

$\chi_{c0}(1P)$

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

$\chi_{c0}(1P)$ 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	$\gamma\gamma \rightarrow \chi_{c0} \rightarrow \text{hadrons}$
3406 ± 7 ± 6	230	¹ ABE	07 BELL	$e^+e^- \rightarrow J/\psi(c\bar{c})$
3414.21 ± 0.39 ± 0.27		ABLIKIM	05G BES2	$\psi(2S) \rightarrow \gamma\chi_{c0}$
3414.7 ^{+0.7} _{-0.6} ± 0.2		² ANDREOTTI	03 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow \pi^0\pi^0$
3415.5 ± 0.4 ± 0.4	392	³ BAGNASCO	02 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$
3417.4 ^{+1.8} _{-1.9} ± 0.2		² AMBROGIANI	99B E835	$\bar{p}p \rightarrow e^+e^-\gamma$
3414.1 ± 0.6 ± 0.8		BAI	99B BES	$\psi(2S) \rightarrow \gamma X$
3417.8 ± 0.4 ± 4		² GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X$
3416 ± 3 ± 4		⁴ TANENBAUM	78 MRK1	e^+e^-
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
3414.6 ± 1.1	266	UEHARA	13 BELL	$\gamma\gamma \rightarrow K_S^0 K_S^0$
3416.5 ± 3.0		EISENSTEIN	01 CLE2	$e^+e^- \rightarrow e^+e^-\chi_{c0}$
3422 ± 10		⁴ BARTEL	78B CNTR	$e^+e^- \rightarrow J/\psi 2\gamma$
3415 ± 9		⁴ BIDDICK	77 CNTR	$e^+e^- \rightarrow \gamma X$

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
10.5 ± 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	$\gamma\gamma \rightarrow \chi_{c0} \rightarrow \text{hadrons}$
12.6 ^{+1.5+0.9} _{-1.6-1.1}		ABLIKIM	05G BES2	$\psi(2S) \rightarrow \gamma\chi_{c0}$
8.6 ^{+1.7} _{-1.3} ± 0.1		ANDREOTTI	03 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow \pi^0\pi^0$
9.7 ± 1.0	392	¹ BAGNASCO	02 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$
16.6 ^{+5.2} _{-3.7} ± 0.1		AMBROGIANI	99B E835	$\bar{p}p \rightarrow e^+e^-\gamma$
14.3 ± 2.0 ± 3.0		BAI	98I BES	$\psi(2S) \rightarrow \gamma\pi^+\pi^-$
13.5 ± 3.3 ± 4.2		GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X, \gamma\pi^0\pi^0$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
13.2 ± 2.1	266	UEHARA	13 BELL	$\gamma\gamma \rightarrow K_S^0 K_S^0$

¹ Recalculated by ANDREOTTI 05A.

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

Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	
Hadronic decays			
Γ_1	$2(\pi^+\pi^-)$	$(2.24 \pm 0.18) \%$	
Γ_2	$\rho^0 \pi^+ \pi^-$	$(8.7 \pm 2.8) \times 10^{-3}$	
Γ_3	$\rho^0 \rho^0$		
Γ_4	$f_0(980) f_0(980)$	$(6.5 \pm 2.1) \times 10^{-4}$	
Γ_5	$\pi^+ \pi^- \pi^0 \pi^0$	$(3.3 \pm 0.4) \%$	
Γ_6	$\rho^+ \pi^- \pi^0 + \text{c.c.}$	$(2.8 \pm 0.4) \%$	
Γ_7	$4\pi^0$	$(3.2 \pm 0.4) \times 10^{-3}$	
Γ_8	$\pi^+ \pi^- K^+ K^-$	$(1.75 \pm 0.14) \%$	
Γ_9	$K_0^*(1430)^0 \bar{K}_0^*(1430)^0 \rightarrow$ $\pi^+ \pi^- K^+ K^-$	$(9.6 \begin{smallmatrix} +3.5 \\ -2.8 \end{smallmatrix}) \times 10^{-4}$	
Γ_{10}	$K_0^*(1430)^0 \bar{K}_2^*(1430)^0 + \text{c.c.} \rightarrow$ $\pi^+ \pi^- K^+ K^-$	$(7.8 \begin{smallmatrix} +1.9 \\ -2.4 \end{smallmatrix}) \times 10^{-4}$	
Γ_{11}	$K_1(1270)^+ K^- + \text{c.c.} \rightarrow$ $\pi^+ \pi^- K^+ K^-$	$(6.1 \pm 1.9) \times 10^{-3}$	
Γ_{12}	$K_1(1400)^+ K^- + \text{c.c.} \rightarrow$ $\pi^+ \pi^- K^+ K^-$	$< 2.6 \times 10^{-3}$	CL=90%
Γ_{13}	$f_0(980) f_0(980)$	$(1.6 \begin{smallmatrix} +1.0 \\ -0.9 \end{smallmatrix}) \times 10^{-4}$	
Γ_{14}	$f_0(980) f_0(2200)$	$(7.8 \begin{smallmatrix} +2.0 \\ -2.5 \end{smallmatrix}) \times 10^{-4}$	
Γ_{15}	$f_0(1370) f_0(1370)$	$< 2.7 \times 10^{-4}$	CL=90%
Γ_{16}	$f_0(1370) f_0(1500)$	$< 1.7 \times 10^{-4}$	CL=90%
Γ_{17}	$f_0(1370) f_0(1710)$	$(6.6 \begin{smallmatrix} +3.5 \\ -2.3 \end{smallmatrix}) \times 10^{-4}$	
Γ_{18}	$f_0(1500) f_0(1370)$	$< 1.3 \times 10^{-4}$	CL=90%
Γ_{19}	$f_0(1500) f_0(1500)$	$< 5 \times 10^{-5}$	CL=90%
Γ_{20}	$f_0(1500) f_0(1710)$	$< 7 \times 10^{-5}$	CL=90%
Γ_{21}	$K^+ K^- \pi^+ \pi^- \pi^0$	$(8.6 \pm 0.9) \times 10^{-3}$	
Γ_{22}	$K_S^0 K^\pm \pi^\mp \pi^+ \pi^-$	$(4.2 \pm 0.4) \times 10^{-3}$	
Γ_{23}	$K^+ K^- \pi^0 \pi^0$	$(5.4 \pm 0.9) \times 10^{-3}$	
Γ_{24}	$K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.}$	$(2.44 \pm 0.33) \%$	
Γ_{25}	$\rho^+ K^- K^0 + \text{c.c.}$	$(1.18 \pm 0.21) \%$	
Γ_{26}	$K^*(892)^- K^+ \pi^0 \rightarrow$ $K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.}$	$(4.5 \pm 1.1) \times 10^{-3}$	
Γ_{27}	$K_S^0 K_S^0 \pi^+ \pi^-$	$(5.6 \pm 1.0) \times 10^{-3}$	
Γ_{28}	$K^+ K^- \eta \pi^0$	$(3.0 \pm 0.7) \times 10^{-3}$	
Γ_{29}	$3(\pi^+ \pi^-)$	$(1.20 \pm 0.18) \%$	
Γ_{30}	$K^+ \bar{K}^*(892)^0 \pi^- + \text{c.c.}$	$(7.2 \pm 1.6) \times 10^{-3}$	
Γ_{31}	$K^*(892)^0 \bar{K}^*(892)^0$	$(1.7 \pm 0.6) \times 10^{-3}$	
Γ_{32}	$\pi \pi$	$(8.33 \pm 0.35) \times 10^{-3}$	

