_7/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
2.4±0.6±0.7	[14] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma\left(\pi^+\pi^-\right)/\Gamma_{\text{total}}$ — Γ_8/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.77±0.17±0.21	185 ± 16	[14] BAI	98I	BES	$\psi(2S) \to \gamma\chi_{c2}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.9 ±1.0	4	[15] BRANDELIK	79C	DASP	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma\left(\pi^0\pi^0\right)/\Gamma_{\text{total}}$ — Γ_9/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.08±0.30±0.61	20.8 ± 5.8	[14] BAI	03C	BES	$\psi(2S) \to \gamma\pi^0\pi^0 \to 5\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.1 ±0.2 ±0.2		[18] LEE	85	CBAL	$\psi' \to$ photons

$\left[\Gamma\left(\pi^+\pi^-\right) + \Gamma\left(K^+K^-\right)\right]/\Gamma_{\text{total}}$ — $(\Gamma_8+\Gamma_{13})/\Gamma$

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
24±10	[15] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma\left(K^+K^-K^+K^-\right)/\Gamma_{\text{total}}$ — Γ_{11}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
1.75±0.31±0.34	[14] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma\left(\pi^+\pi^- p\overline{p}\right)/\Gamma_{\text{total}}$ — Γ_{12}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
1.7 ±0.4 OUR EVALUATION Treating systematic error as correlated.				
1.7 ±0.6 OUR AVERAGE Error includes scale factor of 1.3.				
1.46±0.24±0.40	[14] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c2}$
3.30±1.28±0.32	[14] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma\left(K^+K^-\right)/\Gamma_{\text{total}}$ — Γ_{13}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
0.94±0.17±0.13	115 ± 13	[14] BAI	98I	BES	$\psi(2S) \to \gamma\chi_{c2}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.5 ±1.1	2	[15] BRANDELIK	79C	DASP	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma(K^0_S K^0_S)/\Gamma_{\text{total}}$ — Γ_{14}/Γ

VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
0.72±0.20±0.18	[14] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma(p\overline{p})/\Gamma_{\text{total}}$ — Γ_{15}/Γ

VALUE (units 10^{-4})	*DOCUMENT ID*
0.70±0.07 OUR FIT	

$\Gamma(\Lambda\overline{\Lambda})/\Gamma_{\text{total}}$ — Γ_{16}/Γ

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
3.4±1.5±0.7	$8.3^{+3.7}_{-3.4}$	[14] BAI	03E	BES	$\psi(2S) \to \gamma\chi_{c2} \to \gamma\Lambda\overline{\Lambda}$

$\Gamma(\eta\eta)/\Gamma_{\text{total}}$ — Γ_{10}/Γ

VALUE (units 10^{-4})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<15	90	[14] BAI	03C	BES	$\psi(2S) \to \gamma\eta\eta \to 5\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
7.9±4.1±2.4		[18] LEE	85	CBAL	$\psi' \to$ photons

$\Gamma(J/\psi(1S)\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$ — Γ_{17}/Γ

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.015	90	BARATE	81	SPEC	190 GeV π^- Be $\to 2\pi 2\mu$

$\Gamma(K^0_S K^+\pi^- + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{18}/Γ

VALUE (units 10^{-3})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<1.3	90	[14] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c2}$

[14] Rescaled by us using B($\psi(2S) \to \gamma\chi_{c2}$)= (6.4 ± 0.6)% and B($\psi(2S) \to J/\psi(1S)\pi^+\pi^-$) = 0.317 ± 0.011.

[15] Estimated using B($\psi(2S) \to \gamma\chi_{c2}(1P)$) = 0.078; the errors do not contain the uncertainty in the $\psi(2S)$ decay.

[16] ABLIKIM 04H reports [B($\chi_{c2}(1P) \to K^*(892)^0\overline{K}^*(892)^0$) × B($\psi(2S) \to \gamma\chi_{c2}(1P)$)] = (3.11 ± 0.36 ± 0.48) × 10^{-4}. We divide by our best value B($\psi(2S) \to \gamma\chi_{c2}(1P)$) = (8.20 ± 0.30) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[17] Assumes B($K^*(892)^0 \to K^-\pi^+$) = 2/3.

[18] Calculated using B($\psi(2S) \to \gamma\chi_{c2}(1P)$) = 0.078 ± 0.008.

