$\chi_{c2}(1P)$

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

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	$\gamma\gamma \to$ hadrons
3555.70 ± 0.59 ±0.39		ABLIKIM	05G	BES2	$\psi(2S) \to \gamma\chi_{c2}$
3556.173± 0.123±0.020		ANDREOTTI	05A	E835	$p\overline{p} \to e^+e^-\gamma$
3559.9 ± 2.9		EISENSTEIN	01	CLE2	$e^+e^- \to e^+e^-\chi_{c2}$
3556.4 ± 0.7		BAI	99B	BES	$\psi(2S) \to \gamma X$
3556.22 ± 0.131±0.020	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	185 π^- Be $\to \gamma\mu^+\mu^-$ A
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] 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
1.97 ±0.11 OUR FIT					
1.95 ±0.13 OUR AVERAGE					
1.915±0.188±0.013		ANDREOTTI	05A	E835	$p\overline{p} \to e^+e^-\gamma$
1.96 ±0.17 ±0.07	585	[7] ARMSTRONG	92	E760	$\overline{p}p \to e^+e^-\gamma$
$2.6\ {}^{+1.4}_{-1.0}$	50	BAGLIN	86B	SPEC	$\overline{p}p \to e^+e^-X$
$2.8\ {}^{+2.1}_{-2.0}$		[8] GAISER	86	CBAL	$\psi(2S) \to \gamma X$

[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	$2(\pi^+\pi^-)$	(1.10±0.11) %	
Γ_2	$\rho\rho$		
Γ_3	$\pi^+\pi^-\pi^0\pi^0$	(1.99±0.26) %	
Γ_4	$\rho^+\pi^-\pi^0$ + c.c.	(2.4 ±0.4) %	
Γ_5	$4\pi^0$	(1.21±0.17) × 10^{-3}	
Γ_6	$K^+K^-\pi^0\pi^0$	(2.2 ±0.4) × 10^{-3}	
Γ_7	$K^+\pi^-K^0\pi^0$ + c.c.	(1.50±0.22) %	
Γ_8	$\rho^+K^-K^0$ + c.c.	(4.5 ±1.4) × 10^{-3}	
Γ_9	$K^*(892)^0K^+\pi^- \rightarrow K^+\pi^-K^0\pi^0$ + c.c.	(3.2 ±0.9) × 10^{-3}	
Γ_{10}	$K^*(892)^0K^0\pi^0 \rightarrow K^+\pi^-K^0\pi^0$ + c.c.	(4.2 ±0.9) × 10^{-3}	
Γ_{11}	$K^*(892)^-K^+\pi^0 \rightarrow K^+\pi^-K^0\pi^0$ + c.c.	(4.0 ±0.9) × 10^{-3}	
Γ_{12}	$K^*(892)^+K^0\pi^- \rightarrow K^+\pi^-K^0\pi^0$ + c.c.	(3.2 ±0.9) × 10^{-3}	
Γ_{13}	$K^+K^-\eta\pi^0$	(1.4 ±0.5) × 10^{-3}	
Γ_{14}	$K^+K^-\pi^+\pi^-$	(9.1 ±1.1) × 10^{-3}	
Γ_{15}	$K^+K^-\pi^+\pi^-\pi^0$	(1.3 ±0.4) %	
Γ_{16}	$K^+\overline{K}^*(892)^0\pi^-$ + c.c.	(2.3 ±1.2) × 10^{-3}	
Γ_{17}	$K^*(892)^0\overline{K}^*(892)^0$	(2.5 ±0.5) × 10^{-3}	
Γ_{18}	$3(\pi^+\pi^-)$	(8.6 ±1.8) × 10^{-3}	
Γ_{19}	$\phi\phi$	(1.16±0.10) × 10^{-3}	
Γ_{20}	$\omega\omega$	(9.2 ±1.1) × 10^{-4}	
Γ_{21}	$\omega\phi$		
Γ_{22}	$\pi\pi$	(2.42±0.13) × 10^{-3}	
Γ_{23}	$\rho^0\pi^+\pi^-$	(4.0 ±1.7) × 10^{-3}	
Γ_{24}	$\pi^+\pi^-\eta$	(5.2 ±1.4) × 10^{-4}	
Γ_{25}	$\pi^+\pi^-\eta'$	(5.4 ±2.0) × 10^{-4}	
Γ_{26}	$\eta\eta$	(5.9 ±0.5) × 10^{-4}	
Γ_{27}	K^+K^-	(1.09±0.08) × 10^{-3}	
Γ_{28}	$K^0_SK^0_S$	(5.8 ±0.5) × 10^{-4}	
Γ_{29}	$\overline{K}^0K^+\pi^-$ + c.c.	(1.39±0.20) × 10^{-3}	
Γ_{30}	$K^+K^-\pi^0$	(3.3 ±0.8) × 10^{-4}	
Γ_{31}	$K^+K^-\eta$	< 3.5 × 10^{-4}	90%
Γ_{32}	$\eta\eta'$	< 6 × 10^{-5}	90%
Γ_{33}	$\eta'\eta'$	< 1.1 × 10^{-4}	90%
Γ_{34}	$\pi^+\pi^-K^0_SK^0_S$	(2.4 ±0.6) × 10^{-3}	
Γ_{35}	$K^+K^-K^0_SK^0_S$	< 4 × 10^{-4}	90%
Γ_{36}	$K^+K^-K^+K^-$	(1.78±0.22) × 10^{-3}	

Γ_{37}	$K^+K^-\phi$	$(1.54\pm0.32)\times10^{-3}$	
Γ_{38}	$p\overline{p}$	$(7.1\ \pm0.4\ )\times10^{-5}$	
Γ_{39}	$p\overline{p}\pi^0$	$(5.1\ \pm0.5\ )\times10^{-4}$	
Γ_{40}	$p\overline{p}\eta$	$(1.89\pm0.28)\times10^{-4}$	
Γ_{41}	$p\overline{p}\omega$	$(3.9\ \pm0.5\ )\times10^{-4}$	
Γ_{42}	$p\overline{p}\phi$	$(3.0\ \pm1.0\ )\times10^{-5}$	
Γ_{43}	$p\overline{p}\pi^+\pi^-$	$(1.32\pm0.34)\times10^{-3}$	
Γ_{44}	$p\overline{p}\pi^0\pi^0$	$(8.5\ \pm2.6\ )\times10^{-4}$	
Γ_{45}	$p\overline{p}K^+K^-$ (non-resonant)	$(2.08\pm0.35)\times10^{-4}$	
Γ_{46}	$p\overline{p}K^0_SK^0_S$	$<7.9\ \times10^{-4}$	90%
Γ_{47}	$p\overline{n}\pi^-$	$(1.1\ \pm0.4\ )\times10^{-3}$	
Γ_{48}	$\Lambda\overline{\Lambda}$	$(1.86\pm0.27)\times10^{-4}$	
Γ_{49}	$\Lambda\overline{\Lambda}\pi^+\pi^-$	$<3.5\ \times10^{-3}$	90%
Γ_{50}	$K^+\overline{p}\Lambda$ + c.c.	$(8.4\ \pm0.6\ )\times10^{-4}$	
Γ_{51}	$K^+p\Lambda(1520)$+ c.c.	$(3.1\ \pm0.7\ )\times10^{-4}$	
Γ_{52}	$\Lambda(1520)\overline{\Lambda}(1520)$	$(5.0\ \pm1.6\ )\times10^{-4}$	
Γ_{53}	$\Sigma^0\overline{\Sigma}^0$	$<8\ \times10^{-5}$	90%
Γ_{54}	$\Sigma^+\overline{\Sigma}^-$	$<7\ \times10^{-5}$	90%
Γ_{55}	$\Xi^0\overline{\Xi}^0$	$<1.1\ \times10^{-4}$	90%
Γ_{56}	$\Xi^-\overline{\Xi}^+$	$(1.55\pm0.35)\times10^{-4}$	
Γ_{57}	$J/\psi(1S)\pi^+\pi^-\pi^0$	<1.5 %	90%
Γ_{58}	$\eta_c(1S)\pi^+\pi^-$	<2.3 %	90%

Radiative decays

Γ_{59}	$\gamma J/\psi(1S)$	$(19.8\ \pm0.8\ )$ %	
Γ_{60}	$\gamma\rho^0$	$<2.1\ \times10^{-5}$	90%
Γ_{61}	$\gamma\omega$	$<6\ \times10^{-6}$	90%
Γ_{62}	$\gamma\phi$	$<8\ \times10^{-6}$	90%
Γ_{63}	$\gamma\gamma$	$(2.61\pm0.16)\times10^{-4}$	

CONSTRAINED FIT INFORMATION

A multiparticle fit to $\chi_{c1}(1P)$, $\chi_{c0}(1P)$, $\chi_{c2}(1P)$, and $\psi(2S)$ with 4 total widths, a partial width, 25 combinations of partial widths obtained from integrated cross section, and 84 branching ratios uses 227 measurements to determine 49 parameters. The overall fit has a $\chi^2 = 325.4$ for 178 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle\delta p_i \delta p_j\right\rangle/(\delta p_i{\cdot}\delta p_j)$, in percent, from the fit to parameters p_i, including the branching fractions, $x_i \equiv \Gamma_i/\Gamma_{\text{total}}$.

