$\chi_{c2}(1P)$

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

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
3556.20 ± 0.09 OUR AVERAGE					
3555.3 ± 0.6 ± 2.2	2.5k	UEHARA	08	BELL	$\gamma\gamma \rightarrow$ hadrons
3555.70 ± 0.59 ± 0.39		ABLIKIM	05G	BES2	$\psi(2S) \rightarrow \gamma\chi_{c2}$
3556.173 ± 0.123 ± 0.020		ANDREOTTI	05A	E835	$p\overline{p} \rightarrow e^+e^-\gamma$
3559.9 ± 2.9		EISENSTEIN	01	CLE2	$e^+e^- \rightarrow e^+e^-\chi_{c2}$
3556.4 ± 0.7		BAI	99B	BES	$\psi(2S) \rightarrow \gamma X$
3556.22 ± 0.131 ± 0.020	585	[1] ARMSTRONG	92	E760	$\overline{p}p \rightarrow e^+e^-\gamma$
3556.9 ± 0.4 ± 0.5	50	BAGLIN	86B	SPEC	$\overline{p}p \rightarrow e^+e^-X$
3557.8 ± 0.2 ± 4		[2] GAISER	86	CBAL	$\psi(2S) \rightarrow \gamma X$
3553.4 ± 2.2	66	[3] LEMOIGNE	82	GOLI	185 π^- Be $\rightarrow \gamma\mu^+\mu^-$ A
3555.9 ± 0.7		[4] OREGLIA	82	CBAL	$e^+e^- \rightarrow J/\psi 2\gamma$
3557 ± 1.5	69	[5] HIMEL	80	MRK2	$e^+e^- \rightarrow J/\psi 2\gamma$
3551 ± 11	15	BRANDELIK	79B	DASP	$e^+e^- \rightarrow J/\psi 2\gamma$
3553 ± 4		[5] BARTEL	78B	CNTR	$e^+e^- \rightarrow J/\psi 2\gamma$
3553 ± 4 ± 4		[5,6] TANENBAUM	78	MRK1	e^+e^-
3563 ± 7	360	[5] BIDDICK	77	CNTR	$e^+e^- \rightarrow \gamma X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3543 ± 10	4	WHITAKER	76	MRK1	$e^+e^- \rightarrow J/\psi 2\gamma$

[1] Recalculated by ANDREOTTI 05A, using the value of $\psi(2S)$ 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
2.03 ± 0.12 OUR FIT					
1.95 ± 0.13 OUR AVERAGE					
1.915 ± 0.188 ± 0.013		ANDREOTTI	05A	E835	$p\overline{p} \rightarrow e^+e^-\gamma$
1.96 ± 0.17 ± 0.07	585	[7] ARMSTRONG	92	E760	$\overline{p}p \rightarrow e^+e^-\gamma$
2.6 $^{+1.4}_{-1.0}$	50	BAGLIN	86B	SPEC	$\overline{p}p \rightarrow e^+e^-X$
2.8 $^{+2.1}_{-2.0}$		[8] GAISER	86	CBAL	$\psi(2S) \rightarrow \gamma X$

[7] Recalculated by ANDREOTTI 05A.
[8] 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	$2(\pi^+\pi^-)$	(1.14±0.12) %	
Γ_2	$\rho\rho$		
Γ_3	$\pi^+\pi^- K^+ K^-$	(9.4 ±1.1) $\times 10^{-3}$	
Γ_4	$3(\pi^+\pi^-)$	(8.6 ±1.8) $\times 10^{-3}$	
Γ_5	$K^+\overline{K}^*(892)^0\pi^-$ + c.c.	(2.3 ±1.3) $\times 10^{-3}$	
Γ_6	$K^*(892)^0\overline{K}^*(892)^0$	(2.6 ±0.5) $\times 10^{-3}$	
Γ_7	$\phi\phi$	(1.54±0.30) $\times 10^{-3}$	
Γ_8	$\omega\omega$	(2.0 ±0.7) $\times 10^{-3}$	
Γ_9	$\pi\pi$	(2.17±0.25) $\times 10^{-3}$	
Γ_{10}	$\rho^0\pi^+\pi^-$	(4.1 ±1.8) $\times 10^{-3}$	
Γ_{11}	$\pi^+\pi^-\eta$	(5.5 ±1.5) $\times 10^{-4}$	
Γ_{12}	$\pi^+\pi^-\eta'$	(5.7 ±2.1) $\times 10^{-4}$	
Γ_{13}	$\eta\eta$	< 5 $\times 10^{-4}$	90%
Γ_{14}	K^+K^-	(7.9 ±1.4) $\times 10^{-4}$	
Γ_{15}	$K^0_S K^0_S$	(6.5 ±0.8) $\times 10^{-4}$	
Γ_{16}	$\overline{K}^0 K^+\pi^-$ + c.c.	(1.40±0.21) $\times 10^{-3}$	
Γ_{17}	$K^+K^-\pi^0$	(3.5 ±0.9) $\times 10^{-4}$	
Γ_{18}	$K^+K^-\eta$	< 4 $\times 10^{-4}$	90%
Γ_{19}	$\eta\pi^+\pi^-$	< 1.7 $\times 10^{-3}$	90%
Γ_{20}	$\eta\eta'$	< 2.6 $\times 10^{-4}$	90%
Γ_{21}	$\eta'\eta'$	< 3.5 $\times 10^{-4}$	90%
Γ_{22}	$\pi^+\pi^- K^0_S K^0_S$	(2.5 ±0.6) $\times 10^{-3}$	
Γ_{23}	$K^+K^- K^0_S K^0_S$	< 4 $\times 10^{-4}$	90%
Γ_{24}	$K^+K^-K^+K^-$	(1.84±0.24) $\times 10^{-3}$	
Γ_{25}	$K^+K^-\phi$	(1.63±0.34) $\times 10^{-3}$	
Γ_{26}	$K^0_S K^0_S p\overline{p}$	< 7.9 $\times 10^{-4}$	90%
Γ_{27}	$p\overline{p}$	(6.7 ±0.5) $\times 10^{-5}$	
Γ_{28}	$p\overline{p}\pi^0$	(4.9 ±1.0) $\times 10^{-4}$	
Γ_{29}	$p\overline{p}\eta$	(2.1 ±0.8) $\times 10^{-4}$	
Γ_{30}	$\pi^+\pi^- p\overline{p}$	(1.32±0.34) $\times 10^{-3}$	
Γ_{31}	$p\overline{n}\pi^-$	(1.2 ±0.4) $\times 10^{-3}$	
Γ_{32}	$\Lambda\overline{\Lambda}$	(2.7 ±1.3) $\times 10^{-4}$	
Γ_{33}	$\Lambda\overline{\Lambda}\pi^+\pi^-$	< 3.5 $\times 10^{-3}$	90%
Γ_{34}	$K^+\overline{p}\Lambda$ + c.c.	(9.6 ±1.9) $\times 10^{-4}$	
Γ_{35}	$\Xi^-\overline{\Xi}^+$	< 3.7 $\times 10^{-4}$	90%
Γ_{36}	$J/\psi(1S)\pi^+\pi^-\pi^0$	< 1.5 %	90%

