$\chi_{c0}(1P)$

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

$\chi_{c0}(1P)$ MASS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
3414.75± 0.31 OUR AVERAGE					
3414.2 ± 0.5 ±2.3	5.4k	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to$ hadrons
3406 ± 7 ±6	230	[1] ABE	07	BELL	$e^+e^- \to J/\psi(c\overline{c})$
3414.21± 0.39±0.27		ABLIKIM	05G	BES2	$\psi(2S) \to \gamma\chi_{c0}$
3414.7 $^{+0.7}_{-0.6}$ ±0.2		[2] ANDREOTTI	03	E835	$\overline{p}p \to \chi_{c0} \to \pi^0\pi^0$
3415.5 ± 0.4 ±0.4	392	[3] BAGNASCO	02	E835	$\overline{p}p \to \chi_{c0} \to J/\psi\gamma$
3417.4 $^{+1.8}_{-1.9}$ ±0.2		[2] AMBROGIANI	99B	E835	$\overline{p}p \to e^+e^-\gamma$
3414.1 ± 0.6 ±0.8		BAI	99B	BES	$\psi(2S) \to \gamma$X
3417.8 ± 0.4 ±4		[2] GAISER	86	CBAL	$\psi(2S) \to \gamma$X
3416 ± 3 ±4		[4] TANENBAUM	78	MRK1	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3416.5 ± 3.0		EISENSTEIN	01	CLE2	$e^+e^- \to e^+e^-\chi_{c0}$
3422 ±10		[4] BARTEL	78B	CNTR	$e^+e^- \to J/\psi 2\gamma$
3415 ± 9		[4] BIDDICK	77	CNTR	$e^+e^- \to \gamma$X

[1] From a fit of the J/ψ recoil mass spectrum. Supersedes ABE,K 02 and ABE 04G.

[2] Using mass of $\psi(2S) = 3686.0$ MeV.

[3] Recalculated by ANDREOTTI 05A, using the value of $\psi(2S)$ mass from AULCHENKO 03.

[4] Mass value shifted by us by amount appropriate for $\psi(2S)$ mass = 3686 MeV and $J/\psi(1S)$ mass = 3097 MeV.

$\chi_{c0}(1P)$ WIDTH

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
10.3±0.6 OUR FIT					
10.5±0.8 OUR AVERAGE Error includes scale factor of 1.1.					
10.6±1.9±2.6	5.4k	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to$ hadrons
$12.6^{+1.5+0.9}_{-1.6-1.1}$		ABLIKIM	05G	BES2	$\psi(2S) \to \gamma\chi_{c0}$
$8.6^{+1.7}_{-1.3}$±0.1		ANDREOTTI	03	E835	$\overline{p}p \to \chi_{c0} \to \pi^0\pi^0$
9.7±1.0	392	[5] BAGNASCO	02	E835	$\overline{p}p \to \chi_{c0} \to J/\psi\gamma$
$16.6^{+5.2}_{-3.7}$±0.1		AMBROGIANI	99B	E835	$\overline{p}p \to e^+e^-\gamma$
14.3±2.0±3.0		BAI	98I	BES	$\psi(2S) \to \gamma\pi^+\pi^-$
13.5±3.3±4.2		GAISER	86	CBAL	$\psi(2S) \to \gamma$X, $\gamma\pi^0\pi^0$

[5] Recalculated by ANDREOTTI 05A.

$\chi_{c0}(1P)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level

Hadronic decays

Γ_1	$2(\pi^+\pi^-)$	(2.27 ± 0.19) %	
Γ_2	$\rho^0\pi^+\pi^-$	$(8.9\ \pm2.8\ )\times10^{-3}$	
Γ_3	$\rho^0\rho^0$		
Γ_4	$f_0(980)f_0(980)$	$(6.8\ \pm2.2\ )\times10^{-4}$	
Γ_5	$\pi^+\pi^-\pi^0\pi^0$	$(3.4\ \pm0.4\ )$ %	
Γ_6	$\rho^+\pi^-\pi^0$ + c.c.	$(2.9\ \pm0.4\ )$ %	
Γ_7	$\pi^+\pi^-K^+K^-$	(1.80 ± 0.15) %	
Γ_8	$K_0^*(1430)^0\overline{K}_0^*(1430)^0\to$ $\pi^+\pi^-K^+K^-$	$(1.00^{+0.40}_{-0.29})\times10^{-3}$	
Γ_9	$K_0^*(1430)^0\overline{K}_2^*(1430)^0$ + c.c. $\to$ $\pi^+\pi^-K^+K^-$	$(8.1\ ^{+2.0}_{-2.5}\ )\times10^{-4}$	
Γ_{10}	$K_1(1270)^+K^-$ + c.c. $\to$ $\pi^+\pi^-K^+K^-$	$(6.4\ \pm1.9\ )\times10^{-3}$	
Γ_{11}	$K_1(1400)^+K^-$ + c.c. $\to$ $\pi^+\pi^-K^+K^-$	$<2.7\times10^{-3}$	CL=90%
Γ_{12}	$f_0(980)f_0(980)$	$(1.7\ ^{+1.1}_{-0.9}\ )\times10^{-4}$	
Γ_{13}	$f_0(980)f_0(2200)$	$(8.1\ ^{+2.1}_{-2.6}\ )\times10^{-4}$	
Γ_{14}	$f_0(1370)f_0(1370)$	$<2.8\times10^{-4}$	CL=90%
Γ_{15}	$f_0(1370)f_0(1500)$	$<1.7\times10^{-4}$	CL=90%
Γ_{16}	$f_0(1370)f_0(1710)$	$(6.8\ ^{+4.0}_{-2.4}\ )\times10^{-4}$	
Γ_{17}	$f_0(1500)f_0(1370)$	$<1.3\times10^{-4}$	CL=90%
Γ_{18}	$f_0(1500)f_0(1500)$	$<5\times10^{-5}$	CL=90%
Γ_{19}	$f_0(1500)f_0(1710)$	$<7\times10^{-5}$	CL=90%
Γ_{20}	$K^+K^-\pi^0\pi^0$	$(5.7\ \pm0.9\ )\times10^{-3}$	
Γ_{21}	$K^+\pi^-K^0\pi^0$ + c.c.	(2.53 ± 0.34) %	
Γ_{22}	$\rho^+K^-K^0$ + c.c.	(1.23 ± 0.22) %	
Γ_{23}	$K^*(892)^-K^+\pi^0\to$ $K^+\pi^-K^0\pi^0$ + c.c.	$(4.7\ \pm1.2\ )\times10^{-3}$	
Γ_{24}	$K_S^0K_S^0\pi^+\pi^-$	$(5.8\ \pm1.1\ )\times10^{-3}$	
Γ_{25}	$K^+K^-\eta\pi^0$	$(3.1\ \pm0.7\ )\times10^{-3}$	
Γ_{26}	$3(\pi^+\pi^-)$	(1.20 ± 0.18) %	
Γ_{27}	$K^+\overline{K}^*(892)^0\pi^-$ + c.c.	$(7.3\ \pm1.6\ )\times10^{-3}$	
Γ_{28}	$K^*(892)^0\overline{K}^*(892)^0$	$(1.7\ \pm0.6\ )\times10^{-3}$	
Γ_{29}	$\pi\pi$	$(8.4\ \pm0.4\ )\times10^{-3}$	
Γ_{30}	$\pi^0\eta$	$<1.8\times10^{-4}$	
Γ_{31}	$\pi^0\eta'$	$<1.1\times10^{-3}$	
Γ_{32}	$\eta\eta$	$(2.68\pm0.28)\times10^{-3}$	
Γ_{33}	$\eta\eta'$	$<2.4\times10^{-4}$	CL=90%
Γ_{34}	$\eta'\eta'$	$(2.03\pm0.22)\times10^{-3}$	
Γ_{35}	$\omega\omega$	$(2.2\ \pm0.7\ )\times10^{-3}$	
Γ_{36}	K^+K^-	$(6.10\pm0.35)\times10^{-3}$	