Γ_{33}	$\pi^0 \eta$	< 1.8	$\times 10^{-4}$	
Γ_{34}	$\pi^0 \eta'$	< 1.1	$\times 10^{-3}$	
Γ_{35}	$\pi^0 \eta_c$	< 1.6	$\times 10^{-3}$	CL=90%
Γ_{36}	$\eta \eta$	(2.95 ± 0.19)	$\times 10^{-3}$	
Γ_{37}	$\eta \eta'$	< 2.3	$\times 10^{-4}$	CL=90%
Γ_{38}	$\eta' \eta'$	(1.96 ± 0.21)	$\times 10^{-3}$	
Γ_{39}	$\omega \omega$	(9.5 ± 1.1)	$\times 10^{-4}$	
Γ_{40}	$\omega \phi$	(1.16 ± 0.21)	$\times 10^{-4}$	
Γ_{41}	$\omega K^+ K^-$	(1.94 ± 0.21)	$\times 10^{-3}$	
Γ_{42}	$K^+ K^-$	(5.91 ± 0.32)	$\times 10^{-3}$	
Γ_{43}	$K_S^0 K_S^0$	(3.10 ± 0.18)	$\times 10^{-3}$	
Γ_{44}	$\pi^+ \pi^- \eta$	< 1.9	$\times 10^{-4}$	CL=90%
Γ_{45}	$\pi^+ \pi^- \eta'$	< 3.5	$\times 10^{-4}$	CL=90%
Γ_{46}	$\bar{K}^0 K^+ \pi^- + \text{c.c.}$	< 9	$\times 10^{-5}$	CL=90%
Γ_{47}	$K^+ K^- \pi^0$	< 6	$\times 10^{-5}$	CL=90%
Γ_{48}	$K^+ K^- \eta$	< 2.2	$\times 10^{-4}$	CL=90%
Γ_{49}	$K^+ K^- K_S^0 K_S^0$	(1.4 ± 0.5)	$\times 10^{-3}$	
Γ_{50}	$K^+ K^- K^+ K^-$	(2.75 ± 0.28)	$\times 10^{-3}$	
Γ_{51}	$K^+ K^- \phi$	(9.5 ± 2.4)	$\times 10^{-4}$	
Γ_{52}	$\bar{K}^0 K^+ \pi^- \phi + \text{c.c.}$	(3.7 ± 0.6)	$\times 10^{-3}$	
Γ_{53}	$K^+ K^- \pi^0 \phi$	(1.90 ± 0.35)	$\times 10^{-3}$	
Γ_{54}	$\phi \pi^+ \pi^- \pi^0$	(1.18 ± 0.15)	$\times 10^{-3}$	
Γ_{55}	$\phi \phi$	(7.7 ± 0.7)	$\times 10^{-4}$	
Γ_{56}	$\rho \bar{\rho}$	(2.25 ± 0.09)	$\times 10^{-4}$	
Γ_{57}	$\rho \bar{\rho} \pi^0$	(6.8 ± 0.7)	$\times 10^{-4}$	S=1.3
Γ_{58}	$\rho \bar{\rho} \eta$	(3.5 ± 0.4)	$\times 10^{-4}$	
Γ_{59}	$\rho \bar{\rho} \omega$	(5.1 ± 0.6)	$\times 10^{-4}$	
Γ_{60}	$\rho \bar{\rho} \phi$	(5.9 ± 1.4)	$\times 10^{-5}$	
Γ_{61}	$\rho \bar{\rho} \pi^+ \pi^-$	(2.1 ± 0.7)	$\times 10^{-3}$	S=1.4
Γ_{62}	$\rho \bar{\rho} \pi^0 \pi^0$	(1.02 ± 0.27)	$\times 10^{-3}$	
Γ_{63}	$\rho \bar{\rho} K^+ K^-$ (non-resonant)	(1.19 ± 0.26)	$\times 10^{-4}$	
Γ_{64}	$\rho \bar{\rho} K_S^0 K_S^0$	< 8.8	$\times 10^{-4}$	CL=90%
Γ_{65}	$\rho \bar{n} \pi^-$	(1.24 ± 0.11)	$\times 10^{-3}$	
Γ_{66}	$\bar{\rho} n \pi^+$	(1.34 ± 0.12)	$\times 10^{-3}$	
Γ_{67}	$\rho \bar{n} \pi^- \pi^0$	(2.29 ± 0.21)	$\times 10^{-3}$	
Γ_{68}	$\bar{\rho} n \pi^+ \pi^0$	(2.16 ± 0.18)	$\times 10^{-3}$	
Γ_{69}	$\Lambda \bar{\Lambda}$	(3.21 ± 0.25)	$\times 10^{-4}$	
Γ_{70}	$\Lambda \bar{\Lambda} \pi^+ \pi^-$	(1.15 ± 0.13)	$\times 10^{-3}$	
Γ_{71}	$\Lambda \bar{\Lambda} \pi^+ \pi^-$ (non-resonant)	< 5	$\times 10^{-4}$	CL=90%
Γ_{72}	$\Sigma(1385)^+ \bar{\Lambda} \pi^- + \text{c.c.}$	< 5	$\times 10^{-4}$	CL=90%
Γ_{73}	$\Sigma(1385)^- \bar{\Lambda} \pi^+ + \text{c.c.}$	< 5	$\times 10^{-4}$	CL=90%
Γ_{74}	$K^+ \bar{\rho} \Lambda + \text{c.c.}$	(1.22 ± 0.12)	$\times 10^{-3}$	S=1.3
Γ_{75}	$K^+ \bar{\rho} \Lambda(1520) + \text{c.c.}$	(2.9 ± 0.7)	$\times 10^{-4}$	
Γ_{76}	$\Lambda(1520) \bar{\Lambda}(1520)$	(3.1 ± 1.2)	$\times 10^{-4}$	