x_{14}	17									
x_{16}	4	22								
x_{17}	10	8	2							
x_{19}	18	15	3	9						
x_{22}	24	20	4	12	29					
x_{23}	20	4	1	2	4	5				
x_{26}	14	12	3	7	17	32	3			
x_{27}	18	16	3	9	22	39	4	24		
x_{28}	17	15	3	9	20	34	4	21	25	
x_{29}	9	8	2	5	11	19	2	12	14	12
x_{36}	12	10	2	6	13	22	3	13	16	14
x_{38}	7	5	1	3	4	1	2	0	1	2
x_{48}	8	7	2	4	11	19	2	12	14	13
x_{59}	29	25	5	15	34	61	6	37	45	40
x_{63}	−17	−14	−3	−8	−9	2	−5	2	0	−3
Γ	−25	−21	−5	−12	−25	−36	−6	−22	−28	−25
	x_1	x_{14}	x_{16}	x_{17}	x_{19}	x_{22}	x_{23}	x_{26}	x_{27}	x_{28}

x_{36}	8					
x_{38}	1	2				
x_{48}	7	8	0			
x_{59}	22	26	−10	23		
x_{63}	0	−3	29	1	8	
Γ	−14	−17	−50	−13	−50	−50
	x_{29}	x_{36}	x_{38}	x_{48}	x_{59}	x_{63}

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

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

$\Gamma(p\overline{p}) \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$ — $\Gamma_{38}\Gamma_{59}/\Gamma$

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
27.8±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	$\overline{p}p \to e^+ e^- X$

[9] Calculated by us using B($J/\psi(1S) \to e^+ e^-$) = 0.0593 ± 0.0010.
[10] Recalculated by ANDREOTTI 05A.

$\Gamma(\gamma\gamma) \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$ — $\Gamma_{63}\Gamma_{59}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
102± 6 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	$e^+ e^- \to e^+ e^- \chi_{c2}$

[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.

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

$\Gamma(2(\pi^+\pi^-)) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ — $\Gamma_1\Gamma_{63}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
5.7 ±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	$e^+ e^- \to e^+ e^- \chi_{c2}$

$\Gamma(\rho\rho) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_2\Gamma_{63}/\Gamma$

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	$\gamma\gamma \to \chi_{c2} \to 2(\pi^+\pi^-)$

$\Gamma(K^+K^-\pi^+\pi^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{14}\Gamma_{63}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
4.7 ±0.5 OUR FIT					
4.42±0.42±0.53	780 ± 74	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to K^+K^-\pi^+\pi^-$

$\Gamma(K^+K^-\pi^+\pi^-\pi^0) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{15}\Gamma_{63}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
6.5±0.9±1.5	1250	DEL-AMO-SA..11M		BABR	$\gamma\gamma \to K^+K^-\pi^+\pi^-\pi^0$

$\Gamma(K^*(892)^0\overline{K}^*(892)^0) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{17}\Gamma_{63}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
1.26±0.24 OUR FIT					
0.8 ±0.17±0.27	151 ± 30	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to K^+K^-\pi^+\pi^-$

$\Gamma(\phi\phi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{19}\Gamma_{63}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.59±0.05 OUR FIT					
0.62±0.07±0.05	89 ± 11	[17] LIU	12B	BELL	$\gamma\gamma \to 2(K^+K^-)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.58±0.18±0.16	26.5 ± 8.1	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c2} \to 2(K^+K^-)$

[17] Supersedes UEHARA 08. Using B($\phi \to K^+K^-$) = (48.9 ± 0.5)%.

$\Gamma(\omega\omega) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{20}\Gamma_{63}/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.64	90	[18] LIU	12B	BELL	$\gamma\gamma \to 2(\pi^+\pi^-\pi^0)$

[18] Using B($\omega \to \pi^+\pi^-\pi^0$) = (89.2 ± 0.7)%.

$\Gamma(\omega\phi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{21}\Gamma_{63}/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.04	90	[19] LIU	12B	BELL	$\gamma\gamma \to K^+K^-\pi^+\pi^-\pi^0$

[19] Using B($\phi \to K^+K^-$) = (48.9 ± 0.5)% and B($\omega \to \pi^+\pi^-\pi^0$) = (89.2 ± 0.7)%.

$\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{22}\Gamma_{63}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
1.24±0.08 OUR FIT					
1.18±0.25 OUR AVERAGE					
1.44±0.54±0.47	34 ± 13	[20] UEHARA	09	BELL	10.6 $e^+e^- \to e^+e^-\pi^0\pi^0$
1.14±0.21±0.17	54 ± 10	[21] NAKAZAWA	05	BELL	10.6 $e^+e^- \to e^+e^-\pi^+\pi^-$

[20] We multiplied the measurement by 3 to convert from $\pi^0\pi^0$ to $\pi\pi$. Interference with the continuum included.

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

$\Gamma(\rho^0\pi^+\pi^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{23}\Gamma_{63}/\Gamma$

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

$\Gamma(\eta\eta) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{26}\Gamma_{63}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.53±0.22±0.09	8	[22] UEHARA	10A	BELL	10.6 $e^+e^- \to e^+e^-\eta\eta$

[22] Interference with the continuum not included.

$\Gamma(K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{27}\Gamma_{63}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.56±0.04 OUR FIT					
0.44±0.11±0.07	33 ± 8	NAKAZAWA	05	BELL	10.6 $e^+e^- \to e^+e^-K^+K^-$

$\Gamma(K^0_S K^0_S) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{28}\Gamma_{63}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.297±0.025 OUR FIT					
0.31 ±0.05 ±0.03	38 ± 7	CHEN	07B	BELL	$e^+e^- \to e^+e^-\chi_{c2}$

$\Gamma(\overline{K}^0K^+\pi^- + \text{c.c.}) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{29}\Gamma_{63}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.71±0.11 OUR FIT					
1.20±0.33±0.13	126	[23] DEL-AMO-SA...	11M	BABR	$\gamma\gamma \to K^0_S K^\pm\pi^\mp$

[23] We have multiplied $\overline{K}K\pi$ by 2/3 to obtain $\overline{K}^0K^+\pi^-$ + c.c.

$\Gamma(K^+K^-K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{36}\Gamma_{63}/\Gamma$

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

$\Gamma(\eta_c(1S)\pi^+\pi^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{58}\Gamma_{63}/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<15.7	90	LEES	12AE	BABR	$e^+e^- \to e^+e^-\pi^+\pi^-\eta_c$

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

HADRONIC DECAYS

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

VALUE	DOCUMENT ID
0.0110±0.0011 OUR FIT	

$\Gamma(\rho^0\pi^+\pi^-)/\Gamma(2(\pi^+\pi^-))$ — Γ_{23}/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
0.36±0.15 OUR FIT				
0.31±0.17	TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

$\Gamma(\pi^+\pi^-\pi^0\pi^0)/\Gamma_{total}$ — Γ_3/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.99±0.25±0.08	903.5	[24] HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[24] HE 08B reports $1.87 \pm 0.07 \pm 0.22 \pm 0.13$ % from a measurement of $[\Gamma(\chi_{c2}(1P) \to \pi^+\pi^-\pi^0\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
2.4±0.4±0.1	1031.9	[25,26] HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[25] HE 08B reports $2.23 \pm 0.11 \pm 0.32 \pm 0.16$ % from a measurement of $[\Gamma(\chi_{c2}(1P) \to \rho^+\pi^-\pi^0 + \text{c.c.})/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[26] Calculated by us. We have added the values from HE 08B for $\rho^+\pi^-\pi^0$ and $\rho^-\pi^+\pi^0$ decays assuming uncorrelated statistical and fully correlated systematic uncertainties.