Γ_{37}	$K^0_S K^0_S$	$(3.16 \pm 0.18) \times 10^{-3}$		
Γ_{38}	$\pi^+ \pi^- \eta$	< 2.0	$\times 10^{-4}$	CL=90%
Γ_{39}	$\pi^+ \pi^- \eta'$	< 4	$\times 10^{-4}$	CL=90%
Γ_{40}	$\overline{K}^0 K^+ \pi^-$ + c.c.	< 1.0	$\times 10^{-4}$	CL=90%
Γ_{41}	$K^+ K^- \pi^0$	< 6	$\times 10^{-5}$	CL=90%
Γ_{42}	$K^+ K^- \eta$	< 2.3	$\times 10^{-4}$	CL=90%
Γ_{43}	$K^+ K^- K^0_S K^0_S$	$(1.4 \pm 0.5) \times 10^{-3}$		
Γ_{44}	$K^+ K^- K^+ K^-$	$(2.81 \pm 0.30) \times 10^{-3}$		
Γ_{45}	$K^+ K^- \phi$	$(9.9 \pm 2.5) \times 10^{-4}$		
Γ_{46}	$\phi\phi$	$(9.2 \pm 1.9) \times 10^{-4}$		
Γ_{47}	$p\overline{p}$	$(2.28 \pm 0.13) \times 10^{-4}$		
Γ_{48}	$p\overline{p}\pi^0$	$(5.7 \pm 1.2) \times 10^{-4}$		
Γ_{49}	$p\overline{p}\eta$	$(3.7 \pm 1.1) \times 10^{-4}$		
Γ_{50}	$\pi^+ \pi^- p\overline{p}$	$(2.1 \pm 0.7) \times 10^{-3}$		S=1.4
Γ_{51}	$\pi^0 \pi^0 p\overline{p}$	$(1.05 \pm 0.28) \times 10^{-3}$		
Γ_{52}	$K^0_S K^0_S p\overline{p}$	< 8.8	$\times 10^{-4}$	CL=90%
Γ_{53}	$p\overline{n}\pi^-$	$(1.14 \pm 0.31) \times 10^{-3}$		
Γ_{54}	$\Lambda\overline{\Lambda}$	$(3.3 \pm 0.4) \times 10^{-4}$		
Γ_{55}	$\Lambda\overline{\Lambda}\pi^+ \pi^-$	< 4.0	$\times 10^{-3}$	CL=90%
Γ_{56}	$K^+ \overline{p}\Lambda$ + c.c.	$(1.03 \pm 0.20) \times 10^{-3}$		
Γ_{57}	$\Sigma^0 \overline{\Sigma}^0$	$(4.2 \pm 0.7) \times 10^{-4}$		
Γ_{58}	$\Sigma^+ \overline{\Sigma}^-$	$(3.1 \pm 0.7) \times 10^{-4}$		
Γ_{59}	$\Xi^0 \overline{\Xi}^0$	$(3.2 \pm 0.8) \times 10^{-4}$		
Γ_{60}	$\Xi^- \overline{\Xi}^+$	$(4.9 \pm 0.7) \times 10^{-4}$		

Radiative decays

Γ_{61}	$\gamma J/\psi(1S)$	(1.16 ± 0.08) %		
Γ_{62}	$\gamma \rho^0$	< 9	$\times 10^{-6}$	CL=90%
Γ_{63}	$\gamma\omega$	< 8	$\times 10^{-6}$	CL=90%
Γ_{64}	$\gamma\phi$	< 6	$\times 10^{-6}$	CL=90%
Γ_{65}	$\gamma\gamma$	$(2.22 \pm 0.17) \times 10^{-4}$		

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, 24 combinations of partial widths obtained from integrated cross section, and 82 branching ratios uses 213 measurements to determine 47 parameters. The overall fit has a $\chi^2 = 301.4$ for 166 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, $x_i \equiv \Gamma_i/\Gamma_{\rm total}$.

x_2	26									
x_7	20	5								
x_{27}	9	2	30							
x_{29}	21	5	22	8						
x_{32}	7	2	8	3	15					
x_{36}	20	5	21	8	33	13				
x_{37}	22	6	22	9	32	12	30			
x_{44}	13	3	12	5	18	7	17	17		
x_{46}	7	2	6	3	9	3	8	8	5	
x_{47}	3	1	3	1	−6	−11	4	4	2	1
x_{54}	9	2	9	3	16	6	15	14	8	4
x_{61}	2	0	3	0	12	9	7	6	3	1
x_{65}	−26	−7	−19	−10	−9	−2	−11	−16	−9	−6
Γ	−14	−4	−12	−6	−12	−4	−11	−13	−7	−4
	x_1	x_2	x_7	x_{27}	x_{29}	x_{32}	x_{36}	x_{37}	x_{44}	x_{46}

x_{54}	2			
x_{61}	−47	3		
x_{65}	−7	−3	11	
Γ	3	−5	−10	−57
	x_{47}	x_{54}	x_{61}	x_{65}

$\chi_{c0}(1P)$ PARTIAL WIDTHS

$\chi_{c0}(1P)$ Γ(i)$\Gamma(\gamma J/\psi(1S))/\Gamma$(total)

$\Gamma(p\overline{p})$ × $\Gamma(\gamma J/\psi(1S))/\Gamma_{\rm total}$ **$\Gamma_{47}\Gamma_{61}/\Gamma$**

VALUE (eV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
27.4± 2.4 OUR FIT					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
26.6± 2.6±1.4	392	[6,7] BAGNASCO	02	E835	$\overline{p}p \to \chi_{c0} \to J/\psi\gamma$
$48.7^{+11.3}_{-8.9}$±2.4		[6,7] AMBROGIANI	99B	E835	$\overline{p}p \to \gamma J/\psi$

[6] Calculated by us using $B(J/\psi(1S) \to e^+e^-) = 0.0593 \pm 0.0010$.
[7] Values in $(\Gamma(p\overline{p}) \times \Gamma(\gamma J/\psi(1S))/\Gamma_{total})$ and $(\Gamma(p\overline{p})/\Gamma_{total} \times \Gamma(\gamma J/\psi(1S))/\Gamma_{total})$ are not independent. The latter is used in the fit since it is less correlated to the total width.

$\chi_{c0}(1P)$ Γ(i)Γ($\gamma\gamma$)/Γ(total)

$\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{29}\Gamma_{65}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
19.2± 1.4 OUR FIT					
23 ± 5 OUR AVERAGE					
$29.7^{+17.4}_{-12.0}\pm4.8$	103^{+60}_{-42}	[8] UEHARA	09	BELL	$10.6\ e^+e^- \to e^+e^-\pi^0\pi^0$
22.7± 3.2±3.5	129 ± 18	[9] NAKAZAWA	05	BELL	$e^+e^- \to e^+e^-\chi_{c0}$

[8] We multiplied the measurement by 3 to convert from $\pi^0\pi^0$ to $\pi\pi$. Interference with the continuum included.
[9] We have multiplied $\pi^+\pi^-$ measurement by 3/2 to obtain $\pi\pi$.

$\Gamma(K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{36}\Gamma_{65}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
14.0±1.1 OUR FIT					
14.3±1.6±2.3	153 ± 17	NAKAZAWA	05	BELL	$e^+e^- \to e^+e^-\chi_{c0}$

$\Gamma(K^0_S K^0_S) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{37}\Gamma_{65}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
7.3 ±0.5 OUR FIT					
7.00±0.65±0.71	134 ± 12	CHEN	07B	BELL	$e^+e^- \to e^+e^-\chi_{c0}$

$\Gamma(2(\pi^+\pi^-)) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_1\Gamma_{65}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
52 ± 4 OUR FIT					
49 ±10 OUR AVERAGE	Error includes scale factor of 1.8.				
44.7± 3.6±4.9	3.6k	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to 2(\pi^+\pi^-)$
75 ±13 ±8		EISENSTEIN	01	CLE2	$e^+e^- \to e^+e^-\chi_{c0}$

$\Gamma(\rho^0\rho^0) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_3\Gamma_{65}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<12	90	<252	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to 2(\pi^+\pi^-)$

$\Gamma(\pi^+\pi^-K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_7\Gamma_{65}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
41 ±4 OUR FIT					
38.8±3.7±4.7	1.7k	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to K^+K^-\pi^+\pi^-$

$\Gamma(K^+\overline{K}^*(892)^0\pi^- + \text{c.c.}) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{27}\Gamma_{65}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
17 ±4 OUR FIT					
16.7±6.1±3.0	495 ± 182	UEHARA	08	BELL	$\gamma\gamma \to \chi_{c0} \to K^+K^-\pi^+\pi^-$

$\Gamma(K^*(892)^0\overline{K}^*(892)^0) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{28}\Gamma_{65}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<6	90	<148	UEHARA 08	BELL	$\gamma\gamma \to \chi_{c0} \to K^+K^-\pi^+\pi^-$

$\Gamma(K^+K^-K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{44}\Gamma_{65}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
6.5±0.7 OUR FIT				
7.9±1.3±1.1	215 ± 36	UEHARA 08	BELL	$\gamma\gamma \to \chi_{c0} \to 2(K^+K^-)$