RADIATIVE DECAYS

$\Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$ — Γ_{19}/Γ

VALUE	*DOCUMENT ID*
0.178±0.008 OUR FIT	

$\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ — Γ_{20}/Γ

VALUE (units 10^{-4})	*DOCUMENT ID*
2.40±0.22 OUR FIT	

$\Gamma(\gamma\gamma)/\Gamma(\gamma J/\psi(1S))$ — Γ_{20}/Γ_{19}

VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
1.35±0.15 OUR FIT				
0.99±0.18	[19] AMBROGIANI	00B	E835	$\overline{p}p \to \chi_{c2} \to \gamma\gamma, \gamma J/\psi$

$\Gamma(\gamma\gamma) \times \Gamma(p\overline{p})/\Gamma^2_{\text{total}}$ — $\Gamma_{20}\Gamma_{15}/\Gamma^2$

VALUE (units 10^{-8})	*DOCUMENT ID*		*TECN*	*COMMENT*
1.68±0.22 OUR FIT				
1.7 ±0.4 OUR AVERAGE				
1.60±0.42	ARMSTRONG	93	E760	$\overline{p}p \to \gamma\gamma X$
9.9 ±4.5	BAGLIN	87B	SPEC	$\overline{p}p \to \gamma\gamma X$

[19] Calculated by us using $B(J/\psi(1S) \to e^+e^-) = 0.0593 \pm 0.0010$.

$\chi_{c2}(1P)$ CROSS-PARTICLE BRANCHING RATIOS

$$B(\chi_{c2}(1P) \to p\overline{p}) \times \frac{\Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))}{\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)}$$

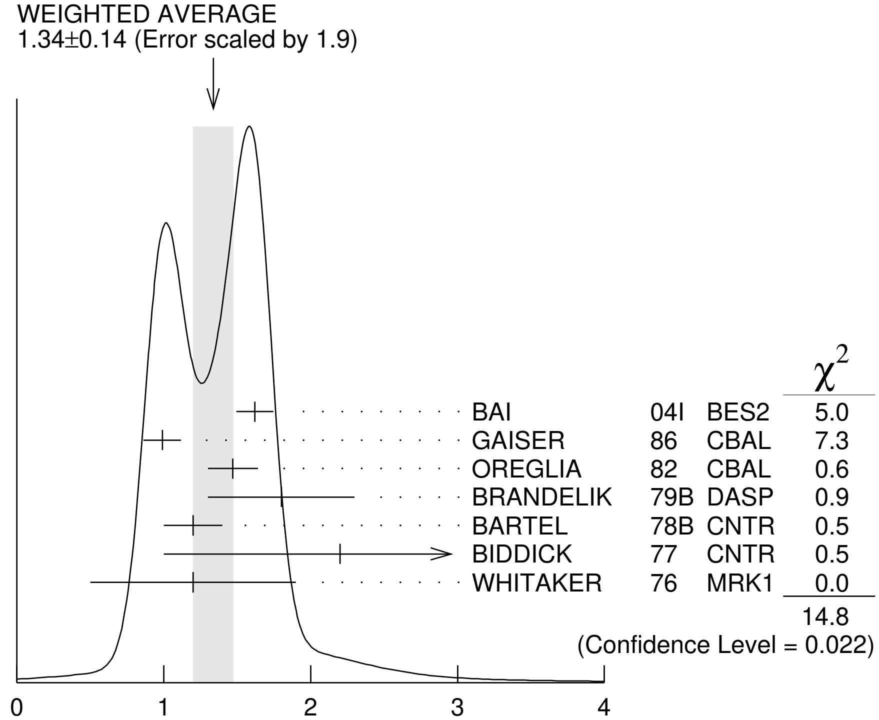
VALUE (units 10^{-5})	*DOCUMENT ID*		*TECN*	*COMMENT*
1.81±0.19 OUR FIT				
1.4 ±1.1	[20] BAI	98I	BES	$\psi(2S) \to \gamma\chi_{c2} \to \gamma\overline{p}p$

$$B(\chi_{c2}(1P) \to p\overline{p}) \times B(\psi(2S) \to \gamma\chi_{c2}(1P))$$

VALUE (units 10^{-6})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
5.7±0.6 OUR FIT					
$\mathbf{4.4^{+1.6}_{-1.4}\pm0.6}$	$14.3^{+5.2}_{-4.7}$	BAI	04F	BES	$\psi(2S) \to \gamma\chi_{c2}(1P) \to \gamma\overline{p}p$

$$B(\chi_{c2}(1P) \to \gamma J/\psi(1S)) \times B(\psi(2S) \to \gamma\chi_{c2}(1P))$$