$\Gamma(4\pi^0)/\Gamma_{total}$ — Γ_5/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.21±0.16±0.05	1164	[27] ABLIKIM	11A	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c2}$

[27] ABLIKIM 11A reports $(1.21 \pm 0.05 \pm 0.16) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to 4\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+K^-\pi^0\pi^0)/\Gamma_{total}$ — Γ_6/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.22±0.04±0.01	76.9	[28] HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[28] HE 08B reports $0.21 \pm 0.03 \pm 0.03 \pm 0.01$ % from a measurement of $[\Gamma(\chi_{c2}(1P) \to K^+K^-\pi^0\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+\pi^-K^0\pi^0 + c.c.)/\Gamma_{total}$ — Γ_7/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.50±0.21±0.06	211.6	[29] HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[29] HE 08B reports $1.41 \pm 0.11 \pm 0.16 \pm 0.10$ % from a measurement of $[\Gamma(\chi_{c2}(1P) \to K^+\pi^-K^0\pi^0 + \text{c.c.})/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\rho^+ K^- K^0 + \text{c.c.})/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.45±0.13±0.02	62.9	[30] HE	08B	CLEO	$e^+ e^- \to \gamma h^+ h^- h^0 h^0$

[30] HE 08B reports $0.42 \pm 0.11 \pm 0.06 \pm 0.03$ % from a measurement of $[\Gamma(\chi_{c2}(1P) \to \rho^+ K^- K^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^*(892)^0 K^+ \pi^- \to K^+ \pi^- K^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}$ Γ_9/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.32±0.09±0.01	38.7	[31] HE	08B	CLEO	$e^+ e^- \to \gamma h^+ h^- h^0 h^0$

[31] HE 08B reports $0.30 \pm 0.07 \pm 0.04 \pm 0.02$ % from a measurement of $[\Gamma(\chi_{c2}(1P) \to K^*(892)^0 K^+ \pi^- \to K^+ \pi^- K^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^*(892)^0 K^0 \pi^0 \to K^+ \pi^- K^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{10}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.42±0.09±0.02	63.0	[32] HE	08B	CLEO	$e^+ e^- \to \gamma h^+ h^- h^0 h^0$

[32] HE 08B reports $0.39 \pm 0.07 \pm 0.05 \pm 0.03$ % from a measurement of $[\Gamma(\chi_{c2}(1P) \to K^*(892)^0 K^0 \pi^0 \to K^+ \pi^- K^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^*(892)^- K^+ \pi^0 \to K^+ \pi^- K^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.40±0.09±0.02	51.1	[33] HE	08B	CLEO	$e^+ e^- \to \gamma h^+ h^- h^0 h^0$

[33] HE 08B reports $0.38 \pm 0.07 \pm 0.04 \pm 0.03$ % from a measurement of $[\Gamma(\chi_{c2}(1P) \to K^*(892)^- K^+ \pi^0 \to K^+ \pi^- K^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^*(892)^+ K^0 \pi^- \to K^+ \pi^- K^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{12}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.32±0.09±0.01	39.3	[34] HE	08B	CLEO	$e^+ e^- \to \gamma h^+ h^- h^0 h^0$

[34] HE 08B reports $0.30 \pm 0.07 \pm 0.04 \pm 0.02$ % from a measurement of $[\Gamma(\chi_{c2}(1P) \to K^*(892)^+ K^0 \pi^- \to K^+ \pi^- K^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+K^-\eta\pi^0)/\Gamma_{total}$ — Γ_{13}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.14±0.05±0.01	22.9	[35] HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[35] HE 08B reports $0.13 \pm 0.04 \pm 0.02 \pm 0.01$ % from a measurement of $[\Gamma(\chi_{c2}(1P) \to K^+K^-\eta\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units 10^{-3})	DOCUMENT ID
9.1±1.1 OUR FIT	

$\Gamma(K^+\overline{K}^*(892)^0\pi^- + c.c.)/\Gamma(K^+K^-\pi^+\pi^-)$ — Γ_{16}/Γ_{14}

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

$\Gamma(K^+\overline{K}^*(892)^0\pi^- + c.c.)/\Gamma_{total}$ — Γ_{16}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
23±12 OUR FIT	

$\Gamma(K^*(892)^0\overline{K}^*(892)^0)/\Gamma_{total}$ — Γ_{17}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
2.5±0.5 OUR FIT	

$\Gamma(3(\pi^+\pi^-))/\Gamma_{total}$ — Γ_{18}/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	[36] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c2}$
8.7±5.9±0.4	[36] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

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

$\Gamma(\phi\phi)/\Gamma_{total}$ — Γ_{19}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
1.16±0.10 OUR FIT	

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

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
0.92±0.11 OUR AVERAGE					
0.89±0.11±0.03	762	[37] ABLIKIM	11K	BES3	$\psi(2S) \to \gamma$ hadrons
1.9 ±0.6 ±0.1	27.7±7.4	[38] ABLIKIM	05N	BES2	$\psi(2S) \to \gamma\chi_{c2} \to \gamma 6\pi$

[37] ABLIKIM 11K reports $(8.9 \pm 0.3 \pm 1.1) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \omega\omega)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[38] ABLIKIM 05N reports $[\Gamma(\chi_{c2}(1P) \to \omega\omega)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))] = (0.165 \pm 0.044 \pm 0.032) \times 10^{-3}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\omega\phi)/\Gamma_{total}$ — Γ_{21}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<2.0	90	[39] ABLIKIM	11K	BES3	$\psi(2S) \to \gamma$ hadrons

[39] ABLIKIM 11K reports $< 2 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \omega\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

$\Gamma(\pi\pi)/\Gamma_{total}$ — Γ_{22}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
2.42±0.13 OUR FIT	

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

VALUE (units 10^{-4})	DOCUMENT ID
40±17 OUR FIT	

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

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
0.52±0.14±0.02		[40] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.6	90	[41] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c2}$

[40] ATHAR 07 reports $(0.49 \pm 0.12 \pm 0.06) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \pi^+\pi^-\eta)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[41] ABLIKIM 06R reports $< 1.7 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \pi^+\pi^-\eta)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.1 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

$\Gamma(\pi^+\pi^-\eta')/\Gamma_{total}$ — Γ_{25}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.54±0.20±0.02	[42] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[42] ATHAR 07 reports $(0.51 \pm 0.18 \pm 0.06) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \pi^+\pi^-\eta')/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\eta\eta)/\Gamma_{total}$ — Γ_{26}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
5.9±0.5 OUR FIT	

$\Gamma(K^+K^-)/\Gamma_{total}$ — Γ_{27}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
1.09±0.08 OUR FIT	

$\Gamma(K^0_S K^0_S)/\Gamma_{total}$ — Γ_{28}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
0.58±0.05 OUR FIT	

$\Gamma(K^0_S K^0_S)/\Gamma(\pi\pi)$ — Γ_{28}/Γ_{22}

VALUE	DOCUMENT ID	TECN	COMMENT
0.239±0.019 OUR FIT			
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.27 ±0.07 ±0.04	[43,44] CHEN 07B	BELL	$e^+e^- \to e^+e^-\chi_{c2}$

[43] 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 $\pi\pi$.

[44] Not independent from other measurements.

$\Gamma(K^0_S K^0_S)/\Gamma(K^+K^-)$ — Γ_{28}/Γ_{27}

VALUE	DOCUMENT ID	TECN	COMMENT
0.53±0.05 OUR FIT			
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.70±0.21±0.12	[45,46] CHEN 07B	BELL	$e^+e^- \to e^+e^-\chi_{c2}$

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

[46] Not independent from other measurements.

$\Gamma(K^+K^-\pi^0)/\Gamma_{total}$ — Γ_{30}/Γ

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
0.33±0.08±0.01	[47] ATHAR 07	CLEO	$\psi(2S) \to \gamma h^+h^-h^0$

[47] ATHAR 07 reports $(0.31 \pm 0.07 \pm 0.04) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to K^+K^-\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+K^-\eta)/\Gamma_{total}$ — Γ_{31}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<0.35	90	[48] ATHAR 07	CLEO	$\psi(2S) \to \gamma h^+h^-h^0$

[48] ATHAR 07 reports $< 0.33 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to K^+K^-\eta)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

$\Gamma(\eta\eta')/\Gamma_{total}$ — Γ_{32}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.6	90	3.3 ± 8.0	[49] ASNER	09	CLEO	$\psi(2S) \to \gamma\eta\eta'$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<2.5	90		[50] ADAMS	07	CLEO	$\psi(2S) \to \gamma\chi_{c2}$

[49] ASNER 09 reports $< 0.6 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \eta\eta')/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

[50] Superseded by ASNER 09. ADAMS 07 reports $< 2.3 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \eta\eta')/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 0.0933 \pm 0.0014 \pm 0.0061$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

$\Gamma(\eta'\eta')/\Gamma_{total}$ — Γ_{33}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<1.1	90	12 ± 7	[51] ASNER	09	CLEO	$\psi(2S) \to \gamma\eta'\eta'$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<3.3	90		[52] ADAMS	07	CLEO	$\psi(2S) \to \gamma\chi_{c2}$

[51] ASNER 09 reports $< 1.0 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \eta'\eta')/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

[52] Superseded by ASNER 09. ADAMS 07 reports $< 3.1 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \eta'\eta')/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 0.0933 \pm 0.0014 \pm 0.0061$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

$\Gamma(\pi^+\pi^- K^0_S K^0_S)/\Gamma_{total}$ — Γ_{34}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
2.4±0.6±0.1	57 ± 11	[53] ABLIKIM	05O	BES2	$\psi(2S) \to \gamma\chi_{c2}$

[53] ABLIKIM 05O reports $[\Gamma(\chi_{c2}(1P) \to \pi^+\pi^- K^0_S K^0_S)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))] = (0.207 \pm 0.039 \pm 0.033) \times 10^{-3}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+K^- K^0_S K^0_S)/\Gamma_{total}$ — Γ_{35}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<4	90	2.3 ± 2.2	[54] ABLIKIM	05O	BES2	$e^+e^- \to \chi_{c2}\gamma$