$\Gamma(\phi\phi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{46}\Gamma_{65}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
2.1±0.5 OUR FIT				
2.3±0.9±0.4	23.6 ± 9.6	UEHARA 08	BELL	$\gamma\gamma \to \chi_{c0} \to 2(K^+K^-)$

$\chi_{c0}(1P)$ BRANCHING RATIOS

HADRONIC DECAYS

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

VALUE	DOCUMENT ID
0.0227±0.0019 OUR FIT	

$\Gamma(\rho^0\pi^+\pi^-)/\Gamma(2(\pi^+\pi^-))$ Γ_2/Γ_1

VALUE	DOCUMENT ID	TECN	COMMENT
0.39±0.12 OUR FIT			
0.39±0.12	TANENBAUM 78	MRK1	$\psi(2S) \to \gamma\chi_{c0}$

$\Gamma(\rho^0\pi^+\pi^-)/\Gamma_{total}$ Γ_2/Γ

VALUE	DOCUMENT ID
0.0089±0.0028 OUR FIT	

$\Gamma(f_0(980)f_0(980))/\Gamma_{total}$ Γ_4/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
6.8±2.1±0.2	36 ± 9	[10] ABLIKIM 04G	BES	$\psi(2S) \to \gamma 2\pi^+ 2\pi^-$

[10] ABLIKIM 04G reports $[\Gamma(\chi_{c0}(1P) \to f_0(980)f_0(980))/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))] = (6.5 \pm 1.6 \pm 1.3) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\pi^+\pi^-\pi^0\pi^0)/\Gamma_{total}$ Γ_5/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
3.4±0.4±0.1	1751.4	[11] HE 08B	CLEO	$e^+e^- \to \gamma h^+h^-h^0h^0$

[11] HE 08B reports 3.54 ± 0.10 ± 0.43 ± 0.18 % from a measurement of $[\Gamma(\chi_{c0}(1P) \to \pi^+\pi^-\pi^0\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\rho^+\pi^-\pi^0 + \text{c.c.})/\Gamma_{\text{total}}$ Γ_6/Γ

VALUE (%)	*EVTS*		*DOCUMENT ID*		*TECN*	*COMMENT*
2.9±0.4±0.1	1358.5	[12,13]	HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[12] HE 08B reports 3.04 ± 0.18 ± 0.42 ± 0.16 % from a measurement of $[\Gamma(\chi_{c0}(1P) \to \rho^+\pi^-\pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[13] 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.

$\Gamma(\pi^+\pi^- K^+ K^-)/\Gamma_{\text{total}}$ Γ_7/Γ

VALUE (units 10^{-3})	*DOCUMENT ID*
18.0±1.5 OUR FIT	

$\Gamma(K^+\overline{K}^*(892)^0\pi^- + \text{c.c.})/\Gamma(\pi^+\pi^- K^+ K^-)$ Γ_{27}/Γ_7

VALUE	*DOCUMENT ID*	*TECN*	*COMMENT*
0.41±0.09 OUR FIT			
0.41±0.10	TANENBAUM 78	MRK1	$\psi(2S) \to \gamma\chi_{c0}$

$\Gamma(K_0^*(1430)^0\overline{K}_0^*(1430)^0 \to \pi^+\pi^- K^+ K^-)/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$\mathbf{10.0^{+3.7}_{-2.9}\pm0.3}$	83	[14] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+ K^-$

[14] ABLIKIM 05Q reports $(10.44 \pm 2.37^{+3.05}_{-1.90}) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to K_0^*(1430)^0\overline{K}_0^*(1430)^0 \to \pi^+\pi^- K^+ K^-)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K_0^*(1430)^0\overline{K}_2^*(1430)^0 + \text{c.c.} \to \pi^+\pi^- K^+ K^-)/\Gamma_{\text{total}}$ Γ_9/Γ

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$\mathbf{8.1^{+2.0}_{-2.4}\pm0.3}$	62	[15] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+ K^-$

[15] ABLIKIM 05Q reports $(8.49 \pm 1.66^{+1.32}_{-1.99}) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to K_0^*(1430)^0\overline{K}_2^*(1430)^0 + \text{c.c.} \to \pi^+\pi^- K^+ K^-)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K_1(1270)^+ K^- + \text{c.c.} \to \pi^+\pi^- K^+ K^-)/\Gamma_{\text{total}}$ Γ_{10}/Γ

VALUE (units 10^{-3})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$\mathbf{6.4^{+2.0}_{-1.9}\pm0.2}$	68	[16] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+ K^-$

[16] ABLIKIM 05Q reports $(6.66 \pm 1.31^{+1.60}_{-1.51}) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to K_1(1270)^+ K^- + \text{c.c.} \to \pi^+\pi^- K^+ K^-)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. The measurement assumes $\text{B}(K_1(1270) \to K\rho(770)) = 42 \pm 6\%$.

$\Gamma(K_1(1400)^+ K^- + \text{c.c.} \to \pi^+\pi^- K^+ K^-)/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<2.7	90	[17] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+ K^-$

[17] ABLIKIM 05Q reports $< 2.85 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to K_1(1400)^+ K^- + \text{c.c.} \to \pi^+\pi^- K^+ K^-)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$. The measurement assumes $\text{B}(K_1(1400) \to K^*(892)\pi) = 94 \pm 6\%$.

$\Gamma(f_0(980) f_0(980))/\Gamma_{\text{total}}$ Γ_{12}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{17^{+11}_{-9} \pm 1}$	28	[18] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+ K^-$

[18] ABLIKIM 05Q reports $[\Gamma(\chi_{c0}(1P) \to f_0(980) f_0(980))/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))] = (1.59 \pm 0.50^{+0.89}_{-0.72}) \times 10^{-5}$ which we divide by our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. One of the $f_0(980)$ mesons is identified via decay to $\pi^+\pi^-$ while the other via $K^+ K^-$ decay.

$\Gamma(f_0(980) f_0(2200))/\Gamma_{\text{total}}$ Γ_{13}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{8.1^{+2.0}_{-2.5} \pm 0.3}$	77	[19] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+ K^-$

[19] ABLIKIM 05Q reports $(8.42 \pm 1.42^{+1.65}_{-2.29}) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to f_0(980) f_0(2200))/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. The f_0 mesons are identified via $f_0(980) \to \pi^+\pi^-$ and $f_0(2200) \to K^+ K^-$ decays.

$\Gamma(f_0(1370) f_0(1370))/\Gamma_{\text{total}}$ Γ_{14}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<2.8	90	[20] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+ K^-$

[20] ABLIKIM 05Q reports $< 2.9 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to f_0(1370) f_0(1370))/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$. One of the $f_0(1370)$ mesons is identified via decay to $\pi^+\pi^-$ while the other via $K^+ K^-$ decay. Both branching fractions for these f_0 decays are implicitly included in the quoted result.

$\Gamma(f_0(1370)f_0(1500))/\Gamma_{total}$ Γ_{15}/Γ

VALUE (units 10^{-4})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<1.7	90	[21] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+K^-$

[21] ABLIKIM 05Q reports $< 1.8 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to f_0(1370)f_0(1500))/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$. The f_0 mesons are identified via $f_0(1370) \to \pi^+\pi^-$ and $f_0(1500) \to K^+K^-$ decays. Both branching fractions for these f_0 decays are implicitly included in the quoted result.

$\Gamma(f_0(1370)f_0(1710))/\Gamma_{total}$ Γ_{16}/Γ

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$\mathbf{6.8^{+3.6}_{=2.4} \pm 0.2}$	61	[22] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+K^-$

[22] ABLIKIM 05Q reports $(7.12 \pm 1.85^{+3.28}_{-1.68}) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to f_0(1370)f_0(1710))/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. The f_0 mesons are identified via $f_0(1370) \to \pi^+\pi^-$ and $f_0(1710) \to K^+K^-$ decays. Both branching fractions for these f_0 decays are implicitly included in the quoted result.

$\Gamma(f_0(1500)f_0(1370))/\Gamma_{total}$ Γ_{17}/Γ

VALUE (units 10^{-4})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<1.3	90	[23] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+K^-$

[23] ABLIKIM 05Q reports $< 1.4 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to f_0(1500)f_0(1370))/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$. The f_0 mesons are identified via $f_0(1500) \to \pi^+\pi^-$ and $f_0(1370) \to K^+K^-$ decays. Both branching fractions for these f_0 decays are implicitly included in the quoted result.

$\Gamma(f_0(1500)f_0(1500))/\Gamma_{total}$ Γ_{18}/Γ

VALUE (units 10^{-4})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.5	90	[24] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+K^-$

[24] ABLIKIM 05Q reports $< 0.55 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to f_0(1500)f_0(1500))/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$. One of the $f_0(1500)$ is identified via decay to $\pi^+\pi^-$ while the other via K^+K^- decay. Both branching fractions for these f_0 decays are implicitly included in the quoted result.