Radiative decays

Γ_{37}	$\gamma J/\psi(1S)$	(20.0 ± 1.0) %
Γ_{38}	$\gamma\gamma$	$(2.43 \pm 0.18) \times 10^{-4}$

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

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

$\Gamma(p\overline{p}) \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$ — $\Gamma_{27}\Gamma_{37}/\Gamma$

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
27.3±1.4 OUR FIT				
27.5±1.5 OUR AVERAGE				
27.0±1.5±1.1	[9] ANDREOTTI	05A	E835	$p\overline{p} \to e^+e^-\gamma$
27.7±1.5±2.0	[9,10] ARMSTRONG	92	E760	$\overline{p}p \to e^+e^-\gamma$
36 ±8	[9] BAGLIN	86B	SPEC	$\overline{p}p \to e^+e^-X$

$\Gamma(\gamma\gamma) \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$ — $\Gamma_{38}\Gamma_{37}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
99± 7 OUR FIT					
117± 10 OUR AVERAGE					
111± 12± 9	147 ± 15	[11] DOBBS	06	CLE3	10.4 $e^+e^- \to e^+e^-\chi_{c2}$
114± 11± 9	136 ± 13.3	[11,12] ABE	02T	BELL	$e^+e^- \to e^+e^-\chi_{c2}$
139± 55± 21		[11,13] ACCIARRI	99E	L3	$e^+e^- \to e^+e^-\chi_{c2}$
242± 65± 51		[11,14] ACKER..,K...	98	OPAL	$e^+e^- \to e^+e^-\chi_{c2}$
150± 42± 36		[11,15] DOMINICK	94	CLE2	$e^+e^- \to e^+e^-\chi_{c2}$
470±240±120		[11,16] BAUER	93	TPC	$e^+e^- \to e^+e^-\chi_{c2}$

[9] Calculated by us using B($J/\psi(1S) \to e^+e^-$) = 0.0593 ± 0.0010.
[10] Recalculated by ANDREOTTI 05A.
[11] Calculated by us using B($J/\psi \to \ell^+\ell^-$) = 0.1187 ± 0.0008.
[12] All systematic errors added in quadrature.
[13] 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.
[14] 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.
[15] 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.
[16] 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.

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

$\Gamma(2(\pi^+\pi^-)) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ — $\Gamma_1\Gamma_{38}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
5.6 ±0.5 OUR FIT					
5.2 ±0.7 OUR AVERAGE					
5.01±0.44±0.55	1597±138	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to 2(\pi^+\pi^-)$
6.4 ±1.8 ±0.8		EISENSTEIN	01	CLE2	$e^+e^- \to e^+e^-\chi_{c2}$

$\Gamma(\rho^0\pi^+\pi^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{10}\Gamma_{38}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
2.0±0.9 OUR FIT					
3.2±1.9±0.5	986 ± 578	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to 2(\pi^+\pi^-)$

$\Gamma(\rho\rho) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_2\Gamma_{38}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<7.8	90	<598	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to 2(\pi^+\pi^-)$

$\Gamma(\pi^+\pi^-K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_3\Gamma_{38}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
4.6 ±0.5 OUR FIT					
4.42±0.42±0.53	780 ± 74	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to K^+K^-\pi^+\pi^-$

$\Gamma(K^*(892)^0\overline{K}^*(892)^0) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_6\Gamma_{38}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
1.27±0.24 OUR FIT					
0.8 ±0.17±0.27	151 ± 30	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to K^+K^-\pi^+\pi^-$