Γ_{77}	$\Sigma^0 \bar{\Sigma}^0$	$(4.4 \pm 0.4) \times 10^{-4}$	
Γ_{78}	$\Sigma^+ \bar{\Sigma}^-$	$(3.9 \pm 0.7) \times 10^{-4}$	S=1.7
Γ_{79}	$\Sigma(1385)^+ \bar{\Sigma}(1385)^-$	$(1.6 \pm 0.6) \times 10^{-4}$	
Γ_{80}	$\Sigma(1385)^- \bar{\Sigma}(1385)^+$	$(2.3 \pm 0.6) \times 10^{-4}$	
Γ_{81}	$K^- \Lambda \bar{\Xi}^+ + \text{c.c.}$	$(1.90 \pm 0.34) \times 10^{-4}$	
Γ_{82}	$\Xi^0 \bar{\Xi}^0$	$(3.1 \pm 0.8) \times 10^{-4}$	
Γ_{83}	$\Xi^- \bar{\Xi}^+$	$(4.7 \pm 0.7) \times 10^{-4}$	
Γ_{84}	$\eta_c \pi^+ \pi^-$	$< 7 \times 10^{-4}$	CL=90%

Radiative decays

Γ_{85}	$\gamma J/\psi(1S)$	$(1.27 \pm 0.06) \%$	
Γ_{86}	$\gamma \rho^0$	$< 9 \times 10^{-6}$	CL=90%
Γ_{87}	$\gamma \omega$	$< 8 \times 10^{-6}$	CL=90%
Γ_{88}	$\gamma \phi$	$< 6 \times 10^{-6}$	CL=90%
Γ_{89}	$\gamma \gamma$	$(2.23 \pm 0.13) \times 10^{-4}$	

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, 25 combinations of partial widths obtained from integrated cross section, and 84 branching ratios uses 240 measurements to determine 49 parameters. The overall fit has a $\chi^2 = 342.4$ for 191 degrees of freedom.

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

x_2	25									
x_8	14	4								
x_{30}	7	2	29							
x_{32}	15	4	16	5						
x_{36}	8	2	9	3	21					
x_{42}	13	3	14	5	28	17				
x_{43}	12	3	13	4	27	16	22			
x_{50}	9	2	8	3	14	8	12	11		
x_{55}	10	3	10	4	14	9	12	12	7	
x_{56}	7	2	9	3	13	6	15	15	8	8
x_{69}	8	2	9	3	20	12	17	16	8	9
x_{85}	4	1	5	1	14	9	10	10	5	5
x_{89}	-16	-4	-9	-6	5	4	2	4	-2	-4
Γ	-22	-6	-17	-8	-16	-9	-15	-14	-10	-13
	x_1	x_2	x_8	x_{30}	x_{32}	x_{36}	x_{42}	x_{43}	x_{50}	x_{55}

χ_{69}	11			
χ_{85}	-21	8		
χ_{89}	2	4	9	
Γ	-7	-9	-8	-48
	χ_{56}	χ_{69}	χ_{85}	χ_{89}

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

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

$\Gamma(p\bar{p}) \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$ $\Gamma_{56}\Gamma_{85}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
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30.0 ± 2.3 OUR FIT

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

26.6 ± 2.6 ± 1.4	392	1,2 BAGNASCO 02	E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$
48.7 ^{+11.3} _{-8.9} ± 2.4		1,2 AMBROGIANI 99B	E835	$\bar{p}p \rightarrow \gamma J/\psi$

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

² Values in $(\Gamma(p\bar{p}) \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}})$ and $(\Gamma(p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}})$ are not independent. The latter is used in the fit since it is less correlated to the total width.

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

$\Gamma(2(\pi^+\pi^-)) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_1\Gamma_{89}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
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53 ± 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	$\gamma\gamma \rightarrow \chi_{c0} \rightarrow 2(\pi^+\pi^-)$
75 ± 13 ± 8		EISENSTEIN 01	CLE2	$e^+e^- \rightarrow e^+e^-\chi_{c0}$

$\Gamma(\rho^0\rho^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_3\Gamma_{89}/\Gamma$

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

<12	90	<252	UEHARA 08	BELL	$\gamma\gamma \rightarrow \chi_{c0} \rightarrow 2(\pi^+\pi^-)$
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$\Gamma(\pi^+\pi^-K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_8\Gamma_{89}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
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41 ± 4 OUR FIT

38.8 ± 3.7 ± 4.7	1.7k	UEHARA 08	BELL	$\gamma\gamma \rightarrow \chi_{c0} \rightarrow K^+K^-\pi^+\pi^-$
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$\Gamma(K^+K^-\pi^+\pi^-\pi^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{21}\Gamma_{89}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
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26 ± 4 ± 4	1094	DEL-AMO-SA..11M	BABR	$\gamma\gamma \rightarrow K^+K^-\pi^+\pi^-\pi^0$
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$\Gamma(K^+\bar{K}^*(892)^0\pi^- + \text{c.c.}) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{30}\Gamma_{89}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
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17 ± 4 OUR FIT

16.7 ± 6.1 ± 3.0	495 ± 182	UEHARA 08	BELL	$\gamma\gamma \rightarrow \chi_{c0} \rightarrow K^+K^-\pi^+\pi^-$
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$\Gamma(K^*(892)^0 \bar{K}^*(892)^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{31}\Gamma_{89}/\Gamma$

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

<6	90	<148	UEHARA	08	BELL $\gamma\gamma \rightarrow \chi_{c0} \rightarrow K^+ K^- \pi^+ \pi^-$
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$\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{32}\Gamma_{89}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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19.5 ± 1.4 OUR FIT

23 ± 5 OUR AVERAGE

29.7 ^{+17.4} _{-12.0} ± 4.8	103 ⁺⁶⁰ ₋₄₂	¹ UEHARA	09	BELL	10.6 $e^+ e^- \rightarrow e^+ e^- \pi^0 \pi^0$
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22.7 ± 3.2 ± 3.5	129 ± 18	² NAKAZAWA	05	BELL	10.6 $e^+ e^- \rightarrow e^+ e^- \pi^+ \pi^-$
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¹ We multiplied the measurement by 3 to convert from $\pi^0 \pi^0$ to $\pi\pi$. Interference with the continuum included.