$\Gamma(f_0(1500)f_0(1710))/\Gamma_{total}$ Γ_{19}/Γ

VALUE (units 10^{-4})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.7	90	[25] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+K^-$

[25] ABLIKIM 05Q reports $< 0.73 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to f_0(1500)\, f_0(1710))/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$. The f_0 mesons are identified via $f_0(1500) \to \pi^+\pi^-$ and $f_0(1710) \to K^+K^-$ decays. Both branching fractions for these f_0 decays are implicitly included in the quoted result.

$\Gamma(K^+K^-\pi^0\pi^0)/\Gamma_{\text{total}}$ Γ_{20}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.57±0.09±0.02	213.5	[26] HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[26] HE 08B reports 0.59 ± 0.05 ± 0.08 ± 0.03 % from a measurement of $[\Gamma(\chi_{c0}(1P) \to K^+K^-\pi^0\pi^0)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+\pi^-K^0\pi^0 + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{21}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
2.53±0.33±0.08	401.7	[27] HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[27] HE 08B reports 2.64 ± 0.15 ± 0.31 ± 0.14 % from a measurement of $[\Gamma(\chi_{c0}(1P) \to K^+\pi^-K^0\pi^0 + \text{ c.c.})/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. 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_{22}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.23±0.21±0.04	179.7	[28] HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[28] HE 08B reports 1.28 ± 0.16 ± 0.15 ± 0.07 % from a measurement of $[\Gamma(\chi_{c0}(1P) \to \rho^+K^-K^0 + \text{ c.c.})/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. 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_{23}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.47±0.12±0.02	64.1	[29] HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[29] HE 08B reports 0.49 ± 0.10 ± 0.07 ± 0.03 % from a measurement of $[\Gamma(\chi_{c0}(1P) \to K^*(892)^-K^+\pi^0 \to K^+\pi^-K^0\pi^0 + \text{ c.c.})/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^0_S K^0_S \pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{24}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
5.8±1.1±0.2	152 ± 14	[30] ABLIKIM	05O	BES2	$\psi(2S) \to \gamma\chi_{c0}$

[30] ABLIKIM 05O reports $[\Gamma(\chi_{c0}(1P) \to K^0_S K^0_S \pi^+\pi^-)/\Gamma_{\rm total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))] = (0.558 \pm 0.051 \pm 0.089) \times 10^{-3}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+K^-\eta\pi^0)/\Gamma_{\rm total}$ Γ_{25}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.31±0.07±0.01	56.4	[31] HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[31] HE 08B reports $0.32 \pm 0.05 \pm 0.05 \pm 0.02$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \to K^+K^-\eta\pi^0)/\Gamma_{\rm total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(3(\pi^+\pi^-))/\Gamma_{\rm total}$ Γ_{26}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
12.0±1.8 OUR EVALUATION	Treating systematic error as correlated.			
12.0±1.7 OUR AVERAGE				
11.7±1.0±1.9	[32] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c0}$
12.5±2.9±0.5	[32] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c0}$

[32] Rescaled by us using $B(\psi(2S) \to \gamma\chi_{c0}) = (9.4 \pm 0.4)\%$ and $B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) = (32.6 \pm 0.5)\%$.

$\Gamma(K^+\overline{K}^*(892)^0\pi^- + \text{c.c.})/\Gamma_{\rm total}$ Γ_{27}/Γ

VALUE	DOCUMENT ID
0.0073±0.0016 OUR FIT	

$\Gamma(K^*(892)^0\overline{K}^*(892)^0)/\Gamma_{\rm total}$ Γ_{28}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.7±0.6±0.1	64	[33] ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\pi^+\pi^- K^+K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.6±0.4±0.1	30.1±5.7	[34,35] ABLIKIM	04H	BES	Repl. by ABLIKIM 05Q

[33] ABLIKIM 05Q reports $[\Gamma(\chi_{c0}(1P) \to K^*(892)^0\overline{K}^*(892)^0)/\Gamma_{\rm total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))] = (0.168 \pm 0.035^{+0.047}_{-0.040}) \times 10^{-3}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

[35] ABLIKIM 04H reports $[\Gamma(\chi_{c0}(1P) \to K^*(892)^0\overline{K}^*(892)^0)/\Gamma_{\rm total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))] = (1.53 \pm 0.29 \pm 0.26) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\pi\pi)/\Gamma_{\rm total}$ Γ_{29}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
8.4±0.4 OUR FIT	

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

VALUE (units 10^{-3})	DOCUMENT ID
2.68±0.28 OUR FIT	

$\Gamma(\eta\eta)/\Gamma(\pi\pi)$ Γ_{32}/Γ_{29}

VALUE	DOCUMENT ID	TECN	COMMENT
0.321±0.035 OUR FIT			
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.26 $\pm$0.09 $^{+0.03}_{-0.02}$	[36] ANDREOTTI	05C	E835 $\overline{p}p \rightarrow$ 2 mesons
0.24 $\pm$0.10 $\pm$0.08	[36] BAI	03C	BES $\psi(2S) \rightarrow 5\gamma$

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

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

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<0.24	90	35 ± 13	[37] ASNER 09	CLEO	$\psi(2S) \rightarrow \gamma\eta'\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.5	90		[38] ADAMS 07	CLEO	$\psi(2S) \rightarrow \gamma\chi_{c0}$

[37] ASNER 09 reports $< 0.25 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$.

[38] Superseded by ASNER 09. ADAMS 07 reports $< 0.5 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$.

$\Gamma(\eta'\eta')/\Gamma_{\text{total}}$ Γ_{34}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
2.03±0.21±0.07	0.4k	[39] ASNER 09	CLEO	$\psi(2S) \rightarrow \gamma\eta'\eta'$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.6 $\pm$0.4 $\pm$0.1	23	[40] ADAMS 07	CLEO	$\psi(2S) \rightarrow \gamma\chi_{c0}$

[39] ASNER 09 reports $(2.12 \pm 0.13 \pm 0.21) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \eta'\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[40] Superseded by ASNER 09. ADAMS 07 reports $(1.7 \pm 0.4 \pm 0.2) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \eta'\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 0.0922 \pm 0.0011 \pm 0.0046$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\omega\omega)/\Gamma_{\text{total}}$ Γ_{35}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
2.2±0.7±0.1	38.1 ± 9.6	[41] ABLIKIM 05N	BES2	$\psi(2S) \rightarrow \gamma\chi_{c0} \rightarrow \gamma 6\pi$

[41] ABLIKIM 05N reports $[\Gamma(\chi_{c0}(1P) \rightarrow \omega\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))] = (0.212 \pm 0.053 \pm 0.037) \times 10^{-3}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units 10^{-3})	*DOCUMENT ID*
6.10±0.35 OUR FIT	

$\Gamma(K^0_S K^0_S)/\Gamma_{\text{total}}$ Γ_{37}/Γ

VALUE (units 10^{-3})	*DOCUMENT ID*
3.16±0.18 OUR FIT	

$\Gamma(K^0_S K^0_S)/\Gamma(\pi\pi)$ Γ_{37}/Γ_{29}

VALUE	*DOCUMENT ID*	*TECN*	*COMMENT*
0.379±0.024 OUR FIT			
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.31 ±0.05 ±0.05	[42,43] CHEN	07B BELL	$e^+e^- \to e^+e^-\chi_{c0}$

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

[43] Not independent from other measurements.

$\Gamma(K^0_S K^0_S)/\Gamma(K^+K^-)$ Γ_{37}/Γ_{36}

VALUE	*DOCUMENT ID*	*TECN*	*COMMENT*
0.519±0.035 OUR FIT			
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.49 ±0.07 ±0.08	[44,45] CHEN	07B BELL	$e^+e^- \to e^+e^-\chi_{c0}$

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

[45] Not independent from other measurements.

$\Gamma(\pi^+\pi^-\eta)/\Gamma_{\text{total}}$ Γ_{38}/Γ

VALUE (units 10^{-3})	*CL%*	*DOCUMENT ID*	*TECN*	*COMMENT*
<0.20	90	[46] ATHAR	07 CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<1.1	90	[47] ABLIKIM	06R BES2	$\psi(2S) \to \gamma\chi_{c0}$

[46] ATHAR 07 reports $< 0.21 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to \pi^+\pi^-\eta)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$.

[47] ABLIKIM 06R reports $< 1.1 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to \pi^+\pi^-\eta)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$.