$\Gamma(K^+K^-K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{24}\Gamma_{38}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.91±0.12 OUR FIT					
1.10±0.21±0.15	126 ± 24	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to 2(K^+K^-)$

$\Gamma(\phi\phi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_7\Gamma_{38}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.76±0.14 OUR FIT					
0.58±0.18±0.16	26.5 ± 8.1	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to 2(K^+K^-)$

$\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_9\Gamma_{38}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
1.07±0.11 OUR FIT					
1.14±0.21±0.17	54 ± 10	[17] NAKAZAWA	05	BELL	$e^+e^- \to e^+e^-\chi_{c2}$

$\Gamma(K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{14}\Gamma_{38}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.39±0.04 OUR FIT					
0.44±0.11±0.07	33 ± 8	NAKAZAWA	05	BELL	$e^+e^- \to e^+e^-\chi_{c2}$

$\Gamma(K^0_SK^0_S) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{15}\Gamma_{38}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.320±0.032 OUR FIT					
0.31 ±0.05 ±0.03	38 ± 7	CHEN	07B	BELL	$e^+e^- \to e^+e^-\chi_{c2}$

[17] We have multiplied $\pi^+\pi^-$ measurement by 3/2 to obtain $\pi\pi$.

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

——— HADRONIC DECAYS ———

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

VALUE	DOCUMENT ID
0.0114±0.0012 OUR FIT	

$\Gamma\big(\rho^0\pi^+\pi^-\big)/\Gamma\big(2(\pi^+\pi^-)\big)$ — Γ_{10}/Γ_1

VALUE	DOCUMENT ID	TECN	COMMENT
0.36±0.17 OUR FIT			
0.31±0.17	TANENBAUM 78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma\big(\rho^0\pi^+\pi^-\big)/\Gamma_{\text{total}}$ — Γ_{10}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
41±18 OUR FIT	

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

VALUE (units 10^{-3})	DOCUMENT ID
9.4±1.1 OUR FIT	

$\Gamma\big(K^+\overline{K}^*(892)^0\pi^- + \text{c.c.}\big)/\Gamma\big(\pi^+\pi^-K^+K^-\big)$ — Γ_5/Γ_3

VALUE	DOCUMENT ID	TECN	COMMENT
0.25±0.14 OUR FIT			
0.25±0.13	TANENBAUM 78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

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

VALUE (units 10^{-4})	DOCUMENT ID
23±13 OUR FIT	

$\Gamma\big(3(\pi^+\pi^-)\big)/\Gamma_{\text{total}}$ — Γ_4/Γ

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
8.6±1.8 OUR EVALUATION	Treating systematic error as correlated.		
8.6±1.8 OUR AVERAGE			
8.6±0.9±1.6	[18] BAI 99B	BES	$\psi(2S) \to \gamma\chi_{c2}$
8.7±5.9±0.4	[18] TANENBAUM 78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

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

VALUE (units 10^{-3})	DOCUMENT ID
2.6±0.5 OUR FIT	

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

VALUE (units 10^{-3})	DOCUMENT ID
1.54±0.30 OUR FIT	

$\Gamma\big(\omega\omega\big)/\Gamma_{\text{total}}$ — Γ_8/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
2.0±0.7±0.1	27.7 ± 7.4	[19] ABLIKIM 05N	BES2	$\psi(2S) \to \gamma\chi_{c2} \to \gamma 6\pi$

$\Gamma(\pi\pi)/\Gamma_{total}$ — Γ_9/Γ

VALUE (units 10^{-3})	DOCUMENT ID
2.17±0.25 OUR FIT	

$\Gamma(\pi^+\pi^-\eta)/\Gamma_{total}$ — Γ_{11}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.55±0.15±0.03	[20] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

$\Gamma(\pi^+\pi^-\eta')/\Gamma_{total}$ — Γ_{12}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.57±0.21±0.03	[21] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

$\Gamma(\eta\eta)/\Gamma_{total}$ — Γ_{13}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
< 5	90	[22] ADAMS	07	CLEO	$\psi(2S) \to \gamma\chi_{c2}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<12	90	[18] BAI	03C	BES	$\psi(2S) \to \gamma\eta\eta \to 5\gamma$
7.9±4.1±2.4		[23] LEE	85	CBAL	$\psi' \to$ photons

$\Gamma(K^+K^-)/\Gamma_{total}$ — Γ_{14}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
0.79±0.14 OUR FIT	

$\Gamma(K^0_S K^0_S)/\Gamma_{total}$ — Γ_{15}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
0.65±0.08 OUR FIT	

$\Gamma(K^0_S K^0_S)/\Gamma(\pi\pi)$ — Γ_{15}/Γ_9

VALUE	DOCUMENT ID		TECN	COMMENT
0.30±0.06 OUR FIT				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.27±0.07±0.04	[24,25] CHEN	07B	BELL	$e^+e^- \to e^+e^-\chi_{c2}$

$\Gamma(K^0_S K^0_S)/\Gamma(K^+K^-)$ — Γ_{15}/Γ_{14}

VALUE	DOCUMENT ID		TECN	COMMENT
0.83±0.19 OUR FIT				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.70±0.21±0.12	[25,26] CHEN	07B	BELL	$e^+e^- \to e^+e^-\chi_{c2}$