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.45±0.09 OUR FIT					
1.34±0.14 OUR AVERAGE Error includes scale factor of 1.9. See the ideogram below.					
1.62±0.04±0.12	5.8k	BAI	04I	BES2	$\psi(2S) \to J/\psi\gamma\gamma$
0.99±0.10±0.08		GAISER	86	CBAL	$\psi(2S) \to \gamma X$
1.47±0.17		[21] OREGLIA	82	CBAL	$\psi(2S) \to \gamma\chi_{c2}$
1.8 ±0.5		[22] BRANDELIK	79B	DASP	$\psi(2S) \to \gamma\chi_{c2}$
1.2 ±0.2		[22] BARTEL	78B	CNTR	$\psi(2S) \to \gamma\chi_{c2}$
2.2 ±1.2		[23] BIDDICK	77	CNTR	$e^+e^- \to \gamma X$
1.2 ±0.7		[21] WHITAKER	76	MRK1	e^+e^-



$B(\chi_{c2}(1P) \to \gamma J/\psi(1S)) \times B(\psi(2S) \to \gamma\chi_{c2}(1P))$

$B(\chi_{c2}(1P) \to \gamma J/\psi(1S)) \times \frac{\Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))}{\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)}$

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
4.59±0.38 OUR FIT					
4.2 ±1.1 OUR AVERAGE					
6.0 ±2.8	1.3k	[24] ABLIKIM	04B	BES	$\psi(2S) \to J/\psi X$
3.9 ±1.2		[25] HIMEL	80	MRK2	$\psi(2S) \to \gamma\chi_{c2}$

$B(\chi_{c2}(1P) \to \gamma\gamma) \times B(\psi(2S) \to \gamma\chi_{c2}(1P))$

VALUE (units 10^{-5})	*DOCUMENT ID*		*TECN*	*COMMENT*
1.96±0.20 OUR FIT				
7.0 ±2.1 ±2.0	LEE	85	CBAL	$\psi(2S) \to \gamma\chi_{c2}$

$B(\chi_{c2}(1P) \to 2(\pi^+\pi^-)) \times \frac{\Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))}{\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)}$

VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
3.1±0.4 OUR FIT				
3.1±1.0 OUR AVERAGE Error includes scale factor of 2.5.				
2.3±0.1±0.5	[26] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c2}$
4.3±0.6	[27] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

[20] Calculated by us. The value for B($\chi_{c2} \to p\overline{p}$) reported in BAI 98I is derived using B($\psi(2S) \to \gamma\chi_{c2}$) = (7.8 ± 0.8)% and B($\psi(2S) \to J/\psi(1S)\pi^+\pi^-$) = (32.4 ± 2.6)% [BAI 98D].

[21] Recalculated by us using B($J/\psi(1S) \to \ell^+\ell^-$) = 0.1181 ± 0.0020.

[22] Recalculated by us using B($J/\psi(1S) \to \mu^+\mu^-$) = 0.0588 ± 0.0010.

[23] Assumes isotropic gamma distribution.

[24] From a fit to the J/ψ recoil mass spectra.

[25] The value for B($\psi(2S) \to \gamma\chi_{c2}$)×B($\chi_{c2} \to \gamma J/\psi(1S)$) reported in HIMEL 80 is derived using B($\psi(2S) \to J/\psi(1S)\pi^+\pi^-$) = (33 ± 3)% and B($J/\psi(1S) \to \ell^+\ell^-$) = 0.138 ± 0.018. Calculated by us using B($J/\psi(1S) \to \ell^+\ell^-$) = (0.1181 ± 0.0020).