$\Gamma(\pi^+\pi^-\eta')/\Gamma_{\text{total}}$ Γ_{39}/Γ

VALUE (units 10^{-3})	*CL%*	*DOCUMENT ID*	*TECN*	*COMMENT*
<0.4	90	[48] ATHAR	07 CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[48] ATHAR 07 reports $< 0.38 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to \pi^+\pi^-\eta')/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$.

$\Gamma(\overline{K}^0 K^+\pi^- + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{40}/Γ

VALUE (units 10^{-3})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.10	90	[49] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

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

<0.7	90	[50,51] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c0}$
<0.7	90	[51,52] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c0}$

[49] ATHAR 07 reports $< 0.10\times10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to \overline{K}^0 K^+\pi^- + \text{c.c.})/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46)\times10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = 9.62\times10^{-2}$.

[50] ABLIKIM 06R reports $< 0.70\times10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to \overline{K}^0 K^+\pi^- + \text{c.c.})/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.2 \pm 0.4)\times10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = 9.62\times10^{-2}$.

[51] We have multiplied the $K^0_S K^+\pi^-$ measurement by a factor of 2 to convert to $K^0 K^+\pi^-$.

[52] Rescaled by us using $\text{B}(\psi(2S) \to \gamma\chi_{c0}) = (9.4 \pm 0.4)\%$ and $\text{B}(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) = (32.6 \pm 0.5)\%$.

$\Gamma(K^+K^-\pi^0)/\Gamma_{\text{total}}$ Γ_{41}/Γ

VALUE (units 10^{-3})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.06	90	[53] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[53] ATHAR 07 reports $< 0.06\times10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to K^+K^-\pi^0)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22\pm0.11\pm0.46)\times10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = 9.62\times10^{-2}$.

$\Gamma(K^+K^-\eta)/\Gamma_{\text{total}}$ Γ_{42}/Γ

VALUE (units 10^{-3})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.23	90	[54] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[54] ATHAR 07 reports $< 0.24\times10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to K^+K^-\eta)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46)\times10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = 9.62\times10^{-2}$.

$\Gamma(K^+K^-K^0_S K^0_S)/\Gamma_{\text{total}}$ Γ_{43}/Γ

VALUE (units 10^{-3})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.43±0.48±0.05	16.8 ± 4.8	[55] ABLIKIM	05O	BES2	$\psi(2S) \to \gamma\chi_{c0}$

[55] ABLIKIM 05O reports $[\Gamma(\chi_{c0}(1P) \to K^+K^-K^0_S K^0_S)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))] = (0.138 \pm 0.039 \pm 0.025)\times10^{-3}$ which we divide by our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31)\times10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+K^-K^+K^-)/\Gamma_{\text{total}}$ Γ_{44}/Γ

VALUE (units 10^{-3})	*DOCUMENT ID*
2.81±0.30 OUR FIT	

$\Gamma(K^+K^-\phi)/\Gamma_{total}$ Γ_{45}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
0.99±0.25±0.03	38	[56] ABLIKIM	06T	BES2	$\psi(2S) \to \gamma 2K^+ 2K^-$

[56] ABLIKIM 06T reports $(1.03 \pm 0.22 \pm 0.15) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to K^+K^-\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\phi\phi)/\Gamma_{total}$ Γ_{46}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
0.92±0.19 OUR FIT	

$\Gamma(p\overline{p})/\Gamma_{total}$ Γ_{47}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
2.28±0.13 OUR FIT	

$\Gamma(p\overline{p}\pi^0)/\Gamma_{total}$ Γ_{48}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.57±0.12±0.02	[57] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[57] ATHAR 07 reports $(0.59 \pm 0.10 \pm 0.08) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to p\overline{p}\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. 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_{49}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.37±0.11±0.01	[58] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[58] ATHAR 07 reports $(0.39 \pm 0.11 \pm 0.04) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to p\overline{p}\eta)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\pi^+\pi^-p\overline{p})/\Gamma_{total}$ Γ_{50}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
2.1 ±0.7 OUR EVALUATION Error includes scale factor of 1.4. Treating systematic error as correlated.				
2.1 ±1.0 OUR AVERAGE Error includes scale factor of 2.0.				
1.57±0.21±0.53	[59] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c0}$
4.20±1.15±0.18	[59] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c0}$

[59] Rescaled by us using $B(\psi(2S) \to \gamma\chi_{c0}) = (9.4 \pm 0.4)\%$ and $B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) = (32.6 \pm 0.5)\%$.

$\Gamma(\pi^0\pi^0 p\overline{p})/\Gamma_{total}$ Γ_{51}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.105±0.028±0.003	39.5	[60] HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[60] HE 08B reports 0.11 ± 0.02 ± 0.02 ± 0.01 % from a measurement of $[\Gamma(\chi_{c0}(1P) \to \pi^0\pi^0 p\overline{p})/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^0_S K^0_S p\overline{p})/\Gamma_{total}$ Γ_{52}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<8.8	90	[61] ABLIKIM	06D	BES2	$\psi(2S) \to \chi_{c0}\gamma$

[61] Using $B(\psi(2S) \to \chi_{c0}\gamma) = (9.2 \pm 0.5)\%$

$\Gamma(p\overline{n}\pi^-)/\Gamma_{total}$ Γ_{53}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
11.4±3.1±0.4	[62] ABLIKIM	06I	BES2	$\psi(2S) \to \gamma p\pi^- X$

[62] ABLIKIM 06I reports $[\Gamma(\chi_{c0}(1P) \to p\overline{n}\pi^-)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))] = (1.10 \pm 0.24 \pm 0.18) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Lambda\overline{\Lambda})/\Gamma_{total}$ Γ_{54}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
3.3±0.4 OUR FIT	

$\Gamma(\Lambda\overline{\Lambda}\pi^+\pi^-)/\Gamma_{total}$ Γ_{55}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<4.0	90	[63] ABLIKIM	06D	BES2	$\psi(2S) \to \chi_{c0}\gamma$

[63] Using $B(\psi(2S) \to \chi_{c0}\gamma) = (9.2 \pm 0.5)\%$

$\Gamma(K^+\overline{p}\Lambda + \text{c.c.})/\Gamma_{total}$ Γ_{56}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
1.03±0.19±0.03	[64] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[64] ATHAR 07 reports $(1.07 \pm 0.17 \pm 0.12) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to K^+\overline{p}\Lambda + \text{c.c.})/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. 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_{57}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
4.2±0.7±0.1	78 ± 10	[65] NAIK	08	CLEO	$\psi(2S) \to \gamma\Sigma^0\overline{\Sigma}^0$

[65] NAIK 08 reports $(4.41 \pm 0.56 \pm 0.47) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to \Sigma^0\overline{\Sigma}^0)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Sigma^+\overline{\Sigma}^-)/\Gamma_{\text{total}}$ Γ_{58}/Γ

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
3.1±0.7±0.1	39 ± 7	[66] NAIK	08	CLEO	$\psi(2S) \to \gamma\Sigma^+\overline{\Sigma}^-$

[66] NAIK 08 reports $(3.25 \pm 0.57 \pm 0.43) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to \Sigma^+\overline{\Sigma}^-)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Xi^0\overline{\Xi}^0)/\Gamma_{\text{total}}$ Γ_{59}/Γ

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
3.2±0.8±0.1	23.3 ± 4.9	[67] NAIK	08	CLEO	$\psi(2S) \to \gamma\Xi^0\overline{\Xi}^0$

[67] NAIK 08 reports $(3.34 \pm 0.70 \pm 0.48) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to \Xi^0\overline{\Xi}^0)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Xi^-\overline{\Xi}^+)/\Gamma_{\text{total}}$ Γ_{60}/Γ

VALUE (units 10^{-4})	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
4.9±0.7±0.2		95 ± 11	[68] NAIK	08	CLEO	$\psi(2S) \to \gamma\Xi^+\overline{\Xi}^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<10.3	90		[69] ABLIKIM	06D	BES2	$\psi(2S) \to \chi_{c0}\gamma$

[68] NAIK 08 reports $(5.14 \pm 0.60 \pm 0.47) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \to \Xi^-\overline{\Xi}^+)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[69] Using $\text{B}(\psi(2S) \to \chi_{c0}\gamma) = (9.2 \pm 0.5)\%$

$\Gamma(p\overline{p})/\Gamma_{\text{total}} \times \Gamma(\pi\pi)/\Gamma_{\text{total}}$ $\Gamma_{47}/\Gamma \times \Gamma_{29}/\Gamma$

VALUE (units 10^{-7})	*DOCUMENT ID*		*TECN*	*COMMENT*
19.0±1.4 OUR FIT				
15.3±2.4±0.8	[70] ANDREOTTI	03	E835	$\overline{p}p \to \chi_{c0} \to \pi^0\pi^0$

[70] We have multiplied $\text{B}(p\overline{p})\cdot\text{B}(\pi^0\pi^0)$ measurement by 3 to obtain $\text{B}(p\overline{p})\cdot\text{B}(\pi\pi)$.