$\Gamma(\overline{K}^0 K^+\pi^- + c.c.)/\Gamma_{total}$ — Γ_{16}/Γ

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.40±0.21 OUR AVERAGE						
1.46±0.23±0.07			[27] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$
1.2 ±0.4 ±0.1		28	[28] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c2}$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<2.0	90		[18] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma(K^+K^-\pi^0)/\Gamma_{total}$ — Γ_{17}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.35±0.09±0.02	[29] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

$\Gamma(K^+K^-\eta)/\Gamma_{total}$ — Γ_{18}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<0.4	90	[30] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

$\Gamma(\eta\pi^+\pi^-)/\Gamma_{total}$ — Γ_{19}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<1.7	90	[31] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma(\eta\eta')/\Gamma_{total}$ — Γ_{20}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<2.6	90	[32] ADAMS	07	CLEO	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma(\eta'\eta')/\Gamma_{total}$ — Γ_{21}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<3.5	90	[33] ADAMS	07	CLEO	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma(\pi^+\pi^- K^0_S K^0_S)/\Gamma_{total}$ — Γ_{22}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
2.5±0.6±0.1	57 ± 11	[34] ABLIKIM	05O	BES2	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma(K^+K^- K^0_S K^0_S)/\Gamma_{total}$ — Γ_{23}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<4	90	2.3 ± 2.2	[35] ABLIKIM	05O	BES2	$e^+e^- \to \chi_{c2}\gamma$

$\Gamma(K^+K^-K^+K^-)/\Gamma_{total}$ — Γ_{24}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
1.84±0.24 OUR FIT	

$\Gamma(K^+K^-\phi)/\Gamma_{total}$ — Γ_{25}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.63±0.34±0.08	52	[36] ABLIKIM	06T	BES2	$\psi(2S) \to \gamma 2K^+ 2K^-$

$\Gamma(K^0_S K^0_S p\overline{p})/\Gamma_{total}$ — Γ_{26}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<7.9	90	[37] ABLIKIM	06D	BES2	$\psi(2S) \to \chi_{c2}\gamma$

$\Gamma(p\overline{p})/\Gamma_{total}$ — Γ_{27}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
0.67±0.05 OUR FIT	

$\Gamma(p\overline{p}\pi^0)/\Gamma_{total}$ — Γ_{28}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.49±0.10±0.02	[38] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

$\Gamma(p\overline{p}\eta)/\Gamma_{total}$ — Γ_{29}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.21±0.08±0.01	[39] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

$\Gamma(\pi^+\pi^- p\overline{p})/\Gamma_{total}$ — Γ_{30}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
1.32±0.34 OUR EVALUATION	Treating systematic error as correlated.			
1.3 ±0.4 OUR AVERAGE	Error includes scale factor of 1.3.			
1.17±0.19±0.30	[18] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c2}$
2.64±1.03±0.14	[18] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma(p\overline{n}\pi^-)/\Gamma_{total}$ — Γ_{31}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
12±4±1	[40] ABLIKIM	06I	BES2	$\psi(2S) \to \gamma p\pi^- X$

$\Gamma(\Lambda\overline{\Lambda})/\Gamma_{total}$ — Γ_{32}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.7±1.2±0.5	$8.3^{+3.7}_{-3.4}$	[18] BAI	03E	BES	$\psi(2S) \to \gamma\chi_{c2} \to \gamma\Lambda\overline{\Lambda}$

$\Gamma(\Lambda\overline{\Lambda}\pi^+\pi^-)/\Gamma_{total}$ — Γ_{33}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<3.5	90	[37] ABLIKIM	06D	BES2	$\psi(2S) \to \chi_{c2}\gamma$

$\Gamma(K^+\overline{p}\Lambda + \text{c.c.})/\Gamma_{total}$ — Γ_{34}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.96±0.18±0.05	[41] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

$\Gamma(\Xi^-\overline{\Xi}^+)/\Gamma_{total}$ — Γ_{35}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<3.7	90	[37] ABLIKIM	06D	BES2	$\psi(2S) \to \chi_{c2}\gamma$

$\Gamma(J/\psi(1S)\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{36}/Γ

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

[18] Rescaled by us using B($\psi(2S) \to \gamma\chi_{c2}$)= (8.3 ± 0.4)% and B($\psi(2S) \to J/\psi(1S)\pi^+\pi^-$) = (32.6 ± 0.5)%. Multiplied by a factor of 2 to convert from $K^0_S K^+\pi^-$ to $K^0 K^+\pi^-$ decay.

[19] ABLIKIM 05N reports [B($\chi_{c2}(1P) \to \omega\omega$)] × [B($\psi(2S) \to \gamma\chi_{c2}(1P)$)] = (0.165 ± 0.044 ± 0.032) × 10^{-3}. We divide by our best value B($\psi(2S) \to \gamma\chi_{c2}(1P)$) = (8.3 ± 0.4) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[20] ATHAR 07 reports (0.49 ± 0.12 ± 0.06) × 10^{-3} for B($\psi(2S) \to \gamma\chi_{c2}(1P)$) = (9.33 ± 0.14 ± 0.61) × 10^{-2}. We rescale to our best value B($\psi(2S) \to \gamma\chi_{c2}(1P)$) = (8.3 ± 0.4) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[21] ATHAR 07 reports $(0.51 \pm 0.18 \pm 0.06) \times 10^{-3}$ for $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$. We rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[22] ADAMS 07 reports $< 4.7 \times 10^{-4}$ for $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 0.0933 \pm 0.0014 \pm 0.0061$. We rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 0.083$.