[54] ABLIKIM 05O reports $[\Gamma(\chi_{c2}(1P) \to K^+K^- K^0_S K^0_S)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))] < 3.5 \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

$\Gamma(K^+K^-K^+K^-)/\Gamma_{total}$ — Γ_{36}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
1.78±0.22 OUR FIT	

$\Gamma(K^+K^-\phi)/\Gamma_{total}$ — Γ_{37}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.54±0.32±0.06	52	[55] ABLIKIM	06T	BES2	$\psi(2S) \to \gamma 2K^+ 2K^-$

[55] ABLIKIM 06T reports $(1.67 \pm 0.26 \pm 0.24) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to K^+K^-\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.1 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units 10^{-4})	DOCUMENT ID
0.71±0.04 OUR FIT	

$\Gamma(p\overline{p}\pi^0)/\Gamma_{total}$ — Γ_{39}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.51±0.05 OUR AVERAGE				
0.51±0.04±0.02	[56] ONYISI	10	CLE3	$\psi(2S) \to \gamma p\overline{p}X$
0.47±0.10±0.02	[57] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+h^-h^0$

[56] ONYISI 10 reports $(4.83 \pm 0.25 \pm 0.35 \pm 0.31) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to p\overline{p}\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[57] ATHAR 07 reports $(0.44 \pm 0.08 \pm 0.05) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to p\overline{p}\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\overline{p}\eta)/\Gamma_{total}$ — Γ_{40}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.189±0.028 OUR AVERAGE				
0.188±0.028±0.007	[58] ONYISI	10	CLE3	$\psi(2S) \to \gamma p\overline{p}X$
0.20 ±0.08 ±0.01	[59] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+h^-h^0$

[58] ONYISI 10 reports $(1.76 \pm 0.23 \pm 0.14 \pm 0.11) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to p\overline{p}\eta)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[59] ATHAR 07 reports $(0.19 \pm 0.07 \pm 0.02) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to p\overline{p}\eta)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\overline{p}\omega)/\Gamma_{total}$ Γ_{41}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.39±0.05±0.02	[60] ONYISI	10	CLE3	$\psi(2S) \rightarrow \gamma p \overline{p} X$

[60] ONYISI 10 reports $(3.68 \pm 0.35 \pm 0.26 \pm 0.24) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \rightarrow p\overline{p}\omega)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\overline{p}\phi)/\Gamma_{total}$ Γ_{42}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
3.0±0.9±0.1	24 ± 7	[61] ABLIKIM	11F	BES3	$\psi(2S) \rightarrow \gamma p \overline{p} K^+ K^-$

[61] ABLIKIM 11F reports $(3.04 \pm 0.85 \pm 0.43) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \rightarrow p\overline{p}\phi)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\overline{p}\pi^+\pi^-)/\Gamma_{total}$ Γ_{43}/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	[62] BAI	99B	BES	$\psi(2S) \rightarrow \gamma\chi_{c2}$
2.64±1.03±0.14	[62] TANENBAUM	78	MRK1	$\psi(2S) \rightarrow \gamma\chi_{c2}$

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

$\Gamma(p\overline{p}\pi^0\pi^0)/\Gamma_{total}$ Γ_{44}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.085±0.025±0.003	29.2	[63] HE	08B	CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$

[63] HE 08B reports $0.08 \pm 0.02 \pm 0.01 \pm 0.01$ % from a measurement of $[\Gamma(\chi_{c2}(1P) \rightarrow p\overline{p}\pi^0\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\overline{p}K^+K^-\text{(non-resonant)})/\Gamma_{total}$ Γ_{45}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.08±0.34±0.08	131 ± 12	[64] ABLIKIM	11F	BES3	$\psi(2S) \rightarrow \gamma p \overline{p} K^+ K^-$

[64] ABLIKIM 11F reports $(2.08 \pm 0.19 \pm 0.30) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \rightarrow p\overline{p}K^+K^-\text{(non-resonant)})/\Gamma_{total}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\overline{p}K^0_S K^0_S)/\Gamma_{\text{total}}$ — Γ_{46}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<7.9	90	[65] ABLIKIM	06D	BES2	$\psi(2S) \rightarrow \chi_{c2}\gamma$

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

$\Gamma(p\overline{n}\pi^-)/\Gamma_{\text{total}}$ — Γ_{47}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
11.1±3.7±0.4	[66] ABLIKIM	06I	BES2	$\psi(2S) \rightarrow \gamma p \pi^- X$

[66] ABLIKIM 06I reports [$\Gamma(\chi_{c2}(1P) \rightarrow p\overline{n}\pi^-)/\Gamma_{\text{total}}$] × [B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$)] = $(0.97 \pm 0.20 \pm 0.26) \times 10^{-4}$ which we divide by our best value B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$) = $(8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Lambda\overline{\Lambda})/\Gamma_{\text{total}}$ — Γ_{48}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
1.86±0.27 OUR FIT	

$\Gamma(\Lambda\overline{\Lambda}\pi^+\pi^-)/\Gamma_{\text{total}}$ — Γ_{49}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<3.5	90	[67] ABLIKIM	06D	BES2	$\psi(2S) \rightarrow \chi_{c2}\gamma$

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

$\Gamma(K^+\overline{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{50}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
8.4±0.6 OUR AVERAGE					
8.4±0.6±0.3	5k	[68,69] ABLIKIM	13D	BES3	$\psi(2S) \rightarrow \gamma\Lambda\overline{p}K^+$
9.1±1.7±0.4		[70] ATHAR	07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

[68] ABLIKIM 13D reports $(8.4 \pm 0.3 \pm 0.6) \times 10^{-4}$ from a measurement of [$\Gamma(\chi_{c2}(1P) \rightarrow K^+\overline{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}$] × [B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$)] assuming B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$) = $(8.72 \pm 0.34) \times 10^{-2}$, which we rescale to our best value B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$) = $(8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[69] Using B($\Lambda \rightarrow p\pi^-$) = 63.9%.

[70] ATHAR 07 reports $(8.5 \pm 1.4 \pm 1.0) \times 10^{-4}$ from a measurement of [$\Gamma(\chi_{c2}(1P) \rightarrow K^+\overline{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}$] × [B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$)] assuming B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$) = $(9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$) = $(8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+ p \Lambda(1520) + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{51}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
3.1±0.7±0.1	79 ± 13	[71] ABLIKIM	11F	BES3	$\psi(2S) \rightarrow \gamma p\overline{p}K^+K^-$

[71] ABLIKIM 11F reports $(3.06 \pm 0.50 \pm 0.54) \times 10^{-4}$ from a measurement of [$\Gamma(\chi_{c2}(1P) \rightarrow K^+ p \Lambda(1520) + \text{c.c.})/\Gamma_{\text{total}}$] × [B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$)] assuming B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$) = $(8.74 \pm 0.35) \times 10^{-2}$, which we rescale to our best value B($\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$) = $(8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Lambda(1520)\overline{\Lambda}(1520))/\Gamma_{total}$ — Γ_{52}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
5.0±1.6±0.2	29 ± 7	[72] ABLIKIM	11F	BES3	$\psi(2S) \to \gamma p \overline{p} K^+ K^-$

[72] ABLIKIM 11F reports $(5.05 \pm 1.29 \pm 0.93) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \Lambda(1520)\overline{\Lambda}(1520))/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Sigma^0\overline{\Sigma}^0)/\Gamma_{total}$ — Γ_{53}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.8	90	7.5 ± 3.4	[73] NAIK	08	CLEO	$\psi(2S) \to \gamma\Sigma^0\overline{\Sigma}^0$

[73] NAIK 08 reports $< 0.75 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \Sigma^0\overline{\Sigma}^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

$\Gamma(\Sigma^+\overline{\Sigma}^-)/\Gamma_{total}$ — Γ_{54}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.7	90	4.0 ± 3.5	[74] NAIK	08	CLEO	$\psi(2S) \to \gamma\Sigma^+\overline{\Sigma}^-$

[74] NAIK 08 reports $< 0.67 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \Sigma^+\overline{\Sigma}^-)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

$\Gamma(\Xi^0\overline{\Xi}^0)/\Gamma_{total}$ — Γ_{55}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<1.1	90	2.9 ± 1.7	[75] NAIK	08	CLEO	$\psi(2S) \to \gamma\Xi^0\overline{\Xi}^0$

[75] NAIK 08 reports $< 1.06 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \Xi^0\overline{\Xi}^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

$\Gamma(\Xi^-\overline{\Xi}^+)/\Gamma_{total}$ — Γ_{56}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.55±0.34±0.06		29 ± 5	[76] NAIK	08	CLEO	$\psi(2S) \to \gamma\Xi^+\overline{\Xi}^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 3.7	90		[77] ABLIKIM	06D	BES2	$\psi(2S) \to \chi_{c2}\gamma$

[76] NAIK 08 reports $(1.45 \pm 0.30 \pm 0.15) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \Xi^-\overline{\Xi}^+)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.76 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

$\Gamma(J/\psi(1S)\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{57}/Γ

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

$\Gamma(\eta_c(1S)\pi^+\pi^-)/\Gamma(\overline{K}^0 K^+\pi^- + \text{c.c.})$ — Γ_{58}/Γ_{29}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<16.4	90	[78] LEES	12AE	BABR	$e^+e^- \to e^+e^-\pi^+\pi^-\eta_c$

[78] We divided the reported limit by 2 to take into account the $K^0_L K^+\pi^-$ mode.