$\Gamma(p\overline{p})/\Gamma_{\text{total}} \times \Gamma(\pi^0\eta)/\Gamma_{\text{total}}$ $\Gamma_{47}/\Gamma \times \Gamma_{30}/\Gamma$

VALUE (units 10^{-7})	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.4	ANDREOTTI	05C	E835	$\overline{p}p \to \pi^0\eta$

$\Gamma(p\overline{p})/\Gamma_{total} \times \Gamma(\pi^0\eta')/\Gamma_{total}$ $\Gamma_{47}/\Gamma \times \Gamma_{31}/\Gamma$

VALUE (units 10^{-7})	*DOCUMENT ID*		*TECN*	*COMMENT*
<2.5	ANDREOTTI	05C	E835	$\overline{p}p \rightarrow \pi^0\eta$

$\Gamma(p\overline{p})/\Gamma_{total} \times \Gamma(\eta\eta)/\Gamma_{total}$ $\Gamma_{47}/\Gamma \times \Gamma_{32}/\Gamma$

VALUE (units 10^{-7})	*DOCUMENT ID*		*TECN*	*COMMENT*
6.1±0.7 OUR FIT				
$\mathbf{4.0\pm1.2^{+0.5}_{-0.3}}$	ANDREOTTI	05C	E835	$\overline{p}p \rightarrow \eta\eta$

$\Gamma(p\overline{p})/\Gamma_{total} \times \Gamma(\eta\eta')/\Gamma_{total}$ $\Gamma_{47}/\Gamma \times \Gamma_{33}/\Gamma$

VALUE (units 10^{-6})	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$2.1^{+2.3}_{-1.5}$	ANDREOTTI	05C	E835	$\overline{p}p \rightarrow \pi^0\eta$

RADIATIVE DECAYS

$\Gamma(\gamma J/\psi(1S))/\Gamma_{total}$ Γ_{61}/Γ

VALUE (units 10^{-4})	*DOCUMENT ID*	*TECN*	*COMMENT*
116± 8 OUR FIT			
• • • We do not use the following data for averages, fits, limits, etc. • • •			
200±20±20	[71] ADAM 05A	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$

[71] Uses B($\psi(2S) \rightarrow \gamma\chi_{c0} \rightarrow \gamma\gamma J/\psi$) from ADAM 05A and B($\psi(2S) \rightarrow \gamma\chi_{c0}$) from ATHAR 04.

$\Gamma(\gamma\rho^0)/\Gamma_{total}$ Γ_{62}/Γ

VALUE (units 10^{-6})	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
<9	90	1.2 ± 4.5	[72] BENNETT	08A	CLEO	$\psi(2S) \rightarrow \gamma\gamma\rho^0$

[72] BENNETT 08A reports $< 9.6 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma\rho^0)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$.

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

VALUE (units 10^{-6})	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
<8	90	0.0 ± 2.8	[73] BENNETT	08A	CLEO	$\psi(2S) \rightarrow \gamma\gamma\omega$

[73] BENNETT 08A reports $< 8.8 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma\omega)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$.

$\Gamma(\gamma\phi)/\Gamma_{total}$ Γ_{64}/Γ

VALUE (units 10^{-6})	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
<6	90	0.1 ± 1.6	[74] BENNETT	08A	CLEO	$\psi(2S) \rightarrow \gamma\gamma\phi$

[74] BENNETT 08A reports $< 6.4 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma\phi)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.62 \times 10^{-2}$.

$\Gamma(\gamma\gamma)/\Gamma_{total}$ Γ_{65}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
2.22±0.17 OUR FIT					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<8	90	[75] WICHT	08	BELL	$B^{\pm} \to K^{\pm}\gamma\gamma$

[75] WICHT 08 reports $[\Gamma(\chi_{c0}(1P) \to \gamma\gamma)/\Gamma_{total}] \times [B(B^+ \to \chi_{c0}(1P)K^+)] < 0.11 \times 10^{-6}$ which we divide by our best value $B(B^+ \to \chi_{c0}(1P)K^+) = 1.33 \times 10^{-4}$.

$\Gamma(\gamma\gamma)/\Gamma(\gamma J/\psi(1S))$ Γ_{65}/Γ_{61}

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
1.91±0.19 OUR FIT				
2.0 ±0.4 OUR AVERAGE				
$2.2 \pm 0.4\ ^{+0.1}_{-0.2}$	[76] ANDREOTTI	04	E835	$p\overline{p} \to \chi_{c0} \to \gamma\gamma$
1.45±0.74	[77] AMBROGIANI	00B	E835	$\overline{p}p \to \chi_{c2} \to \gamma\gamma, \gamma J/\psi$

[76] The values of $B(p\overline{p})B(\gamma\gamma)$ and $B(\gamma\gamma)B(\gamma J/\psi)$ measured by ANDREOTTI 04 are not independent. The latter is used in the fit because of smaller systematics.

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

$\Gamma(p\overline{p})/\Gamma_{total} \times \Gamma(\gamma J/\psi(1S))/\Gamma_{total}$ $\Gamma_{47}/\Gamma \times \Gamma_{61}/\Gamma$

VALUE (units 10^{-7})	EVTS	DOCUMENT ID		TECN	COMMENT
26.5±1.8 OUR FIT					
28.2±2.1 OUR AVERAGE					
28.0±1.9±1.3	392	[78,79,80] BAGNASCO	02	E835	$\overline{p}p \to \chi_{c0} \to J/\psi\gamma$
$29.3^{+5.7}_{-4.7}\pm1.5$	89	[78,79] AMBROGIANI	99B		$\overline{p}p \to \chi_{c0} \to J/\psi\gamma$

[78] Values in $(\Gamma(p\overline{p}) \times \Gamma(\gamma J/\psi(1S))/\Gamma_{total})$ and $(\Gamma(p\overline{p})/\Gamma_{total} \times \Gamma(\gamma J/\psi(1S))/\Gamma_{total})$ are not independent. The latter is used in the fit since it is less correlated to the total width.

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

[80] Recalculated by ANDREOTTI 05A.

$\Gamma(p\overline{p})/\Gamma_{total} \times \Gamma(\gamma\gamma)/\Gamma_{total}$ $\Gamma_{47}/\Gamma \times \Gamma_{65}/\Gamma$

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
5.1 ±0.5 OUR FIT				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$6.52\pm1.18^{+0.48}_{-0.72}$	[81] ANDREOTTI	04	E835	$p\overline{p} \to \chi_{c0} \to \gamma\gamma$

[81] The values of $B(p\overline{p})B(\gamma\gamma)$ and $B(\gamma\gamma)B(\gamma J/\psi)$ measured by ANDREOTTI 04 are not independent. The latter is used in the fit because of smaller systematics.

$\chi_{c0}(1P)$ CROSS-PARTICLE BRANCHING RATIOS

$\Gamma(\chi_{c0}(1P) \to p\overline{p})/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma_{total}$ $\Gamma_{47}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
21.9±1.4 OUR FIT					
23.7±1.8 OUR AVERAGE					
23.7±1.4±1.4	383 ± 22	[82] NAIK	08	CLEO	$\psi(2S) \to \gamma p\overline{p}$
$23.6^{+3.7}_{-3.4}\pm3.4$	89.5^{+14}_{-13}	BAI	04F	BES	$\psi(2S) \to \gamma\chi_{c0}(1P) \to \gamma\overline{p}p$

[82] Calculated by us. NAIK 08 reports $B(\chi_c^0 \to p\overline{p}) = (25.7 \pm 1.5 \pm 1.5 \pm 1.3) \times 10^{-5}$ using $B(\psi(2S) \to \gamma\chi_c^0) = (9.22 \pm 0.11 \pm 0.46)\%$.