[23] Calculated using $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 0.078 \pm 0.008$.

[24] Using $\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ from the $\pi^+\pi^-$ measurement of NAKAZAWA 05 rescaled by 3/2 to convert to $\pi\pi$.

[25] Not independent from other measurements.

[26] Using $\Gamma(K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ from NAKAZAWA 05.

[27] ATHAR 07 reports $(1.3 \pm 0.2 \pm 0.1) \times 10^{-3}$ for $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$. We rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[28] We have multiplied the $K^0_S K^+\pi^-$ measurement by a factor of 2 to convert to $K^0 K^+\pi^-$. ABLIKIM 06R reports $(1.2 \pm 0.4 \pm 0.2) \times 10^{-3}$ for $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.1 \pm 0.6) \times 10^{-2}$. We rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[29] ATHAR 07 reports $(0.31 \pm 0.07 \pm 0.04) \times 10^{-3}$ for $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$. We rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[30] ATHAR 07 reports $< 0.33 \times 10^{-3}$ for $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$. We rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 0.083$.

[31] ABLIKIM 06R reports $< 1.7 \times 10^{-3}$ for $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.1 \pm 0.4) \times 10^{-2}$. We rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 0.083$.

[32] ADAMS 07 reports $< 2.3 \times 10^{-4}$ for $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 0.0933 \pm 0.0014 \pm 0.0061$. We rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 0.083$.

[33] ADAMS 07 reports $< 3.1 \times 10^{-4}$ for $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 0.0933 \pm 0.0014 \pm 0.0061$. We rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 0.083$.

[34] ABLIKIM 05O reports $[B(\chi_{c2}(1P) \rightarrow \pi^+\pi^- K^0_S K^0_S)] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))] = (0.207 \pm 0.039 \pm 0.033) \times 10^{-3}$. We divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[35] ABLIKIM 05O reports $[B(\chi_{c2}(1P) \rightarrow K^+K^- K^0_S K^0_S)] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))] < 3.5 \times 10^{-5}$. We divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 0.083$.

[36] ABLIKIM 06T reports $(1.67 \pm 0.26 \pm 0.24) \times 10^{-3}$ for $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.1 \pm 0.4) \times 10^{-2}$. We rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[37] Using $B(\psi(2S) \rightarrow \chi_{c2}\gamma) = (9.3 \pm 0.6)\%$.

[38] ATHAR 07 reports $(0.44 \pm 0.08 \pm 0.05) \times 10^{-3}$ for $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$. We rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[39] ATHAR 07 reports $(0.19 \pm 0.07 \pm 0.02) \times 10^{-3}$ for $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$. We rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[40] ABLIKIM 06I reports $[B(\chi_{c2}(1P) \to p\overline{n}\pi^-)] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))] = (0.97 \pm 0.20 \pm 0.26) \times 10^{-4}$. We divide by our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[41] ATHAR 07 reports $(0.85 \pm 0.14 \pm 0.10) \times 10^{-3}$ for $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$. We rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

RADIATIVE DECAYS

$\Gamma(\gamma J/\psi(1S))/\Gamma_{total}$ — Γ_{37}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.200±0.010 OUR FIT				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.199±0.005±0.012	[42] ADAM	05A	CLEO	$e^+e^- \to \psi(2S) \to \gamma\chi_{c2}$

$\Gamma(\gamma\gamma)/\Gamma_{total}$ — Γ_{38}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
2.43±0.18 OUR FIT	

$\Gamma(\gamma\gamma)/\Gamma(\gamma J/\psi(1S))$ — Γ_{38}/Γ_{37}

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
1.21±0.10 OUR FIT				
0.99±0.18	[43] AMBROGIANI	00B	E835	$\overline{p}p \to \chi_{c2} \to \gamma\gamma, \gamma J/\psi$

$\Gamma(\gamma\gamma) \times \Gamma(p\overline{p})/\Gamma^2_{total}$ — $\Gamma_{38}\Gamma_{27}/\Gamma^2$

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
1.64±0.20 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	$\overline{p}p \to \gamma\gamma X$

[42] Uses $B(\psi(2S) \to \gamma\chi_{c2} \to \gamma\gamma J/\psi)$ from ADAM 05A and $B(\psi(2S) \to \gamma\chi_{c2})$ from ATHAR 04.