RADIATIVE DECAYS

$\Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$ — Γ_{59}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.198±0.008 OUR FIT				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.199±0.005±0.012	[79] ADAM	05A	CLEO	$e^+e^- \to \psi(2S) \to \gamma\chi_{c2}$

[79] 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.

$\Gamma(\gamma\rho^0)/\Gamma_{\text{total}}$ — Γ_{60}/Γ

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<21	90	13 ± 11	[80] ABLIKIM	11E	BES3	$\psi(2S) \to \gamma\gamma\rho^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<50	90	17.2 ± 6.8	[81] BENNETT	08A	CLEO	$\psi(2S) \to \gamma\gamma\rho^0$

[80] ABLIKIM 11E reports $< 20.8 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \gamma\rho^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

[81] BENNETT 08A reports $< 50 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \gamma\rho^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.1 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

$\Gamma(\gamma\omega)/\Gamma_{\text{total}}$ — Γ_{61}/Γ

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<6	90	1 ± 6	[82] ABLIKIM	11E	BES3	$\psi(2S) \to \gamma\gamma\omega$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<6	90	0.0 ± 1.8	[83] BENNETT	08A	CLEO	$\psi(2S) \to \gamma\gamma\omega$

[82] ABLIKIM 11E reports $< 6.1 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \gamma\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

[83] BENNETT 08A reports $< 7.0 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \to \gamma\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (8.1 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

$\Gamma(\gamma\phi)/\Gamma_{\text{total}}$ — Γ_{62}/Γ

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
< 8	90	5 ± 5	[84] ABLIKIM	11E	BES3	$\psi(2S) \to \gamma\gamma\phi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<12	90	1.3 ± 2.5	[85] BENNETT	08A	CLEO	$\psi(2S) \to \gamma\gamma\phi$

[84] ABLIKIM 11E reports $< 8.1 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \rightarrow \gamma\phi)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

[85] BENNETT 08A reports $< 13 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c2}(1P) \rightarrow \gamma\phi)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.1 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 8.76 \times 10^{-2}$.

$\Gamma(\gamma\gamma)/\Gamma_{total}$ — Γ_{63}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
2.61±0.16 OUR FIT	

$\Gamma(\gamma\gamma)/\Gamma(\gamma J/\psi(1S))$ — Γ_{63}/Γ_{59}

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
1.31±0.09 OUR FIT			
0.99±0.18	[86] AMBROGIANI 00B	E835	$\overline{p}p \rightarrow \chi_{c2} \rightarrow \gamma\gamma, \gamma J/\psi$

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

$\Gamma(\gamma\gamma)/\Gamma_{total} \times \Gamma(p\overline{p})/\Gamma_{total}$ — $\Gamma_{63}/\Gamma \times \Gamma_{38}/\Gamma$

VALUE (units 10^{-8})	DOCUMENT ID	TECN	COMMENT
1.85±0.18 OUR FIT			
1.7 ±0.4 OUR AVERAGE			
1.60±0.42	ARMSTRONG 93	E760	$\overline{p}p \rightarrow \gamma\gamma X$
9.9 ±4.5	BAGLIN 87B	SPEC	$\overline{p}p \rightarrow \gamma\gamma X$

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

$\Gamma(\chi_{c2}(1P) \rightarrow K^+K^-\pi^+\pi^-)/\Gamma_{total} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)$ — $\Gamma_{14}/\Gamma \times \Gamma_{120}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
2.35±0.26 OUR FIT			
2.5 ±0.9 OUR AVERAGE Error includes scale factor of 2.3.			
1.90±0.14±0.44	BAI 99B	BES	$\psi(2S) \rightarrow \gamma\chi_{c2}$
3.8 ±0.67	[87] TANENBAUM 78	MRK1	$\psi(2S) \rightarrow \gamma\chi_{c2}$

[87] The reported value is derived using $B(\psi(2S) \rightarrow \pi^+\pi^- J/\psi) \times B(J/\psi \rightarrow \ell^+\ell^-) = (4.6 \pm 0.7)\%$. Calculated by us using $B(J/\psi \rightarrow \ell^+\ell^-) = 0.1181 \pm 0.0020$.

$\Gamma(\chi_{c2}(1P) \rightarrow K^*(892)^0\overline{K}^*(892)^0)/\Gamma_{total} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))/\Gamma_{total}$ — $\Gamma_{17}/\Gamma \times \Gamma_{120}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
2.2 ±0.4 OUR FIT			
3.11±0.36±0.48	ABLIKIM 04H	BES2	$\psi(2S) \rightarrow \gamma\chi_{c2}$

$\Gamma(\chi_{c2}(1P) \to p\overline{p})/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{38}/\Gamma \times \Gamma^{\psi(2S)}_{120}/\Gamma^{\psi(2S)}_{11}$

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.83±0.13 OUR FIT				
1.4 ±1.1	[88] BAI	98I	BES	$\psi(2S) \to \gamma\chi_{c2} \to \gamma\overline{p}p$

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

$\Gamma(\chi_{c2}(1P) \to p\overline{p})/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma_{total}$ $\Gamma_{38}/\Gamma \times \Gamma^{\psi(2S)}_{120}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
6.2±0.5 OUR FIT					
6.7±1.1 OUR AVERAGE Error includes scale factor of 1.5.					
7.2±0.7±0.4	121 ± 12	[89] NAIK	08	CLEO	$\psi(2S) \to \gamma p\overline{p}$
$4.4^{+1.6}_{-1.4}\pm0.6$	$14.3^{+5.2}_{-4.7}$	BAI	04F	BES	$\psi(2S) \to \gamma\chi_{c2}(1P) \to \gamma\overline{p}p$

[89] Calculated by us. NAIK 08 reports $B(\chi_{c2} \to p\overline{p}) = (7.7 \pm 0.8 \pm 0.4 \pm 0.5) \times 10^{-5}$ using $B(\psi(2S) \to \gamma\chi_{c2}) = (9.33 \pm 0.14 \pm 0.61)\%$.

$\Gamma(\chi_{c2}(1P) \to \Lambda\overline{\Lambda})/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma_{total}$ $\Gamma_{48}/\Gamma \times \Gamma^{\psi(2S)}_{120}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
16.3±2.3 OUR FIT					
15.9±2.1±1.0	71 ± 9	[90] NAIK	08	CLEO	$\psi(2S) \to \gamma\Lambda\overline{\Lambda}$

[90] Calculated by us. NAIK 08 reports $B(\chi_{c2} \to \Lambda\overline{\Lambda}) = (17.0 \pm 2.2 \pm 1.1 \pm 1.1) \times 10^{-5}$ using $B(\psi(2S) \to \gamma\chi_{c2}) = (9.33 \pm 0.14 \pm 0.61)\%$.

$\Gamma(\chi_{c2}(1P) \to \Lambda\overline{\Lambda})/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{48}/\Gamma \times \Gamma^{\psi(2S)}_{120}/\Gamma^{\psi(2S)}_{11}$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
4.8±0.7 OUR FIT					
$\mathbf{7.1^{+3.1}_{-2.9}\pm1.3}$	$8.3^{+3.7}_{-3.4}$	[91] BAI	03E	BES	$\psi(2S) \to \gamma\Lambda\overline{\Lambda}$

[91] BAI 03E reports [$B(\chi_{c2} \to \Lambda\overline{\Lambda})$ $B(\psi(2S) \to \gamma\chi_{c2})$ / $B(\psi(2S) \to J/\psi\pi^+\pi^-)$] × [$B^2(\Lambda \to \pi^- p)$ / $B(J/\psi \to p\overline{p})$] = $(1.33^{+0.59}_{-0.55} \pm 0.25)\%$. We calculate from this measurement the presented value using $B(\Lambda \to \pi^- p) = (63.9 \pm 0.5)\%$ and $B(J/\psi \to p\overline{p}) = (2.17 \pm 0.07) \times 10^{-3}$.