$\Gamma(\chi_{c0}(1P) \to p\overline{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{47}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-5})	*DOCUMENT ID*		*TECN*	*COMMENT*
6.5±0.4 OUR FIT				
4.6±1.9	[83] BAI	98I	BES	$\psi(2S) \to \gamma\chi_{c0} \to \gamma\overline{p}p$

[83] Calculated by us. The value for $B(\chi_{c0} \to p\overline{p})$ reported in BAI 98I is derived using $B(\psi(2S) \to \gamma\chi_{c0}) = (9.3 \pm 0.8)\%$ and $B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$\Gamma(\chi_{c0}(1P) \to \Lambda\overline{\Lambda})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}$ $\Gamma_{54}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-6})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
32 ±4 OUR FIT					
31.2±3.3±2.0	131 ± 12	[84] NAIK	08	CLEO	$\psi(2S) \to \gamma\Lambda\overline{\Lambda}$

[84] Calculated by us. NAIK 08 reports $B(\chi_c^0 \to \Lambda\overline{\Lambda}) = (33.8 \pm 3.6 \pm 2.2 \pm 1.7) \times 10^{-5}$ using $B(\psi(2S) \to \gamma\chi_c^0) = (9.22 \pm 0.11 \pm 0.46)\%$.

$\Gamma(\chi_{c0}(1P) \to \Lambda\overline{\Lambda})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{54}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-5})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
9.5±1.1 OUR FIT					
$\mathbf{13.0^{+3.6}_{-3.5} \pm 2.5}$	$15.2^{+4.2}_{-4.0}$	[85] BAI	03E	BES	$\psi(2S) \to \gamma\Lambda\overline{\Lambda}$

[85] BAI 03E reports $[\ B(\chi_c^0 \to \Lambda\overline{\Lambda})\ B(\psi(2S) \to \gamma\chi_c^0)\ /\ B(\psi(2S) \to J/\psi\pi^+\pi^-)\ ] \times [B^2(\Lambda \to \pi^- p)\ /\ B(J/\psi \to p\overline{p})\ ] = (2.45^{+0.68}_{-0.65} \pm 0.46)\%$. We calculate from this measurement the presented value using $B(\Lambda \to \pi^- p) = (63.9 \pm 0.5)\%$ and $B(J/\psi \to p\overline{p}) = (2.17 \pm 0.07) \times 10^{-3}$.

$\Gamma(\chi_{c0}(1P) \to \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}$ $\Gamma_{61}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.112±0.008 OUR FIT					
0.073±0.018 OUR AVERAGE					
0.069±0.018		[86] OREGLIA	82	CBAL	$\psi(2S) \to \gamma\chi_{c0}$
0.4 ±0.3		[87] BRANDELIK	79B	DASP	$\psi(2S) \to \gamma\chi_{c0}$
0.16 ±0.11		[87] BARTEL	78B	CNTR	$\psi(2S) \to \gamma\chi_{c0}$
3.3 ±1.7		[88] BIDDICK	77	CNTR	$e^+e^- \to \gamma X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.125±0.007±0.013	560	[89] MENDEZ	08	CLEO	$\psi(2S) \to \gamma\chi_{c0}$
0.18 ±0.01 ±0.02	172	[90] ADAM	05A	CLEO	Repl. by MENDEZ 08

[86] Recalculated by us using B($J/\psi(1S) \to \ell^+\ell^-$) = 0.1181 ± 0.0020.
[87] Recalculated by us using B($J/\psi(1S) \to \mu^+\mu^-$) = 0.0588 ± 0.0010.
[88] Assumes isotropic gamma distribution.
[89] Not independent from other measurements of MENDEZ 08.
[90] Not independent from other values reported by ADAM 05A.

$\Gamma(\chi_{c0}(1P) \to \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\text{anything})$ $\Gamma_{61}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma_{9}^{\psi(2S)}$

$\Gamma_{61}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma_{9}^{\psi(2S)} = \Gamma_{61}/\Gamma \times \Gamma_{105}^{\psi(2S)}/(\Gamma_{11}^{\psi(2S)} + \Gamma_{12}^{\psi(2S)} + \Gamma_{13}^{\psi(2S)} + 0.344\Gamma_{106}^{\psi(2S)} + 0.195\Gamma_{107}^{\psi(2S)})$

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.188±0.014 OUR FIT					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.201±0.011±0.021	560	[91] MENDEZ	08	CLEO	$\psi(2S) \to \gamma\chi_{c0}$
0.31 ±0.02 ±0.03	172	ADAM	05A	CLEO	Repl. by MENDEZ 08

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

$\Gamma(\chi_{c0}(1P) \to \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{61}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.333±0.024 OUR FIT					
0.358±0.020±0.037	560	MENDEZ	08	CLEO	$\psi(2S) \to \gamma\chi_{c0}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.55 ±0.04 ±0.06	172	[92] ADAM	05A	CLEO	Repl. by MENDEZ 08

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

$\Gamma(\chi_{c0}(1P) \to \gamma\gamma)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}$ $\Gamma_{65}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-5})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2.14±0.19 OUR FIT					
2.21±0.33 OUR AVERAGE					
2.17±0.32±0.10	207 ± 31	ECKLUND	08A	CLEO	$\psi(2S) \to \gamma\chi_{c0} \to 3\gamma$
3.7 ±1.8 ±1.0		LEE	85	CBAL	$\psi(2S) \to \gamma\chi_{c0}$

$\Gamma(\chi_{c0}(1P) \to \pi\pi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}$ $\Gamma_{29}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
8.03±0.32 OUR FIT					
8.7 ±0.4 OUR AVERAGE					
8.81±0.11±0.43	8.9k	[93] ASNER	09	CLEO	$\psi(2S) \to \gamma\pi^+\pi^-$
8.13±0.19±0.89	2.8k	[94] ASNER	09	CLEO	$\psi(2S) \to \gamma\pi^0\pi^0$

[93] Calculated by us. ASNER 09 reports B($\chi_{c0} \to \pi^+\pi^-$) = (6.37 ± 0.08 ± 0.31 ± 0.32) × 10^{-3} using B($\psi(2S) \to \gamma\chi_{c0}$) = (9.22 ± 0.11 ± 0.46)%. We have multiplied the $\pi^+\pi^-$ measurement by 3/2 to obtain $\pi\pi$.
[94] Calculated by us. ASNER 09 reports B($\chi_{c0} \to \pi^0\pi^0$) = (2.94 ± 0.07 ± 0.32 ± 0.15) × 10^{-3} using B($\psi(2S) \to \gamma\chi_{c0}$) = (9.22 ± 0.11 ± 0.46)%. We have multiplied the $\pi^0\pi^0$ measurement by 3 to obtain $\pi\pi$.

$\Gamma(\chi_{c0}(1P) \to \pi\pi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{29}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
23.9±1.0 OUR FIT					
20.7±1.7 OUR AVERAGE					
23.9±2.7±4.1	97 ± 11	[95] BAI	03C	BES	$\psi(2S) \to \gamma\chi_{c0} \to \gamma\pi^0\pi^0$
20.2±1.1±1.5	720 ± 32	[96] BAI	98I	BES	$\psi(2S) \to \gamma\chi_{c0} \to \gamma\pi^+\pi^-$

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

[96] Calculated by us. The value for $B(\chi_{c0} \to \pi^+\pi^-)$ reported in BAI 98I is derived using $B(\psi' \to \gamma\chi_{c0}) = (9.3 \pm 0.8)\%$ and $B(\psi' \to J/\psi\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D]. We have multiplied $\pi^+\pi^-$ measurement by 3/2 to obtain $\pi\pi$.

$\Gamma(\chi_{c0}(1P) \to \eta\eta)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}$ $\Gamma_{32}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2.57±0.26 OUR FIT					
2.93±0.12±0.29	0.9k	[97] ASNER	09	CLEO	$\psi(2S) \to \gamma\eta\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.86±0.46±0.37	48	[98] ADAMS	07	CLEO	$\psi(2S) \to \gamma\chi_{c0}$

[97] Calculated by us. ASNER 09 reports $B(\chi_{c0} \to \eta\eta) = (3.18 \pm 0.13 \pm 0.31 \pm 0.16) \times 10^{-3}$ using $B(\psi(2S) \to \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$.

[98] Superseded by ASNER 09. Calculated by us. The value of $B(\chi_{c0}(1P) \to \eta\eta)$ reported by ADAMS 07 was derived using $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46)\%$ (ATHAR 04).

$\Gamma(\chi_{c0}(1P) \to \eta\eta)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{32}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
0.77 ±0.08 OUR FIT				
0.578±0.241±0.158	BAI	03C	BES	$\psi(2S) \to \gamma\eta\eta$

$\Gamma(\chi_{c0}(1P) \to K^+K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}$ $\Gamma_{36}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
5.86±0.28 OUR FIT					
5.97±0.07±0.32	8.1k	[99] ASNER	09	CLEO	$\psi(2S) \to \gamma K^+K^-$

[99] Calculated by us. ASNER 09 reports $B(\chi_{c0} \to K^+K^-) = (6.47 \pm 0.08 \pm 0.35 \pm 0.32) \times 10^{-3}$ using $B(\psi(2S) \to \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$.