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

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

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

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
2.38±0.28 OUR FIT				
2.5 ±0.9 OUR AVERAGE	Error includes scale factor of 2.3.			
1.90±0.14±0.44	BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c2}$
3.8 ±0.67	[44] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

$B(\chi_{c2}(1P) \to K^*(892)^0 \overline{K}^*(892)^0) \times B(\psi(2S) \to \gamma\chi_{c2}(1P))$

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
2.1 ±0.4 OUR FIT				
3.11±0.36±0.48	ABLIKIM	04H	BES2	$\psi(2S) \to \gamma\chi_{c2}$

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

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.70±0.17 OUR FIT				
1.4 ±1.1	[45] 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
5.6±0.6 OUR FIT					
$\mathbf{4.4^{+1.6}_{-1.4}\pm0.6}$	$14.3^{+5.2}_{-4.7}$	BAI	04F	BES	$\psi(2S) \to \gamma\chi_{c2}(1P) \to \gamma\overline{p}p$

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

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
0.199±0.017 OUR FIT					
0.190±0.034±0.019	115 ± 13	[46] BAI	98I	BES	$\psi(2S) \to \gamma K^+K^-$

$B(\chi_{c2}(1P) \to K^0_S K^0_S) \times B(\psi(2S) \to \gamma\chi_{c2}(1P))$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
5.4 ±0.7 OUR FIT					
5.72±0.76±0.63	65	ABLIKIM	05O	BES2	$\psi(2S) \to \gamma K^0_S K^0_S$

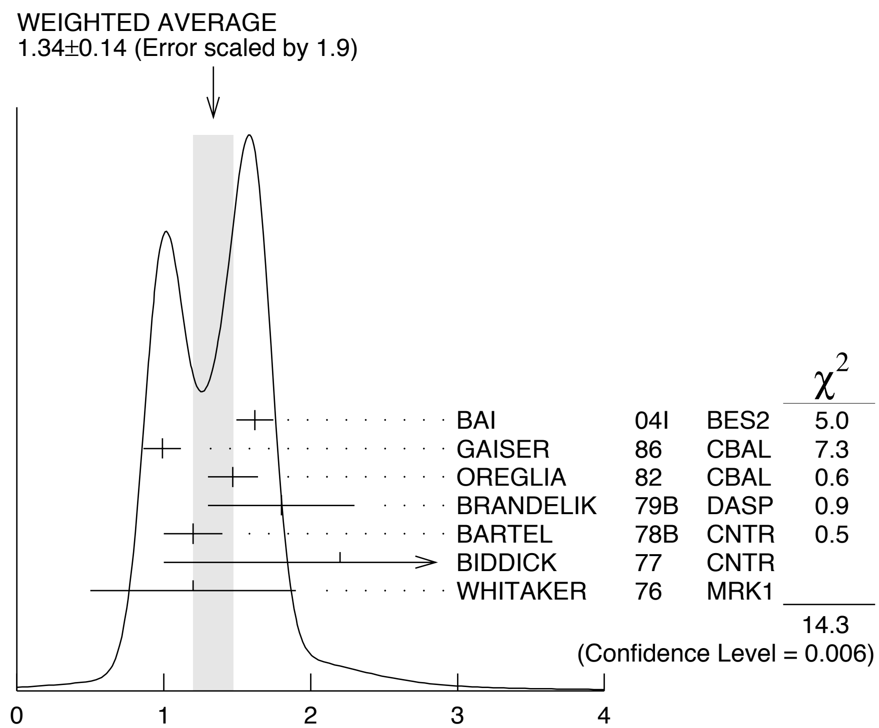
$B(\chi_{c2}(1P) \to K^0_S K^0_S) \times \frac{\Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))}{\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)}$

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
16.4±1.4 OUR FIT				
14.7±4.1±3.3	[47] BAI	99B	BES	$\psi(2S) \to \gamma K^0_S K^0_S$

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.66±0.04 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		[48] OREGLIA	82	CBAL	$\psi(2S) \to \gamma\chi_{c2}$
1.8 ±0.5		[49] BRANDELIK	79B	DASP	$\psi(2S) \to \gamma\chi_{c2}$

1.2 ±0.2		[49] BARTEL	78B	CNTR	$\psi(2S) \to \gamma\chi_{c2}$
2.2 ±1.2		[50] BIDDICK	77	CNTR	$e^+e^- \to \gamma X$
1.2 ±0.7		[48] WHITAKER	76	MRK1	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.85±0.04±0.07	1.9k	[51] ADAM	05A	CLEO	$\psi(2S) \to J/\psi\gamma\gamma$



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

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
2.88±0.04 OUR FIT					
3.11±0.07±0.07	1.9k	ADAM	05A	CLEO	$\psi(2S) \to J/\psi\gamma\gamma$

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
5.08±0.18 OUR FIT					
4.2 ±1.1 OUR AVERAGE					
6.0 ±2.8	1.3k	[52] ABLIKIM	04B	BES	$\psi(2S) \to J/\psi X$
3.9 ±1.2		[53] HIMEL	80	MRK2	$\psi(2S) \to \gamma\chi_{c2}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
5.52±0.13±0.13	1.9k	[51] ADAM	05A	CLEO	$\psi(2S) \to J/\psi\gamma\gamma$

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

VALUE (units 10^{-5})	*DOCUMENT ID*		*TECN*	*COMMENT*
2.01±0.19 OUR FIT				
7.0 ±2.1 ±2.0	LEE	85	CBAL	$\psi(2S) \rightarrow \gamma\chi_{c2}$

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

VALUE (units 10^{-3})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.55±0.05 OUR FIT					
0.54±0.06 OUR AVERAGE					
0.66±0.18±0.37	21 ± 6	[54] BAI	03C	BES	$\psi(2S) \rightarrow \gamma\pi^0\pi^0$
0.54±0.05±0.04	185 ± 16	[55] BAI	98I	BES	$\psi(2S) \rightarrow \gamma\pi^+\pi^-$