$\Gamma(\chi_{c2}(1P) \to \pi\pi)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma_{total}$ $\Gamma_{22}/\Gamma \times \Gamma^{\psi(2S)}_{120}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.12±0.08 OUR FIT					
2.17±0.09 OUR AVERAGE					
2.19±0.05±0.15	4.5k	[92] ABLIKIM	10A	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c2}$
2.23±0.06±0.10	2.5k	[93] ASNER	09	CLEO	$\psi(2S) \to \gamma\pi^+\pi^-$
1.90±0.08±0.20	0.8k	[94] ASNER	09	CLEO	$\psi(2S) \to \gamma\pi^0\pi^0$

[92] Calculated by us. ABLIKIM 10A reports B($\chi_{c2} \to \pi^0\pi^0$) = ($0.88 \pm 0.02 \pm 0.06 \pm 0.04) \times 10^{-3}$ using B($\psi(2S) \to \gamma\chi_{c2}$) = ($8.3 \pm 0.4$)%. We have multiplied the $\pi^0\pi^0$ measurement by 3 to obtain $\pi\pi$.

[93] Calculated by us. ASNER 09 reports B($\chi_{c2} \to \pi^+\pi^-$) = ($1.59 \pm 0.04 \pm 0.07 \pm 0.10) \times 10^{-3}$ using B($\psi(2S) \to \gamma\chi_{c2}$) = ($9.33 \pm 0.14 \pm 0.61$)%. We have multiplied the $\pi^+\pi^-$ measurement by 3/2 to obtain $\pi\pi$.

[94] Calculated by us. ASNER 09 reports B($\chi_{c2} \to \pi^0\pi^0$) = ($0.68 \pm 0.03 \pm 0.07 \pm 0.04) \times 10^{-3}$ using B($\psi(2S) \to \gamma\chi_{c2}$) = ($9.33 \pm 0.14 \pm 0.61$)%. We have multiplied the $\pi^0\pi^0$ measurement by 3 to obtain $\pi\pi$.

$\Gamma(\chi_{c2}(1P) \to \pi\pi)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\quad \Gamma_{22}/\Gamma \times \Gamma_{120}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
0.622±0.024 OUR FIT					
0.54 ±0.06 OUR AVERAGE					
0.66 ±0.18 ±0.37	21 ± 6	[95] BAI	03C	BES	$\psi(2S) \to \gamma\pi^0\pi^0$
0.54 ±0.05 ±0.04	185 ± 16	[96] BAI	98I	BES	$\psi(2S) \to \gamma\pi^+\pi^-$

[95] We have multiplied $\pi^0\pi^0$ measurement by 3 to obtain $\pi\pi$.

[96] Calculated by us. The value for B($\chi_{c2} \to \pi^+\pi^-$) reported by BAI 98I is derived using B($\psi(2S) \to \gamma\chi_{c2}$) = ($7.8 \pm 0.8$)% and B($\psi(2S) \to J/\psi\pi^+\pi^-$) = ($32.4 \pm 2.6$)% [BAI 98D]. We have multiplied $\pi^+\pi^-$ measurement by 3/2 to obtain $\pi\pi$.

$\Gamma(\chi_{c2}(1P) \to \eta\eta)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma_{total}$ $\quad \Gamma_{26}/\Gamma \times \Gamma_{120}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.52±0.04 OUR FIT						
0.52±0.04 OUR AVERAGE						
0.54±0.03±0.04		386	[97] ABLIKIM	10A	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c2}$
0.47±0.05±0.05		156 ± 14	ASNER	09	CLEO	$\psi(2S) \to \gamma\eta\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 0.44	90		[98] ADAMS	07	CLEO	$\psi(2S) \to \gamma\chi_{c2}$
< 3	90		BAI	03C	BES	$\psi(2S) \to \gamma\eta\eta \to 5\gamma$
0.62±0.31±0.19			LEE	85	CBAL	$\psi(2S) \to$ photons

[97] Calculated by us. ABLIKIM 10A reports B($\chi_{c2} \to \eta\eta$) = ($0.65 \pm 0.04 \pm 0.05 \pm 0.03) \times 10^{-3}$ using B($\psi(2S) \to \gamma\chi_{c2}$) = ($8.3 \pm 0.4$)%.

[98] Superseded by ASNER 09.

$\Gamma(\chi_{c2}(1P) \to K^+K^-)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma_{total}$ $\quad \Gamma_{27}/\Gamma \times \Gamma_{120}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
9.5±0.6 OUR FIT					
10.5±0.3±0.6	1.6k	[99] ASNER	09	CLEO	$\psi(2S) \to \gamma K^+K^-$

[99] Calculated by us. ASNER 09 reports B($\chi_{c2} \to K^+K^-$) = ($1.13 \pm 0.03 \pm 0.06 \pm 0.07) \times 10^{-3}$ using B($\psi(2S) \to \gamma\chi_{c2}$) = ($9.33 \pm 0.14 \pm 0.61$)%.

$\Gamma(\chi_{c2}(1P) \to K^+K^-)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ — $\Gamma_{27}/\Gamma \times \Gamma_{120}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
0.280±0.017 OUR FIT				
0.190±0.034±0.019	115 ± 13	[100] BAI 98I	BES	$\psi(2S) \to \gamma K^+K^-$

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

$\Gamma(\chi_{c2}(1P) \to K^0_S K^0_S)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma_{total}$ — $\Gamma_{28}/\Gamma \times \Gamma_{120}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
5.1 ±0.4 OUR FIT				
5.0 ±0.4 OUR AVERAGE				
4.9 ±0.3 ±0.3	373 ± 20	[101] ASNER 09	CLEO	$\psi(2S) \to \gamma K^0_S K^0_S$
5.72±0.76±0.63	65	ABLIKIM 05O	BES2	$\psi(2S) \to \gamma K^0_S K^0_S$

[101] Calculated by us. ASNER 09 reports B($\chi_{c2} \to K^0_S K^0_S$) = (0.53 ± 0.03 ± 0.03 ± 0.03) $\times 10^{-3}$ using B($\psi(2S) \to \gamma\chi_{c2}$) = (9.33 ± 0.14 ± 0.61)%.

$\Gamma(\chi_{c2}(1P) \to K^0_S K^0_S)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ — $\Gamma_{28}/\Gamma \times \Gamma_{120}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-5})	DOCUMENT ID	TECN	COMMENT
14.9±1.1 OUR FIT			
14.7±4.1±3.3	[102] BAI 99B	BES	$\psi(2S) \to \gamma K^0_S K^0_S$

[102] Calculated by us. The value of B($\chi_{c2} \to K^0_S K^0_S$) reported by BAI 99B was derived using B($\psi(2S) \to \gamma\chi_{c2}(1P)$) = (7.8 ± 0.8)% and B($\psi(2S) \to J/\psi\pi^+\pi^-$) = (32.4 ± 2.6)% [BAI 98D].

$\Gamma(\chi_{c2}(1P) \to \overline{K}^0 K^+\pi^- + c.c.)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma_{total}$ — $\Gamma_{29}/\Gamma \times \Gamma_{120}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
1.22±0.17 OUR FIT				
1.15±0.18 OUR AVERAGE				
1.21±0.19±0.09	37	[103] ATHAR 07	CLEO	$\psi(2S) \to \gamma K^0_S K^\pm\pi^\mp$
0.97±0.32±0.13	28	[104] ABLIKIM 06R	BES2	$\psi(2S) \to \gamma K^0_S K^\pm\pi^\mp$

[103] Calculated by us. ATHAR 07 reports B($\chi_{c2} \to \overline{K}^0 K^+\pi^-$ + c.c.) = (1.3 ± 0.2 ± 0.1 ± 0.1) $\times 10^{-3}$ using B($\psi(2S) \to \gamma\chi_{c2}$) = (9.33 ± 0.14 ± 0.61)%.

[104] Calculated by us. ABLIKIM 06R reports B($\chi_{c2} \to K^0_S K^\pm\pi^\mp$) = (0.6 ± 0.2 ± 0.1) $\times 10^{-3}$ using B($\psi(2S) \to \gamma\chi_{c2}$) = (8.1 ± 0.6)%. We have multiplied by 2 to obtain $\overline{K}^0 K^+\pi^-$ + c.c. from $K^0_S K^\pm\pi^\mp$.

$\Gamma(\chi_{c2}(1P) \to 2(\pi^+\pi^-))/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_1/\Gamma \times \Gamma^{\psi(2S)}_{120}/\Gamma^{\psi(2S)}_{11}$

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
2.84±0.27 OUR FIT				
3.1 ±1.0 OUR AVERAGE Error includes scale factor of 2.5.				
2.3 ±0.1 ±0.5	[105] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c2}$
4.3 ±0.6	[106] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c2}$

[105] 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].

[106] 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.

$\Gamma(\chi_{c2}(1P) \to K^+K^-K^+K^-)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma_{total}$ $\Gamma_{36}/\Gamma \times \Gamma^{\psi(2S)}_{120}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.56±0.19 OUR FIT					
1.76±0.16±0.24	160	[107] ABLIKIM	06T	BES2	$\psi(2S) \to \gamma 2K^+2K^-$

[107] Calculated by us. The value of B($\chi_{c2} \to 2K^+2K^-$) reported by ABLIKIM 06T was derived using B($\psi(2S) \to \gamma\chi_{c2}(1P)$) = (8.1 ± 0.4)%.