$\Gamma(\chi_{c0}(1P) \to K^+K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{36}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-3})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.75±0.09 OUR FIT					
1.63±0.10±0.15	774 ± 38	[100] BAI	98I	BES	$\psi(2S) \to \gamma K^+K^-$

[100] Calculated by us. The value for $B(\chi_{c0} \to K^+K^-)$ reported by BAI 98I is derived using $B(\psi(2S) \to \gamma\chi_{c0}) = (9.3 \pm 0.8)\%$ and $B(\psi(2S) \to J/\psi\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$\Gamma(\chi_{c0}(1P) \to K^0_S K^0_S)/\Gamma_{\rm total} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma_{\rm total}$ $\Gamma_{37}/\Gamma \times \Gamma^{\psi(2S)}_{105}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
3.04±0.15 OUR FIT					
3.18±0.17 OUR AVERAGE					
3.22±0.07±0.17	2.1k	[101] ASNER	09	CLEO	$\psi(2S) \to \gamma K^0_S K^0_S$
3.02±0.19±0.33	322	ABLIKIM	05O	BES2	$\psi(2S) \to \gamma K^0_S K^0_S$

[101] Calculated by us. ASNER 09 reports $B(\chi_{c0} \to K^0_S K^0_S) = (3.49 \pm 0.08 \pm 0.18 \pm 0.17) \times 10^{-3}$ using $B(\psi(2S) \to \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$.

$\Gamma(\chi_{c0}(1P) \to K^0_S K^0_S)/\Gamma_{\rm total} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{37}/\Gamma \times \Gamma^{\psi(2S)}_{105}/\Gamma^{\psi(2S)}_{11}$

VALUE (units 10^{-4})	*DOCUMENT ID*		*TECN*	*COMMENT*
9.1±0.5 OUR FIT				
5.6±0.8±1.3	[102] BAI	99B	BES	$\psi(2S) \to \gamma K^0_S K^0_S$

[102] Calculated by us. The value of $B(\chi_{c0} \to K^0_S K^0_S)$ reported by BAI 99B was derived using $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.3 \pm 0.8)\%$ and $B(\psi(2S) \to J/\psi\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$\Gamma(\chi_{c0}(1P) \to 2(\pi^+\pi^-))/\Gamma_{\rm total} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_1/\Gamma \times \Gamma^{\psi(2S)}_{105}/\Gamma^{\psi(2S)}_{11}$

VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
6.5±0.5 OUR FIT				
6.9±2.4 OUR AVERAGE Error includes scale factor of 3.8.				
4.4±0.1±0.9	[103] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c0}$
9.3±0.9	[104] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c0}$

[103] Calculated by us. The value for $B(\chi_{c0} \to 2\pi^+ 2\pi^-)$ reported in BAI 99B is derived using $B(\psi(2S) \to \gamma\chi_{c0}) = (9.3 \pm 0.8)\%$ and $B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

[104] The value $B(\psi(1S) \to \gamma\chi_{c0}) \times B(\chi_{c0} \to 2\pi^+ 2\pi^-)$ reported in TANENBAUM 78 is derived using $B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) \times B(J/\psi(1S) \to \ell^+\ell^-) = (4.6 \pm 0.7)\%$. Calculated by us using $B(J/\psi(1S) \to \ell^+\ell^-) = 0.1181 \pm 0.0020$.

$\Gamma(\chi_{c0}(1P) \to \pi^+\pi^- K^+ K^-)/\Gamma_{\rm total} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma_{\rm total}$ $\Gamma_7/\Gamma \times \Gamma^{\psi(2S)}_{105}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
1.73±0.13 OUR FIT				
1.64±0.05±0.2	ABLIKIM	05Q	BES2	$\psi(2S) \to \gamma\chi_{c0}$

$\Gamma(\chi_{c0}(1P) \to \pi^+\pi^- K^+ K^-)/\Gamma_{\rm total} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_7/\Gamma \times \Gamma^{\psi(2S)}_{105}/\Gamma^{\psi(2S)}_{11}$

VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*COMMENT*
5.2 ±0.4 OUR FIT				
5.8 ±1.6 OUR AVERAGE Error includes scale factor of 2.3.				
4.22±0.20±0.97	BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c0}$
7.4 ±1.0	[105] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c0}$

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

$\Gamma(\chi_{c0}(1P) \to K^+K^-K^+K^-)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma_{total}$ $\Gamma_{44}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2.70±0.27 OUR FIT					
3.20±0.11±0.41	278	[106] ABLIKIM	06T	BES2	$\psi(2S) \to \gamma 2K^+ 2K^-$

[106] Calculated by us. The value of $B(\chi_{c0} \to 2K^+2K^-)$ reported by ABLIKIM 06T was derived using $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.2 \pm 0.4)\%$.

$\Gamma(\chi_{c0}(1P) \to K^+K^-K^+K^-)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{44}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-4})	*DOCUMENT ID*		*TECN*	*COMMENT*
8.0±0.8 OUR FIT				
6.1±0.8±0.9	[107] BAI	99B	BES	$\psi(2S) \to \gamma 2K^+ 2K^-$

[107] Calculated by us. The value of $B(\chi_{c0} \to 2K^+2K^-)$ reported by BAI 99B was derived using $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.3 \pm 0.8)\%$ and $B(\psi(2S) \to J/\psi\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$\Gamma(\chi_{c0}(1P) \to \phi\phi)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma_{total}$ $\Gamma_{46}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma^{\psi(2S)}$

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.88±0.18 OUR FIT					
0.86±0.19±0.12	26	[108] ABLIKIM	06T	BES2	$\psi(2S) \to \gamma 2K^+ 2K^-$

[108] Calculated by us. The value of $B(\chi_{c0} \to \phi\phi)$ reported by ABLIKIM 06T was derived using $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.2 \pm 0.4)\%$.

$\Gamma(\chi_{c0}(1P) \to \phi\phi)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{46}/\Gamma \times \Gamma_{105}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-4})	*DOCUMENT ID*		*TECN*	*COMMENT*
2.6±0.5 OUR FIT				
2.6±1.0±1.1	[109] BAI	99B	BES	$\psi(2S) \to \gamma 2K^+ 2K^-$

[109] Calculated by us. The value of $B(\chi_{c0} \to \phi\phi)$ reported by BAI 99B was derived using $B(\psi(2S) \to \gamma\chi_{c0}(1P)) = (9.3 \pm 0.8)\%$ and $B(\psi(2S) \to J/\psi\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$\chi_{c0}(1P)$ REFERENCES

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 091501R	K.M. Ecklund *et al.*	(CLEO Collab.)
HE	08B	PR D78 092004	Q. He *et al.*	(CLEO Collab.)
MENDEZ	08	PR D78 011102R	H. Mendez *et al.*	(CLEO Collab.)
NAIK	08	PR D78 031101R	P. Naik *et al.*	(CLEO Collab.)
UEHARA	08	EPJ C53 1	S. Uehara *et al.*	(BELLE Collab.)
WICHT	08	PL B662 323	J. Wicht *et al.*	(BELLE Collab.)
ABE	07	PRL 98 082001	K. Abe *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.)
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.)
ABLIKIM	05Q	PR D72 092002	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.)
ANDREOTTI	05C	PR D72 112002	M. Andreotti *et al.*	(FNAL E835 Collab.)
NAKAZAWA	05	PL B615 39	H. Nakazawa *et al.*	(BELLE Collab.)
ABE	04G	PR D70 071102	K. Abe *et al.*	(BELLE Collab.)
ABLIKIM	04G	PR D70 092002	M. Ablikim *et al.*	(BES Collab.)
ABLIKIM	04H	PR D70 092003	M. Ablikim *et al.*	(BES Collab.)
ANDREOTTI	04	PL B584 16	M. Andreotti *et al.*	(E835 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.)
ANDREOTTI	03	PRL 91 091801	M. Andreotti *et al.*	(FNAL E835 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,K	02	PRL 89 142001	K. Abe *et al.*	(BELLE Collab.)
BAGNASCO	02	PL B533 237	S. Bagnasco *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.)
AMBROGIANI	99B	PRL 83 2902	M. Ambrogiani *et al.*	(FNAL E835 Collab.)
BAI	99B	PR D60 072001	J.Z. Bai *et al.*	(BES 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.)
GAISER	86	PR D34 711	J. Gaiser *et al.*	(Crystal Ball Collab.)
LEE	85	SLAC 282	R.A. Lee	(SLAC)
OREGLIA	82	PR D25 2259	M.J. Oreglia *et al.*	(SLAC, CIT, HARV+)
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+)