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

$\Gamma(\eta\eta) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{36}\Gamma_{89}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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9.4 ± 2.3 ± 1.2	22	¹ UEHARA	10A	BELL	10.6 $e^+ e^- \rightarrow e^+ e^- \eta\eta$
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¹ Interference with the continuum not included.

$\Gamma(\omega\omega) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{39}\Gamma_{89}/\Gamma$

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

<3.9	90	¹ LIU	12B	BELL	$\gamma\gamma \rightarrow 2(\pi^+ \pi^- \pi^0)$
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¹ Using $B(\omega \rightarrow \pi^+ \pi^- \pi^0) = (89.2 \pm 0.7)\%$.

$\Gamma(\omega\phi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{40}\Gamma_{89}/\Gamma$

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

<0.34	90	¹ LIU	12B	BELL	$\gamma\gamma \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$
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¹ Using $B(\phi \rightarrow K^+ K^-) = (48.9 \pm 0.5)\%$ and $B(\omega \rightarrow \pi^+ \pi^- \pi^0) = (89.2 \pm 0.7)\%$.

$\Gamma(K^+ K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{42}\Gamma_{89}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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13.9 ± 1.1 OUR FIT

14.3 ± 1.6 ± 2.3	153 ± 17	NAKAZAWA	05	BELL	10.6 $e^+ e^- \rightarrow e^+ e^- K^+ K^-$
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$\Gamma(K_S^0 K_S^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{43}\Gamma_{89}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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7.3 ± 0.6 OUR FIT

8.7 ± 1.7 ± 0.9	266	¹ UEHARA	13	BELL	$\gamma\gamma \rightarrow K_S^0 K_S^0$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

7.00 ± 0.65 ± 0.71	134 ± 12	CHEN	07B	BELL	$e^+ e^- \rightarrow e^+ e^- \chi_{c0}$
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¹ Supersedes CHEN 07B.

$\Gamma(K^+K^-K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{50}\Gamma_{89}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
6.4±0.7 OUR FIT				
7.9±1.3±1.1	215 ± 36	UEHARA	08 BELL	$\gamma\gamma \rightarrow \chi_{c0} \rightarrow 2(K^+K^-)$

$\Gamma(\phi\phi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{55}\Gamma_{89}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
1.82±0.19 OUR FIT				
1.72±0.33±0.14	56 ± 11	¹ LIU	12B BELL	$\gamma\gamma \rightarrow 2(K^+K^-)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.3 ± 0.9 ± 0.4	23.6 ± 9.6	UEHARA	08 BELL	$\gamma\gamma \rightarrow \chi_{c0} \rightarrow 2(K^+K^-)$
¹ Supersedes UEHARA 08. Using $B(\phi \rightarrow K^+K^-) = (48.9 \pm 0.5)\%$.				

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

———— HADRONIC DECAYS ————

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

VALUE	DOCUMENT ID
0.0224±0.0018 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	$\psi(2S) \rightarrow \gamma\chi_{c0}$

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

VALUE	DOCUMENT ID
0.0087±0.0028 OUR FIT	

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

VALUE (units 10 ⁻⁴)	EVTS	DOCUMENT ID	TECN	COMMENT
6.5±2.1±0.2	36 ± 9	¹ ABLIKIM	04G BES	$\psi(2S) \rightarrow \gamma 2\pi^+ 2\pi^-$

¹ ABLIKIM 04G reports $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(980)f_0(980))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))] = (6.5 \pm 1.6 \pm 1.3) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
3.3±0.4±0.1	1751.4	¹ HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $3.54 \pm 0.10 \pm 0.43 \pm 0.18 \%$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \pi^+\pi^-\pi^0\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(\rho^+\pi^-\pi^0 + \text{c.c.})/\Gamma_{\text{total}} \quad \Gamma_6/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
2.8±0.4±0.1	1358.5	^{1,2} HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $3.04 \pm 0.18 \pm 0.42 \pm 0.16$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \rho^+\pi^-\pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² 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.

$$\Gamma(4\pi^0)/\Gamma_{\text{total}} \quad \Gamma_7/\Gamma$$

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
3.2±0.4±0.1	3296	¹ ABLIKIM	11A BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$

¹ ABLIKIM 11A reports $(3.34 \pm 0.06 \pm 0.44) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow 4\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(\pi^+\pi^-K^+K^-)/\Gamma_{\text{total}} \quad \Gamma_8/\Gamma$$

VALUE (units 10^{-3})	DOCUMENT ID
17.5±1.4 OUR FIT	

$$\Gamma(K^+\bar{K}^*(892)^0\pi^- + \text{c.c.})/\Gamma(\pi^+\pi^-K^+K^-) \quad \Gamma_{30}/\Gamma_8$$

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

$$\Gamma(K_0^*(1430)^0\bar{K}_0^*(1430)^0 \rightarrow \pi^+\pi^-K^+K^-)/\Gamma_{\text{total}} \quad \Gamma_9/\Gamma$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
9.6^{+3.5}_{-2.8}±0.3	83	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

¹ ABLIKIM 05Q reports $(10.44 \pm 2.37^{+3.05}_{-1.90}) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K_0^*(1430)^0\bar{K}_0^*(1430)^0 \rightarrow \pi^+\pi^-K^+K^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(K_0^*(1430)^0\bar{K}_2^*(1430)^0 + \text{c.c.} \rightarrow \pi^+\pi^-K^+K^-)/\Gamma_{\text{total}} \quad \Gamma_{10}/\Gamma$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
7.8^{+1.9}_{-2.4}±0.2	62	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

¹ ABLIKIM 05Q reports $(8.49 \pm 1.66 \pm 1.32) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K_0^*(1430)^0 \bar{K}_2^*(1430)^0 + \text{c.c.} \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K_1(1270)^+ K^- + \text{c.c.} \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}}$ Γ_{11} / Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$6.1 \pm 1.9 \pm 1.8 \pm 0.2$	68	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$

¹ ABLIKIM 05Q reports $(6.66 \pm 1.31 \pm 1.60) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K_1(1270)^+ K^- + \text{c.c.} \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. The measurement assumes $B(K_1(1270) \rightarrow K \rho(770)) = 42 \pm 6\%$.