$\Gamma(\chi_{c2}(1P) \to K^+K^-K^+K^-)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{36}/\Gamma \times \Gamma^{\psi(2S)}_{120}/\Gamma^{\psi(2S)}_{11}$

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
4.6±0.5 OUR FIT				
3.6±0.6±0.6	[108] BAI	99B	BES	$\psi(2S) \to \gamma 2K^+2K^-$

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

$\Gamma(\chi_{c2}(1P) \to \phi\phi)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma_{total}$ $\Gamma_{19}/\Gamma \times \Gamma^{\psi(2S)}_{120}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.01±0.08 OUR FIT					
0.98±0.13 OUR AVERAGE Error includes scale factor of 1.3.					
0.94±0.03±0.10	849	[109] ABLIKIM	11K	BES3	$\psi(2S) \to \gamma$ hadrons
1.38±0.24±0.23	41	[110] ABLIKIM	06T	BES2	$\psi(2S) \to \gamma 2K^+2K^-$

[109] Calculated by us. The value of B($\chi_{c2} \to \phi\phi$) reported by ABLIKIM 11K was derived using B($\psi(2S) \to \gamma\chi_{c2}(1P)$) = (8.74 ± 0.35)%.

[110] Calculated by us. The value of B($\chi_{c2} \to \phi\phi$) reported by ABLIKIM 06T was derived using B($\psi(2S) \to \gamma\chi_{c2}(1P)$) = (8.1 ± 0.4)%.

$\Gamma(\chi_{c2}(1P) \to \phi\phi)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{19}/\Gamma \times \Gamma_{120}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
2.98±0.25 OUR FIT				
4.8 ±1.3 ±1.3	[111] BAI	99B	BES	$\psi(2S) \to \gamma 2K^+ 2K^-$

[111] Calculated by us. The value of $B(\chi_{c2} \to \phi\phi)$ reported by BAI 99B was derived using $B(\psi(2S) \to \gamma\chi_{c2}(1P)) = (7.8 \pm 0.8)\%$ and $B(\psi(2S) \to J/\psi\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$\Gamma(\chi_{c2}(1P) \to \gamma J/\psi(1S))/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma_{total}$ $\Gamma_{59}/\Gamma \times \Gamma_{120}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.74 ±0.04 OUR FIT					
1.52 ±0.15 OUR AVERAGE	Error includes scale factor of 2.6. See the ideogram below.				
1.874±0.007±0.102	76k	ABLIKIM	12O	BES3	$\psi(2S) \to \gamma\chi_{c2}$
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		[112] OREGLIA	82	CBAL	$\psi(2S) \to \gamma\chi_{c2}$
1.8 ±0.5		[113] BRANDELIK	79B	DASP	$\psi(2S) \to \gamma\chi_{c2}$
1.2 ±0.2		[113] BARTEL	78B	CNTR	$\psi(2S) \to \gamma\chi_{c2}$
2.2 ±1.2		[114] BIDDICK	77	CNTR	$e^+e^- \to \gamma X$
1.2 ±0.7		[112] WHITAKER	76	MRK1	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.95 ±0.02 ±0.07	12.4k	[115] MENDEZ	08	CLEO	$\psi(2S) \to \gamma\chi_{c2}$
1.85 ±0.04 ±0.07	1.9k	[116] ADAM	05A	CLEO	Repl. by MENDEZ 08

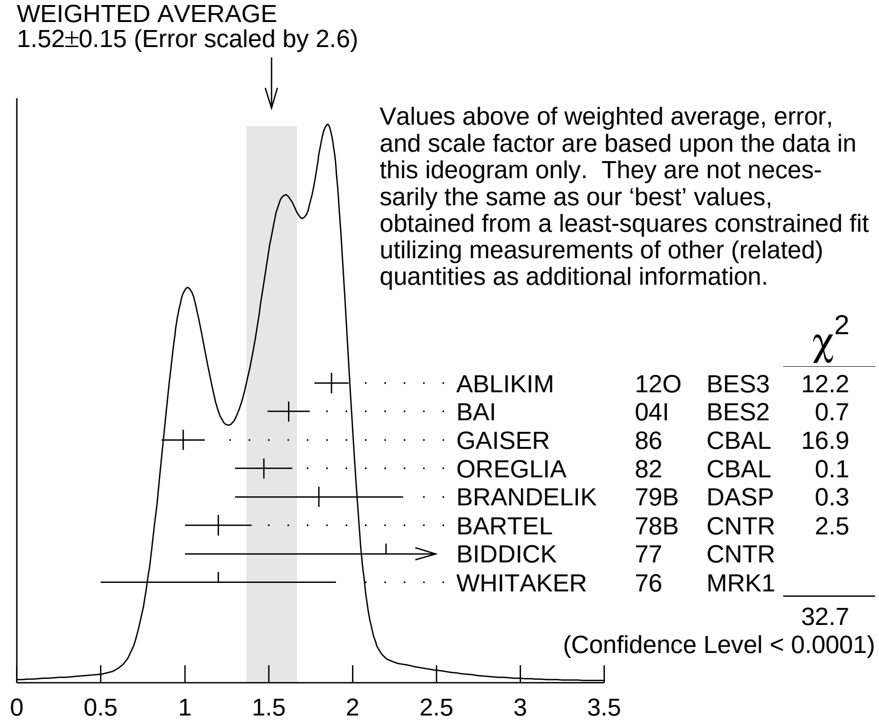
[112] Recalculated by us using $B(J/\psi(1S) \to \ell^+\ell^-) = 0.1181 \pm 0.0020$.

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

[114] Assumes isotropic gamma distribution.

[115] Not independent from other measurements of MENDEZ 08.

[116] Not independent from other values reported by ADAM 05A.



$\Gamma\big(\chi_{c2}(1P) \to \gamma J/\psi(1S)\big)/\Gamma_{\text{total}} \times \Gamma\big(\psi(2S) \to \gamma \chi_{c2}(1P)\big)/\Gamma_{\text{total}}$ (units 10^{-2})

$\Gamma\big(\chi_{c2}(1P) \to \gamma J/\psi(1S)\big)/\Gamma_{\text{total}} \times \Gamma\big(\psi(2S) \to \gamma \chi_{c2}(1P)\big)/\Gamma\big(\psi(2S) \to J/\psi(1S)\text{anything}\big)$ $\quad \Gamma_{59}/\Gamma \times \Gamma^{\psi(2S)}_{120}/\Gamma^{\psi(2S)}_{9}$

$\Gamma_{59}/\Gamma \times \Gamma^{\psi(2S)}_{120}/\Gamma^{\psi(2S)}_{9} = \Gamma_{59}/\Gamma \times \Gamma^{\psi(2S)}_{120}/(\Gamma^{\psi(2S)}_{11}+\Gamma^{\psi(2S)}_{12}+\Gamma^{\psi(2S)}_{13}+0.348\Gamma^{\psi(2S)}_{119}+0.198\Gamma^{\psi(2S)}_{120})$

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2.88±0.07 OUR FIT					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3.12±0.03±0.09	12.4k	[117] MENDEZ	08	CLEO	$\psi(2S) \to \gamma \chi_{c2}$
3.11±0.07±0.07	1.9k	ADAM	05A	CLEO	Repl. by MENDEZ 08

[117] Not independent from other measurements of MENDEZ 08.

$\Gamma\big(\chi_{c2}(1P) \to \gamma J/\psi(1S)\big)/\Gamma_{\text{total}} \times \Gamma\big(\psi(2S) \to \gamma \chi_{c2}(1P)\big)/\Gamma\big(\psi(2S) \to J/\psi(1S)\pi^+\pi^-\big)$ $\quad \Gamma_{59}/\Gamma \times \Gamma^{\psi(2S)}_{120}/\Gamma^{\psi(2S)}_{11}$

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
5.10±0.12 OUR FIT					
5.53±0.17 OUR AVERAGE					
5.56±0.05±0.16	12.4k	MENDEZ	08	CLEO	$\psi(2S) \to \gamma \chi_{c2}$
6.0 ±2.8	1.3k	[118] ABLIKIM	04B	BES	$\psi(2S) \to J/\psi X$
3.9 ±1.2		[119] 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	[120] ADAM	05A	CLEO	Repl. by MENDEZ 08

[118] From a fit to the J/ψ recoil mass spectra.
[119] 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).
[120] Not independent from other values reported by ADAM 05A.