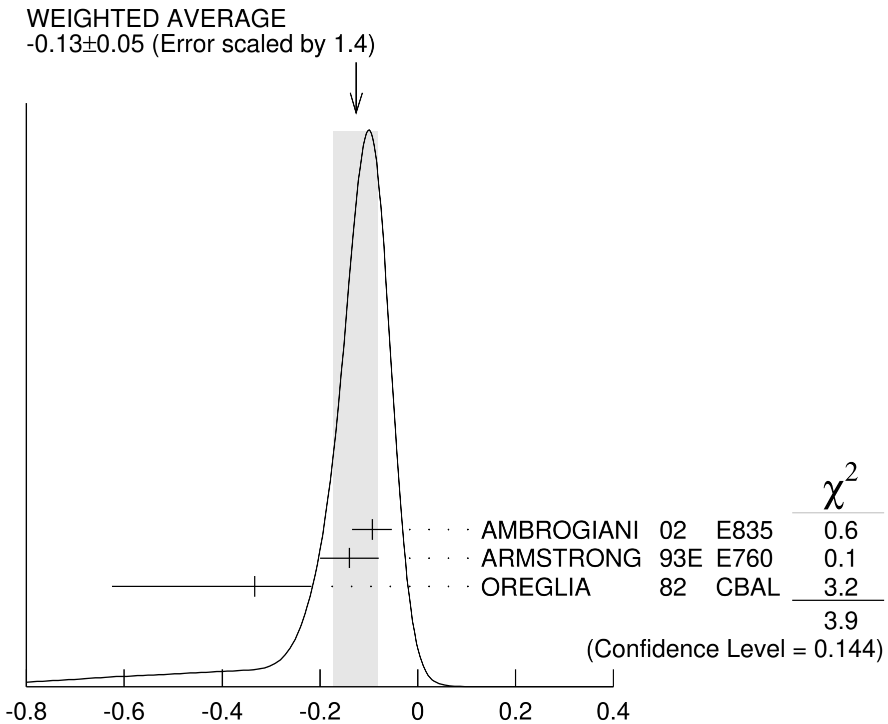
[26] Calculated by us. The value for B($\chi_{c2} \to 2\pi^+2\pi^-$) reported in BAI 99B is derived using B($\psi(2S) \to \gamma\chi_{c2}$) = (7.8 ± 0.8)% and B($\psi(2S) \to J/\psi(1S)\pi^+\pi^-$) = (32.4 ± 2.6)% [BAI 98D].

[27] The value for B($\psi(2S) \to \gamma\chi_{c2}$)×B($\chi_{c2} \to 2\pi^+\pi^-$) reported in TANENBAUM 78 is derived using B($\psi(2S) \to J/\psi(1S)\pi^+\pi^-$)×B($J/\psi(1S)\ell^+\ell^-$) = (4.6 ± 0.7)%. Calculated by us using B($J/\psi(1S) \to \ell^+\ell^-$) = 0.1181 ± 0.0020.

MULTIPOLE AMPLITUDES IN $\chi_{c2}(1P) \to \gamma J/\psi(1S)$ RADIATIVE DECAY

$a_2 = M2/\sqrt{E1^2 + M2^2 + E3^2}$ Magnetic quadrupole fractional transition amplitude

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
−0.13 ±0.05 OUR AVERAGE		Error includes scale factor of 1.4. See the ideogram below.			
$-0.093^{+0.039}_{-0.041} \pm 0.006$	5908	[28] AMBROGIANI	02	E835	$p\overline{p} \to \chi_{c2} \to J/\psi\gamma$
-0.14 ± 0.06	1904	[28] ARMSTRONG	93E	E760	$p\overline{p} \to \chi_{c2} \to J/\psi\gamma$
$-0.333^{+0.116}_{-0.292}$	441	[28] OREGLIA	82	CBAL	$\psi(2S) \to \chi_{c1}\gamma \to J/\psi\gamma\gamma$



$a_2 = M2/\sqrt{E1^2 + M2^2 + E3^2}$

$a_3 = M2/\sqrt{E1^2 + M2^2 + E3^2}$ Electric octupole fractional transition amplitude

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
$\mathbf{0.011^{+0.041}_{-0.033}}$ **OUR AVERAGE**				
$0.020^{+0.055}_{-0.044} \pm 0.009$	5908	AMBROGIANI 02	E835	$p\overline{p} \rightarrow \chi_{c2} \rightarrow J/\psi\gamma$
$0.00\ ^{+0.06}_{-0.05}$	1904	ARMSTRONG 93E	E760	$p\overline{p} \rightarrow \chi_{c2} \rightarrow J/\psi\gamma$

[28] Assuming a_3=0.