$\Gamma(K_1(1400)^+ K^- + \text{c.c.} \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}}$ Γ_{12} / Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
< 2.6	90	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$

¹ ABLIKIM 05Q reports $< 2.85 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K_1(1400)^+ K^- + \text{c.c.} \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.99 \times 10^{-2}$. The measurement assumes $B(K_1(1400) \rightarrow K^*(892) \pi) = 94 \pm 6\%$.

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

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
$15.9 \pm 10.2 \pm 8.8 \pm 0.4$	28	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$

¹ ABLIKIM 05Q reports $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(980) f_0(980)) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))] = (1.59 \pm 0.50 \pm 0.89 \pm 0.72) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. 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_{14} / Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$7.8 \pm 2.0 \pm 2.5 \pm 0.2$	77	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$

¹ ABLIKIM 05Q reports $(8.42 \pm 1.42 \pm 1.65 \pm 2.29) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(980) f_0(2200)) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. 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 $f_0(980) \rightarrow \pi^+ \pi^-$ and $f_0(2200) \rightarrow K^+ K^-$ decays.

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

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<2.7	90	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$
¹ ABLIKIM 05Q reports $< 2.9 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(1370)f_0(1370))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$. 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.				

 $\Gamma(f_0(1370)f_0(1500))/\Gamma_{\text{total}}$ Γ_{16}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<1.7	90	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$
¹ ABLIKIM 05Q reports $< 1.8 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(1370)f_0(1500))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$. The f_0 mesons are identified via $f_0(1370) \rightarrow \pi^+\pi^-$ and $f_0(1500) \rightarrow K^+K^-$ decays. Both branching fractions for these f_0 decays are implicitly included in the quoted result.				

 $\Gamma(f_0(1370)f_0(1710))/\Gamma_{\text{total}}$ Γ_{17}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$6.6^{+3.5}_{-2.3} \pm 0.2$	61	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$
¹ ABLIKIM 05Q reports $(7.12 \pm 1.85^{+3.28}_{-1.68}) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(1370)f_0(1710))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. 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 $f_0(1370) \rightarrow \pi^+\pi^-$ and $f_0(1710) \rightarrow K^+K^-$ decays. Both branching fractions for these f_0 decays are implicitly included in the quoted result.				

 $\Gamma(f_0(1500)f_0(1370))/\Gamma_{\text{total}}$ Γ_{18}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<1.3	90	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$
¹ ABLIKIM 05Q reports $< 1.4 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(1500)f_0(1370))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$. The f_0 mesons are identified via $f_0(1500) \rightarrow \pi^+\pi^-$ and $f_0(1370) \rightarrow K^+K^-$ decays. Both branching fractions for these f_0 decays are implicitly included in the quoted result.				

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

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<0.5	90	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

¹ ABLIKIM 05Q reports $< 0.55 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(1500) f_0(1500))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.99 \times 10^{-2}$. 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.

$\Gamma(f_0(1500) f_0(1710))/\Gamma_{\text{total}}$ Γ_{20}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<0.7	90	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$

¹ ABLIKIM 05Q reports $< 0.73 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(1500) f_0(1710))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.99 \times 10^{-2}$. The f_0 mesons are identified via $f_0(1500) \rightarrow \pi^+ \pi^-$ and $f_0(1710) \rightarrow K^+ K^-$ decays. Both branching fractions for these f_0 decays are implicitly included in the quoted result.

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

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$8.61 \pm 0.13 \pm 0.94$	9.0k	¹ ABLIKIM	13B BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c0}$

¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c0} \gamma) = (9.68 \pm 0.31)\%$.

$\Gamma(K_S^0 K^\pm \pi^\mp \pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{22}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$4.22 \pm 0.10 \pm 0.43$	2.7k	¹ ABLIKIM	13B BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c0}$

¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c0} \gamma) = (9.68 \pm 0.31)\%$.

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
$0.54 \pm 0.09 \pm 0.01$	213.5	¹ HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $0.59 \pm 0.05 \pm 0.08 \pm 0.03$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- \pi^0 \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
$2.44 \pm 0.32 \pm 0.07$	401.7	¹ HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $2.64 \pm 0.15 \pm 0.31 \pm 0.14$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. 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_{25}/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.18±0.20±0.03	179.7	¹ HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $1.28 \pm 0.16 \pm 0.15 \pm 0.07$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \rho^+ K^- K^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^*(892)^- K^+ \pi^0 \rightarrow K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{26}/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.45±0.11±0.01	64.1	¹ HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $0.49 \pm 0.10 \pm 0.07 \pm 0.03$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^*(892)^- K^+ \pi^0 \rightarrow K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K_S^0 K_S^0 \pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{27}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
5.6±1.0±0.2	152 ± 14	¹ ABLIKIM	050 BES2	$\psi(2S) \rightarrow \gamma \chi_{c0}$

¹ ABLIKIM 050 reports $[\Gamma(\chi_{c0}(1P) \rightarrow K_S^0 K_S^0 \pi^+ \pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ = $(0.558 \pm 0.051 \pm 0.089) \times 10^{-3}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+ K^- \eta \pi^0)/\Gamma_{\text{total}}$ Γ_{28}/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.30±0.07±0.01	56.4	¹ HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $0.32 \pm 0.05 \pm 0.05 \pm 0.02$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- \eta \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(3(\pi^+ \pi^-))/\Gamma_{\text{total}}$ Γ_{29}/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	¹ BAI	99B BES	$\psi(2S) \rightarrow \gamma \chi_{c0}$
12.5±2.9±0.5	¹ TANENBAUM	78 MRK1	$\psi(2S) \rightarrow \gamma \chi_{c0}$

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

$\Gamma(K^+ \bar{K}^*(892)^0 \pi^- + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{30}/Γ

VALUE	DOCUMENT ID
0.0072±0.0016 OUR FIT	

$\Gamma(K^*(892)^0 \bar{K}^*(892)^0)/\Gamma_{\text{total}}$ Γ_{31}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$1.68^{+0.59}_{-0.53} \pm 0.05$	64	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$

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

$1.53 \pm 0.39 \pm 0.04$ 30 ± 6 ^{2,3} ABLIKIM 04H BES Repl. by ABLIKIM 05Q

¹ ABLIKIM 05Q reports $[\Gamma(\chi_{c0}(1P) \rightarrow K^*(892)^0 \bar{K}^*(892)^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ = $(0.168 \pm 0.035^{+0.047}_{-0.040}) \times 10^{-3}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² Assumes $B(K^*(892)^0 \rightarrow K^- \pi^+) = 2/3$.