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

VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
2.88±0.29 OUR FIT				
3.1 ±1.0 OUR AVERAGE	Error includes scale factor of 2.5.			
2.3 ±0.1 ±0.5	[56] BAI	99B	BES	$\psi(2S) \rightarrow \gamma\chi_{c2}$
4.3 ±0.6	[57] TANENBAUM	78	MRK1	$\psi(2S) \rightarrow \gamma\chi_{c2}$

$B(\chi_{c2}(1P) \rightarrow K^+K^-K^+K^-) \times B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))$

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.52±0.18 OUR FIT					
1.76±0.16±0.24	160	[58] ABLIKIM	06T	BES2	$\psi(2S) \rightarrow \gamma 2K^+2K^-$

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

VALUE (units 10^{-4})	*DOCUMENT ID*		*TECN*	*COMMENT*
4.7±0.4 OUR FIT				
3.6±0.6±0.6	[59] BAI	99B	BES	$\psi(2S) \rightarrow \gamma 2K^+2K^-$

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

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.27±0.24 OUR FIT					
1.38±0.24±0.23	41	[60] ABLIKIM	06T	BES2	$\psi(2S) \rightarrow \gamma 2K^+2K^-$

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

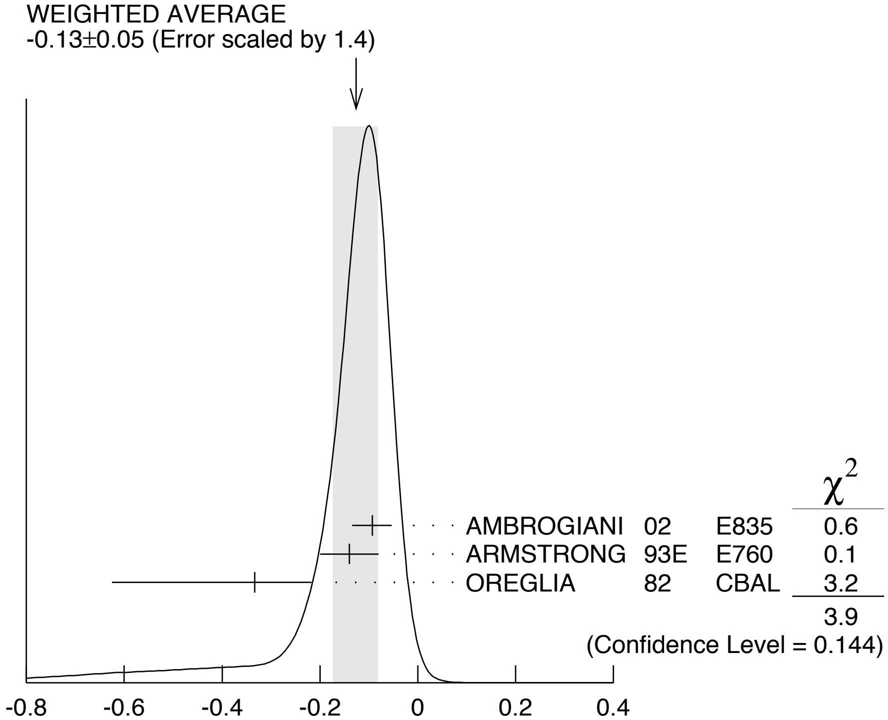
VALUE (units 10^{-4})	*DOCUMENT ID*		*TECN*	*COMMENT*
3.89±0.33 OUR FIT				
4.8 ±1.3 ±1.3	[61] BAI	99B	BES	$\psi(2S) \rightarrow \gamma 2K^+2K^-$