$\Gamma(\chi_{c2}(1P) \to \gamma\gamma)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c2}(1P))/\Gamma_{total}$

$\Gamma_{63}/\Gamma \times \Gamma^{\psi(2S)}_{120}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
2.28±0.16 OUR FIT					
2.73±0.32 OUR AVERAGE					
2.68±0.28±0.15	333 ± 35	ECKLUND	08A	CLEO	$\psi(2S) \to \gamma\chi_{c2} \to 3\gamma$
7.0 ±2.1 ±2.0		LEE	85	CBAL	$\psi(2S) \to \gamma\chi_{c2}$

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 (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
−10.0± 1.5 OUR AVERAGE					
− 9.3± 1.6±0.3	19.8k	[121] ARTUSO	09	CLEO	$\psi(2S) \to \gamma\gamma\ell^+\ell^-$
$-9.3^{+3.9}_{-4.1}\pm0.6$	5.9k	[122] AMBROGIANI	02	E835	$p\overline{p} \to \chi_{c2} \to J/\psi\gamma$
−14 ± 6	1.9k	[122] ARMSTRONG	93E	E760	$p\overline{p} \to \chi_{c2} \to J/\psi\gamma$
$-33.3^{+11.6}_{-29.2}$	441	[122] OREGLIA	82	CBAL	$\psi(2S) \to \chi_{c1}\gamma \to J/\psi\gamma\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
− 7.9± 1.9±0.3	19.8k	[123] ARTUSO	09	CLEO	$\psi(2S) \to \gamma\gamma\ell^+\ell^-$

[121] From a fit with floating *M2* amplitudes a_2 and b_2, and fixed *E3* amplitudes $a_3=b_3=0$.
[122] Assuming $a_3=0$.
[123] From a fit with floating *M2* and *E3* amplitudes a_2, b_2, and a_3, and b_3.

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.6±1.3 OUR AVERAGE					
1.7±1.4±0.3	19.8k	[124] ARTUSO	09	CLEO	$\psi(2S) \to \gamma\gamma\ell^+\ell^-$
$2.0^{+5.5}_{-4.4}\pm0.9$	5908	AMBROGIANI	02	E835	$p\overline{p} \to \chi_{c2} \to J/\psi\gamma$
$0\ ^{+6}_{-5}$	1904	ARMSTRONG	93E	E760	$p\overline{p} \to \chi_{c2} \to J/\psi\gamma$

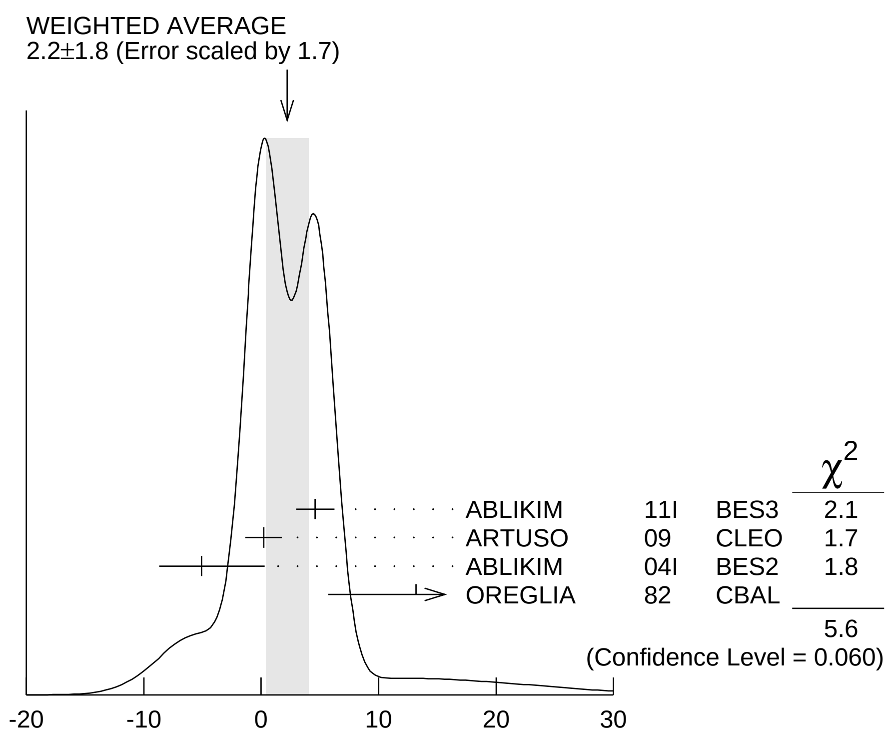
[124] From a fit with floating *M2* and *E3* amplitudes a_2, b_2, and a_3, and b_3.

MULTIPOLE AMPLITUDES IN $\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$ RADIATIVE DECAY

$b_2 = M2/\sqrt{E1^2+M2^2+E3^2}$ Magnetic quadrupole fractional transition amplitude

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
2.2±1.8 OUR AVERAGE	Error includes scale factor of 1.7. See the ideogram below.				
4.6±1.0±1.3	13.8k	[125] ABLIKIM	11I	BES3	$\psi(2S) \rightarrow \gamma\pi^+\pi^-, \gamma K^+K^-$
0.2±1.5±0.4	19.8k	[126] ARTUSO	09	CLEO	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$
$-5.1^{+5.4}_{-3.6}$	721	[125] ABLIKIM	04I	BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-, \gamma K^+K^-$
$13.2^{+9.8}_{-7.5}$	441	[127] OREGLIA	82	CBAL	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.0±1.3±0.3	19.8k	[127] ARTUSO	09	CLEO	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$

[125] From a fit with floating $M2$ and $E3$ amplitudes b_2 and b_3.
[126] From a fit with floating $M2$ and $E3$ amplitudes a_2, b_2, and a_3, and b_3.
[127] From a fit with floating $M2$ amplitudes a_2 and b_2, and fixed $E3$ amplitudes a_3=b_3=0.



$b_2 = M2/\sqrt{E1^2+M2^2+E3^2}$ Magnetic quadrupole fractional transition amplitude (units 10^{-2})

$b_3 = E3/\sqrt{E1^2+M2^2+E3^2}$ Electric octupole fractional transition amplitude

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
−0.3±1.0 OUR AVERAGE					
1.5±0.8±1.8	13.8k	[128] ABLIKIM	11I	BES3	$\psi(2S) \rightarrow \gamma\pi^+\pi^-, \gamma K^+K^-$
−0.8±1.2±0.2	19.8k	ARTUSO	09	CLEO	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$
$-2.7^{+4.3}_{-2.9}$	721	[128] ABLIKIM	04I	BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-, \gamma K^+K^-$

[128] From a fit with floating $M2$ and $E3$ amplitudes b_2 and b_3.

MULTIPOLE AMPLITUDE RATIOS IN RADIATIVE DECAYS $\psi(2S) \to \gamma\chi_{c2}(1P)$ and $\chi_{c2} \to \gamma J/\psi(1S)$

b_2/a_2 Magnetic quadrupole transition amplitude ratio

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{-11^{+14}_{-15}}$	19.8k	[129] ARTUSO	09	CLEO	$\psi(2S) \to \gamma\gamma\ell^+\ell^-$

[129] Statistical and systematic errors combined. From a fit with floating $M2$ amplitudes a_2 and b_2, and fixed $E3$ amplitudes a_3=b_3=0. Not independent of values for $a_2(\chi_{c2}(1P))$ and $b_2(\chi_{c2}(1P))$ from ARTUSO 09.

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

ABLIKIM	13D	PR D87 012007	M. Ablikim et al.	(BES III Collab.)
ABLIKIM	12O	PRL 109 172002	M. Ablikim et al.	(BES III Collab.)
LEES	12AE	PR D86 092005	J.P. Lees et al.	(BABAR Collab.)
LIU	12B	PRL 108 232001	Z.Q. Liu et al.	(BELLE Colalb.)
ABLIKIM	11A	PR D83 012006	M. Ablikim et al.	(BES III Collab.)
ABLIKIM	11E	PR D83 112005	M. Ablikim et al.	(BES III Collab.)
ABLIKIM	11F	PR D83 112009	M. Ablikim et al.	(BES III Collab.)
ABLIKIM	11I	PR D84 092006	M. Ablikim et al.	(BES III Collab.)
ABLIKIM	11K	PRL 107 092001	M. Ablikim et al.	(BES III Collab.)
DEL-AMO-SA...	11M	PR D84 012004	P. del Amo Sanchez et al.	(BABAR Collab.)
ABLIKIM	10A	PR D81 052005	M. Ablikim et al.	(BES III Collab.)
ONYISI	10	PR D82 011103	P.U.E. Onyisi et al.	(CLEO Collab.)
UEHARA	10A	PR D82 114031	S. Uehara et al.	(BELLE Collab.)
ARTUSO	09	PR D80 112003	M. Artuso et al.	(CLEO Collab.)
ASNER	09	PR D79 072007	D.M. Asner et al.	(CLEO Collab.)
UEHARA	09	PR D79 052009	S. Uehara et al.	(BELLE Collab.)
BENNETT	08A	PRL 101 151801	J.V. Bennett et al.	(CLEO Collab.)
ECKLUND	08A	PR D78 091501	K.M. Ecklund et al.	(CLEO Collab.)
HE	08B	PR D78 092004	Q. He et al.	(CLEO Collab.)
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NAIK	08	PR D78 031101	P. Naik et al.	(CLEO Collab.)
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ADAMS	07	PR D75 071101	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 071101	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.)
ABLIKIM	04I	PR D70 092004	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.)
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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)