³ ABLIKIM 04H reports $[\Gamma(\chi_{c0}(1P) \rightarrow K^*(892)^0 \bar{K}^*(892)^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ = $(1.53 \pm 0.29 \pm 0.26) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units 10^{-3})	DOCUMENT ID
8.33 ± 0.35 OUR FIT	

$\Gamma(\pi^0 \eta_c)/\Gamma_{\text{total}}$ Γ_{35}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.6 \times 10^{-3}$	90	¹ ABLIKIM	15N BES3	$\psi(2s) e^+ e^- \rightarrow \gamma \pi^0 \eta_c$

¹ Using $B(\eta_c \rightarrow K_S^0 K^\pm \pi^\mp) \times B(K_S^0 \rightarrow \pi^+ \pi^-) \times B(\pi^0 \rightarrow \gamma \gamma) = (1.66 \pm 0.11) \times 10^{-2}$.

$\Gamma(\eta \eta)/\Gamma_{\text{total}}$ Γ_{36}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
2.95 ± 0.19 OUR FIT	

$\Gamma(\eta \eta)/\Gamma(\pi \pi)$ Γ_{36}/Γ_{32}

VALUE	DOCUMENT ID	TECN	COMMENT
0.354 ± 0.025 OUR FIT			

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

$0.26 \pm 0.09^{+0.03}_{-0.02}$ ¹ ANDREOTTI 05C E835 $\bar{p} p \rightarrow 2$ mesons

$0.24 \pm 0.10 \pm 0.08$ ¹ BAI 03C BES $\psi(2S) \rightarrow 5\gamma$

¹ We have multiplied $\pi^0 \pi^0$ measurement by 3 to obtain $\pi \pi$.

$\Gamma(\eta \eta')/\Gamma_{\text{total}}$ Γ_{37}/Γ

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
< 0.23	90	35 ± 13	¹ ASNER	09 CLEO	$\psi(2S) \rightarrow \gamma \eta' \eta$

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

< 0.5 90 ² ADAMS 07 CLEO $\psi(2S) \rightarrow \gamma \chi_{c0}$

¹ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

² 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

$\Gamma(\eta'\eta')/\Gamma_{\text{total}}$ **Γ_{38}/Γ**

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
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1.96±0.20±0.05	0.4k	¹ ASNER 09	CLEO	$\psi(2S) \rightarrow \gamma\eta'\eta'$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

1.57±0.40±0.04	23	² ADAMS 07	CLEO	$\psi(2S) \rightarrow \gamma\chi_{c0}$
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¹ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. 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_{39}/Γ**

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
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0.95±0.11 OUR AVERAGE

0.91±0.11±0.02	991	¹ ABLIKIM 11K	BES3	$\psi(2S) \rightarrow \gamma$ hadrons
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2.1 ±0.6 ±0.1	38.1 ±9.6	² ABLIKIM 05N	BES2	$\psi(2S) \rightarrow \gamma\chi_{c0} \rightarrow \gamma 6\pi$
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¹ ABLIKIM 11K reports $(0.95 \pm 0.03 \pm 0.11) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \omega\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\omega\phi)/\Gamma_{\text{total}}$ **Γ_{40}/Γ**

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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1.16±0.21±0.03	76	¹ ABLIKIM 11K	BES3	$\psi(2S) \rightarrow \gamma$ hadrons
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¹ ABLIKIM 11K reports $(1.2 \pm 0.1 \pm 0.2) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \omega\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
1.94±0.06±0.20	1.4k	¹ ABLIKIM	13B	BES3 $e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$

¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c0}\gamma) = (9.68 \pm 0.31)\%$.

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

VALUE (units 10^{-3})	DOCUMENT ID
5.91±0.32 OUR FIT	

 $\Gamma(K_S^0 K_S^0)/\Gamma_{\text{total}}$ Γ_{43}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
3.10±0.18 OUR FIT	

 $\Gamma(K_S^0 K_S^0)/\Gamma(\pi\pi)$ Γ_{43}/Γ_{32}

VALUE	DOCUMENT ID	TECN	COMMENT
0.372±0.023 OUR FIT			

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

0.31 ±0.05 ±0.05	^{1,2} CHEN	07B	BELL	$e^+e^- \rightarrow e^+e^-\chi_{c0}$
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¹ 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 $\pi\pi$.

² Not independent from other measurements.

 $\Gamma(K_S^0 K_S^0)/\Gamma(K^+ K^-)$ Γ_{43}/Γ_{42}

VALUE	DOCUMENT ID	TECN	COMMENT
0.52±0.04 OUR FIT			

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

0.49±0.07±0.08	^{1,2} CHEN	07B	BELL	$e^+e^- \rightarrow e^+e^-\chi_{c0}$
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¹ Using $\Gamma(K^+ K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ from NAKAZAWA 05.

² Not independent from other measurements.

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

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<0.19	90	¹ ATHAR	07	CLEO $\psi(2S) \rightarrow \gamma h^+ h^- h^0$

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

<1.0	90	² ABLIKIM	06R	BES2 $\psi(2S) \rightarrow \gamma\chi_{c0}$
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¹ ATHAR 07 reports $< 0.21 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \pi^+\pi^-\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

² ABLIKIM 06R reports $< 1.1 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \pi^+\pi^-\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

 $\Gamma(\pi^+ \pi^- \eta')/\Gamma_{\text{total}}$ Γ_{45}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<0.35	90	¹ ATHAR	07	CLEO $\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ATHAR 07 reports $< 0.38 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \pi^+ \pi^- \eta') / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

$\Gamma(\bar{K}^0 K^+ \pi^- + \text{c.c.}) / \Gamma_{\text{total}}$ Γ_{46} / Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<0.09	90	¹ ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.6	90	^{2,3} ABLIKIM 06R	BES2	$\psi(2S) \rightarrow \gamma \chi_{c0}$
<0.7	90	^{3,4} BAI 99B	BES	$\psi(2S) \rightarrow \gamma \chi_{c0}$

¹ ATHAR 07 reports $< 0.10 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.}) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

² ABLIKIM 06R reports $< 0.70 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.}) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

³ We have multiplied the $K_S^0 K^+ \pi^-$ measurement by a factor of 2 to convert to $K^0 K^+ \pi^-$.