[44] The reported value is derived using B($\psi(2S) \rightarrow \pi^+\pi^- J/\psi$) × B($J/\psi \rightarrow \ell^+\ell^-$) = (4.6 ± 0.7)%. Calculated by us using B($J/\psi \rightarrow \ell^+\ell^-$) = 0.1181 ± 0.0020.
[45] Calculated by us. The value for B($\chi_{c2} \rightarrow p\overline{p}$) reported in BAI 98I is derived using B($\psi(2S) \rightarrow \gamma\chi_{c2}$) = (7.8 ± 0.8)% and B($\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-$) = (32.4 ± 2.6)% [BAI 98D].
[46] Calculated by us. The value for B($\chi_{c2} \rightarrow K^+K^-$) reported by BAI 98I is derived using B($\psi(2S) \rightarrow \gamma\chi_{c2}$) = (7.8 ± 0.8)% and B($\psi(2S) \rightarrow J/\psi\pi^+\pi^-$) = (32.4 ± 2.6)% [BAI 98D].
[47] Calculated by us. The value of B($\chi_{c2} \rightarrow K^0_S K^0_S$) reported by BAI 99B was derived using B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$) = (7.8 ± 0.8)% and B($\psi(2S) \rightarrow J/\psi\pi^+\pi^-$) = (32.4 ± 2.6)% [BAI 98D].
[48] Recalculated by us using B($J/\psi(1S) \rightarrow \ell^+\ell^-$) = 0.1181 ± 0.0020.
[49] Recalculated by us using B($J/\psi(1S) \rightarrow \mu^+\mu^-$) = 0.0588 ± 0.0010.
[50] Assumes isotropic gamma distribution.
[51] Not independent from other values reported by ADAM 05A.
[52] From a fit to the J/ψ recoil mass spectra.
[53] The value for B($\psi(2S) \rightarrow \gamma\chi_{c2}$)×B($\chi_{c2} \rightarrow \gamma J/\psi(1S)$) reported in HIMEL 80 is derived using B($\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-$) = (33 ± 3)% and B($J/\psi(1S) \rightarrow \ell^+\ell^-$) = 0.138 ± 0.018. Calculated by us using B($J/\psi(1S) \rightarrow \ell^+\ell^-$) = (0.1181 ± 0.0020).
[54] We have multiplied $\pi^0\pi^0$ measurement by 3 to obtain $\pi\pi$.
[55] Calculated by us. The value for B($\chi_{c2} \rightarrow \pi^+\pi^-$) reported by BAI 98I is derived using B($\psi(2S) \rightarrow \gamma\chi_{c2}$) = (7.8 ± 0.8)% and B($\psi(2S) \rightarrow J/\psi\pi^+\pi^-$) = (32.4 ± 2.6)% [BAI 98D]. We have multiplied $\pi^+\pi^-$ measurement by 3/2 to obtain $\pi\pi$.
[56] Calculated by us. The value for B($\chi_{c2} \rightarrow 2\pi^+2\pi^-$) reported in BAI 99B is derived using B($\psi(2S) \rightarrow \gamma\chi_{c2}$) = (7.8 ± 0.8)% and B($\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-$) = (32.4 ± 2.6)% [BAI 98D].
[57] The value for B($\psi(2S) \rightarrow \gamma\chi_{c2}$)×B($\chi_{c2} \rightarrow 2\pi^+\pi^-$) reported in TANENBAUM 78 is derived using B($\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-$)×B($J/\psi(1S)\ell^+\ell^-$) = (4.6 ± 0.7)%. Calculated by us using B($J/\psi(1S) \rightarrow \ell^+\ell^-$) = 0.1181 ± 0.0020.
[58] Calculated by us. The value of B($\chi_{c2} \rightarrow 2K^+2K^-$) reported by ABLIKIM 06T was derived using B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$) = (8.1 ± 0.4)%.
[59] Calculated by us. The value of B($\chi_{c2} \rightarrow 2K^+2K^-$) reported by BAI 99B was derived using B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$) = (7.8 ± 0.8)% and B($\psi(2S) \rightarrow J/\psi\pi^+\pi^-$) = (32.4 ± 2.6)% [BAI 98D].
[60] Calculated by us. The value of B($\chi_{c2} \rightarrow \phi\phi$) reported by ABLIKIM 06T was derived using B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$) = (8.1 ± 0.4)%.
[61] Calculated by us. The value of B($\chi_{c2} \rightarrow \phi\phi$) reported by BAI 99B was derived using B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$) = (7.8 ± 0.8)% and B($\psi(2S) \rightarrow J/\psi\pi^+\pi^-$) = (32.4 ± 2.6)% [BAI 98D].

MULTIPOLE AMPLITUDES IN $\chi_{c2}(1P) \rightarrow \gamma J/\psi(1S)$ 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	[62] AMBROGIANI 02	E835	$p\overline{p} \rightarrow \chi_{c2} \rightarrow J/\psi\gamma$
−0.14 ±0.06	1904	[62] ARMSTRONG 93E	E760	$p\overline{p} \rightarrow \chi_{c2} \rightarrow J/\psi\gamma$
$-0.333^{+0.116}_{-0.292}$	441	[62] OREGLIA 82	CBAL	$\psi(2S) \rightarrow \chi_{c1}\gamma \rightarrow J/\psi\gamma\gamma$



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

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

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

[62] Assuming a_3=0.

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

UEHARA	08	EPJ C53 1	S. Uehara *et al.*	(BELLE Collab.)
ADAMS	07	PR D75 071101R	G.S. Adams *et al.*	(CLEO Collab.)
ATHAR	07	PR D75 032002	S.B. Athar *et al.*	(CLEO Collab.)
CHEN	07B	PL B651 15	W.T. Chen *et al.*	(BELLE Collab.)
ABLIKIM	06D	PR D73 052006	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	06I	PR D74 012004	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	06R	PR D74 072001	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	06T	PL B642 197	M. Ablikim *et al.*	(BES Collab.)
DOBBS	06	PR D73 071101R	S. Dobbs *et al.*	(CLEO Collab.)
ABLIKIM	05G	PR D71 092002	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	05N	PL B630 7	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	05O	PL B630 21	M. Ablikim *et al.*	(BES Collab.)
ADAM	05A	PRL 94 232002	N.E. Adam *et al.*	(CLEO Collab.)
ANDREOTTI	05A	NP B717 34	M. Andreotti *et al.*	(FNAL E835 Collab.)
NAKAZAWA	05	PL B615 39	H. Nakazawa *et al.*	(BELLE Collab.)
ABLIKIM	04B	PR D70 012003	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	04H	PR D70 092003	M. Ablikim *et al.*	(BES Collab.)
ATHAR	04	PR D70 112002	S.B. Athar *et al.*	(CLEO 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	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		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		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		Private Comm.	G. Trilling	(LBL, UCB)
BRANDELIK	79B	NP B160 426	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		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		PRL 35 1184 (Errat.)	G.J. Feldman *et al.*	(LBL, SLAC)
TANENBAUM	75	PRL 35 1323	W.M. Tanenbaum *et al.*	(LBL, SLAC)