$\chi_{c2}(1P)$ REFERENCES

ABLIKIM	04B	PR D70 012003	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	04H	PR D70 092003	M. Ablikim *et al.*	(BES Collab.)
BAI	04F	PR D69 092001	J.Z. Bai *et al.*	(BES Collab.)
BAI	04I	PR D70 012006	J.Z. Bai *et al.*	(BES Collab.)
AULCHENKO	03	PL B573 63	V.M. Aulchenko *et al.*	(KEDR Collab.)
BAI	03C	PR D67 032004	J.Z. Bai *et al.*	(BES Collab.)
BAI	03E	PR D67 112001	J.Z. Bai *et al.*	(BES Collab.)
ABE	02T	PL B540 33	K. Abe *et al.*	(BELLE Collab.)
AMBROGIANI	02	PR D65 052002	M. Ambrogiani *et al.*	(FNAL E835 Collab.)
EISENSTEIN	01	PRL 87 061801	B.I. Eisenstein *et al.*	(CLEO Collab.)
AMBROGIANI	00B	PR D62 052002	M. Ambrogiani *et al.*	(FNAL E835 Collab.)
ACCIARRI	99E	PL B453 73	M. Acciarri *et al.*	(L3 Collab.)
BAI	99B	PR D60 072001	J.Z. Bai *et al.*	(BES Collab.)
ACKER..,K...	98	PL B439 197	K. Ackerstaff *et al.*	(OPAL Collab.)
BAI	98D	PR D58 092006	J.Z. Bai *et al.*	(BES Collab.)
BAI	98I	PRL 81 3091	J.Z. Bai *et al.*	(BES Collab.)
DOMINICK	94	PR D50 4265	J. Dominick *et al.*	(CLEO Collab.)
ARMSTRONG	93	PRL 70 2988	T.A. Armstrong *et al.*	(FNAL E760 Collab.)

ARMSTRONG	93B	PR D47 772	T.A. Armstrong *et al.*	(FNAL E760 Collab.)
ARMSTRONG	93E	PR D48 3037	T.A. Armstrong *et al.*	(FNAL-E760 Collab.)
BAUER	93	PL B302 345	D.A. Bauer *et al.*	(TPC Collab.)
ARMSTRONG	92	NP B373 35	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)
Also	92B	PRL 68 1468	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)
BAGLIN	87B	PL B187 191	C. Baglin *et al.*	(R704 Collab.)
BAGLIN	86B	PL B172 455	C. Baglin	(LAPP, CERN, GENO, LYON, OSLO+)
GAISER	86	PR D34 711	J. Gaiser *et al.*	(Crystal Ball Collab.)
LEE	85	SLAC 282	R.A. Lee	(SLAC)
LEMOIGNE	82	PL 113B 509	Y. Lemoigne *et al.*	(SACL, LOIC, SHMP+)
OREGLIA	82	PR D25 2259	M.J. Oreglia *et al.*	(SLAC, CIT, HARV+)
Also	82B	Private Comm.	M.J. Oreglia	(EFI)
BARATE	81	PR D24 2994	R. Barate *et al.*	(SACL, LOIC, SHMP, CERN+)
HIMEL	80	PRL 44 920	T. Himel *et al.*	(LBL, SLAC)
Also	82	Private Comm.	G. Trilling	(LBL, UCB)
BRANDELIK	79B	NP B160 426	R. Brandelik *et al.*	(DASP Collab.)
BRANDELIK	79C	ZPHY C1 233	R. Brandelik *et al.*	(DASP Collab.)
BARTEL	78B	PL 79B 492	W. Bartel *et al.*	(DESY, HEIDP)
TANENBAUM	78	PR D17 1731	W.M. Tanenbaum *et al.*	(SLAC, LBL)
Also	82	Private Comm.	G. Trilling	(LBL, UCB)
BIDDICK	77	PRL 38 1324	C.J. Biddick *et al.*	(UCSD, UMD, PAVI+)
WHITAKER	76	PRL 37 1596	J.S. Whitaker *et al.*	(SLAC, LBL)

OTHER RELATED PAPERS

ABLIKIM	04I	PR D70 092004	M. Ablikim *et al.*	(BES Collab.)
BARBERIS	00G	PL B485 357	D. Barberis *et al.*	(Omega Expt.)
ACCIARRI	99T	PL B461 155	M. Acciarri *et al.*	(L3 Collab.)
CHEN	90B	PL B243 169	W.Y. Chen *et al.*	(CLEO Collab.)
AIHARA	88D	PRL 60 2355	H. Aihara *et al.*	(TPC Collab.)
BARATE	83	PL 121B 449	R. Barate *et al.*	(SACL, LOIC, SHMP, IND)
FELDMAN	75B	PRL 35 821	G.J. Feldman *et al.*	(LBL, SLAC)
Also Erratum.	75C	PRL 35 1189	G.J. Feldman	
TANENBAUM	75	PRL 35 1323	W.M. Tanenbaum *et al.*	(LBL, SLAC)