⁴ Rescaled by us using $B(\psi(2S) \rightarrow \gamma \chi_{c0}) = (9.4 \pm 0.4)\%$ and $B(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) = (32.6 \pm 0.5)\%$.

$\Gamma(K^+ K^- \pi^0) / \Gamma_{\text{total}}$ Γ_{47} / Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<0.06	90	¹ ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ATHAR 07 reports $< 0.06 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- \pi^0) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

$\Gamma(K^+ K^- \eta) / \Gamma_{\text{total}}$ Γ_{48} / Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<0.22	90	¹ ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ATHAR 07 reports $< 0.24 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- \eta) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

$\Gamma(K^+ K^- K_S^0 K_S^0) / \Gamma_{\text{total}}$ Γ_{49} / Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$1.38 \pm 0.46 \pm 0.04$	16.8 ± 4.8	¹ ABLIKIM 050	BES2	$\psi(2S) \rightarrow \gamma \chi_{c0}$

¹ ABLIKIM 050 reports $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- K_S^0 K_S^0) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))] = (0.138 \pm 0.039 \pm 0.025) \times 10^{-3}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+ K^- K^+ K^-)/\Gamma_{\text{total}}$ Γ_{50}/Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>
2.75 ± 0.28 OUR FIT	

$\Gamma(K^+ K^- \phi)/\Gamma_{\text{total}}$ Γ_{51}/Γ

<u>VALUE (units 10^{-3})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.95 ± 0.24 ± 0.03	38	¹ ABLIKIM	06T BES2	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

¹ ABLIKIM 06T reports $(1.03 \pm 0.22 \pm 0.15) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- \phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{K}^0 K^+ \pi^- \phi + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{52}/Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
3.68 ± 0.30 ± 0.50	ABLIKIM	15M BES3	$\psi(2S) \rightarrow \gamma \chi_{c0}$

$\Gamma(K^+ K^- \pi^0 \phi)/\Gamma_{\text{total}}$ Γ_{53}/Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1.90 ± 0.14 ± 0.32	ABLIKIM	15M BES3	$\psi(2S) \rightarrow \gamma \chi_{c0}$

$\Gamma(\phi \pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}$ Γ_{54}/Γ

<u>VALUE (units 10^{-3})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1.18 ± 0.07 ± 0.13	538	¹ ABLIKIM	13B BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c0}$

¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c0} \gamma) = (9.68 \pm 0.31)\%$.

$\Gamma(\phi \phi)/\Gamma_{\text{total}}$ Γ_{55}/Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>
0.77 ± 0.07 OUR FIT	

$\Gamma(p \bar{p})/\Gamma_{\text{total}}$ Γ_{56}/Γ

<u>VALUE (units 10^{-4})</u>	<u>DOCUMENT ID</u>
2.25 ± 0.09 OUR FIT	

$\Gamma(p \bar{p} \pi^0)/\Gamma_{\text{total}}$ Γ_{57}/Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.68 ± 0.07 OUR AVERAGE	Error includes scale factor of 1.3.		

0.72 ± 0.06 ± 0.02	¹	ONYISI	10	CLE3 $\psi(2S) \rightarrow \gamma p \bar{p} X$
0.54 ± 0.11 ± 0.01	²	ATHAR	07	CLEO $\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ONYISI 10 reports $(7.76 \pm 0.37 \pm 0.51 \pm 0.39) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow p \bar{p} \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ATHAR 07 reports $(0.59 \pm 0.10 \pm 0.08) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow p \bar{p} \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\rho\bar{p}\eta)/\Gamma_{\text{total}}$ Γ_{58}/Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.35±0.04 OUR AVERAGE			
0.34±0.04±0.01	¹ ONYISI	10 CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$
0.36±0.11±0.01	² ATHAR	07 CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ONYISI 10 reports $(3.73 \pm 0.38 \pm 0.28 \pm 0.19) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{p}\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ATHAR 07 reports $(0.39 \pm 0.11 \pm 0.04) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{p}\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\rho\bar{p}\omega)/\Gamma_{\text{total}}$ Γ_{59}/Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.51±0.05±0.01	¹ ONYISI	10 CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$

¹ ONYISI 10 reports $(5.57 \pm 0.48 \pm 0.42 \pm 0.14) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{p}\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\rho\bar{p}\phi)/\Gamma_{\text{total}}$ Γ_{60}/Γ

<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
5.9±1.4±0.2	42 ± 8	¹ ABLIKIM	11F BES3	$\psi(2S) \rightarrow \gamma p\bar{p}K^+K^-$

¹ ABLIKIM 11F reports $(6.12 \pm 1.18 \pm 0.86) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{p}\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\rho\bar{p}\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{61}/Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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	¹ BAI	99B BES	$\psi(2S) \rightarrow \gamma\chi_{c0}$
4.20±1.15±0.18	¹ TANENBAUM	78 MRK1	$\psi(2S) \rightarrow \gamma\chi_{c0}$

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

 $\Gamma(\rho\bar{p}\pi^0\pi^0)/\Gamma_{\text{total}}$ Γ_{62}/Γ

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.102±0.027±0.003	39.5	¹ HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $0.11 \pm 0.02 \pm 0.02 \pm 0.01$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p}\pi^0\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\bar{p}K^+K^- \text{ (non-resonant)})/\Gamma_{\text{total}}$ Γ_{63}/Γ

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1.19±0.26±0.03	48 ± 8	¹ ABLIKIM	11F BES3	$\psi(2S) \rightarrow \gamma p\bar{p}K^+K^-$

¹ ABLIKIM 11F reports $(1.24 \pm 0.20 \pm 0.18) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p}K^+K^- \text{ (non-resonant)})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\bar{p}K_S^0K_S^0)/\Gamma_{\text{total}}$ Γ_{64}/Γ

<u>VALUE (units 10^{-4})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<8.8	90	¹ ABLIKIM	06D BES2	$\psi(2S) \rightarrow \chi_{c0}\gamma$

¹ Using $B(\psi(2S) \rightarrow \chi_{c0}\gamma) = (9.2 \pm 0.5)\%$

$\Gamma(p\bar{n}\pi^-)/\Gamma_{\text{total}}$ Γ_{65}/Γ

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
12.4±1.1 OUR AVERAGE				
12.6±1.1±0.3	5150	¹ ABLIKIM	12J BES3	$\psi(2S) \rightarrow \gamma p\bar{n}\pi^-$
11.0±3.0±0.3		² ABLIKIM	06I BES2	$\psi(2S) \rightarrow \gamma p\pi^-X$

¹ ABLIKIM 12J reports $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{n}\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ = $(1.26 \pm 0.02 \pm 0.11) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ABLIKIM 06I reports $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{n}\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ = $(1.10 \pm 0.24 \pm 0.18) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\bar{p}n\pi^+)/\Gamma_{\text{total}}$ Γ_{66}/Γ

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
13.4±1.1±0.4	5808	¹ ABLIKIM	12J BES3	$\psi(2S) \rightarrow \gamma \bar{p}n\pi^+$

¹ ABLIKIM 12J reports $[\Gamma(\chi_{c0}(1P) \rightarrow \bar{p}n\pi^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ = $(1.34 \pm 0.03 \pm 0.11) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\bar{n}\pi^-\pi^0)/\Gamma_{\text{total}}$ Γ_{67}/Γ

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
22.9±2.0±0.6	2480	¹ ABLIKIM	12J BES3	$\psi(2S) \rightarrow \gamma p\bar{n}\pi^-\pi^0$

¹ ABLIKIM 12J reports $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{n}\pi^-\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))] = (2.29 \pm 0.08 \pm 0.18) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\bar{p}n\pi^+\pi^0)/\Gamma_{\text{total}}$ Γ_{68}/Γ

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
21.6±1.7±0.6	2757	¹ ABLIKIM 12J	BES3	$\psi(2S) \rightarrow \gamma\bar{p}n\pi^+\pi^0$

¹ ABLIKIM 12J reports $[\Gamma(\chi_{c0}(1P) \rightarrow \bar{p}n\pi^+\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))] = (2.16 \pm 0.07 \pm 0.16) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Lambda\bar{\Lambda})/\Gamma_{\text{total}}$ Γ_{69}/Γ

<u>VALUE (units 10^{-4})</u>	<u>DOCUMENT ID</u>
3.21±0.25 OUR FIT	

$\Gamma(\Lambda\bar{\Lambda}\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{70}/Γ

<u>VALUE (units 10^{-5})</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
115±12±3		426	¹ ABLIKIM 12I	BES3	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}\pi^+\pi^-$

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

<400	90	² ABLIKIM 06D	BES2	$\psi(2S) \rightarrow \chi_{c0}\gamma$
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¹ ABLIKIM 12I reports $(119.0 \pm 6.4 \pm 11.4) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Lambda\bar{\Lambda}\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² Using $B(\psi(2S) \rightarrow \chi_{c0}\gamma) = (9.2 \pm 0.5)\%$

$\Gamma(\Lambda\bar{\Lambda}\pi^+\pi^- \text{ (non-resonant)})/\Gamma_{\text{total}}$ Γ_{71}/Γ

<u>VALUE (units 10^{-5})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<50	90	¹ ABLIKIM 12I	BES3	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}\pi^+\pi^-$

¹ ABLIKIM 12I reports $< 54 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Lambda\bar{\Lambda}\pi^+\pi^- \text{ (non-resonant)})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

$\Gamma(\Sigma(1385)^+\bar{\Lambda}\pi^- + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{72}/Γ

<u>VALUE (units 10^{-5})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<50	90	¹ ABLIKIM 12I	BES3	$\psi(2S) \rightarrow \gamma\Sigma(1385)^+\bar{\Lambda}\pi^-$

¹ ABLIKIM 12I reports $< 55 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma(1385)^+\bar{\Lambda}\pi^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

$\Gamma(\Sigma(1385)^-\bar{\Lambda}\pi^+ + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{73}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
<50	90	¹ ABLIKIM 12I	BES3	$\psi(2S) \rightarrow \gamma \Sigma(1385)^-\bar{\Lambda}\pi^+$

¹ ABLIKIM 12I reports $< 50 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma(1385)^-\bar{\Lambda}\pi^+ + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

 $\Gamma(K^+\bar{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{74}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
1.22±0.12 OUR AVERAGE				Error includes scale factor of 1.3.
1.28±0.09±0.03	9k	^{1,2} ABLIKIM 13D	BES3	$\psi(2S) \rightarrow \gamma \Lambda\bar{p}K^+$
0.99±0.19±0.03		³ ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ABLIKIM 13D reports $(1.32 \pm 0.03 \pm 0.10) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+\bar{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² Using $B(\Lambda \rightarrow p\pi^-) = 63.9\%$.

³ ATHAR 07 reports $(1.07 \pm 0.17 \pm 0.12) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+\bar{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(K^+\bar{p}\Lambda(1520) + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{75}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
2.9±0.7±0.1	62 ± 12	¹ ABLIKIM 11F	BES3	$\psi(2S) \rightarrow \gamma p\bar{p}K^+K^-$

¹ ABLIKIM 11F reports $(3.00 \pm 0.58 \pm 0.50) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+\bar{p}\Lambda(1520) + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\Lambda(1520)\bar{\Lambda}(1520))/\Gamma_{\text{total}}$ Γ_{76}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
3.1±1.2±0.1	28 ± 10	¹ ABLIKIM 11F	BES3	$\psi(2S) \rightarrow \gamma p\bar{p}K^+K^-$

¹ ABLIKIM 11F reports $(3.18 \pm 1.11 \pm 0.53) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Lambda(1520)\bar{\Lambda}(1520))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}$ Γ_{77}/Γ

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
4.4±0.4 OUR AVERAGE				
4.6±0.5±0.1	243	¹ ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$
4.1±0.6±0.1	78 ± 10	² NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$

¹ ABLIKIM 13H reports $(4.78 \pm 0.34 \pm 0.39) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² NAIK 08 reports $(4.41 \pm 0.56 \pm 0.47) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}$ Γ_{78}/Γ

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
3.9±0.7 OUR AVERAGE Error includes scale factor of 1.7.				
4.4±0.5±0.1	148	¹ ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$
3.0±0.6±0.1	39 ± 7	² NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$

¹ ABLIKIM 13H reports $(4.54 \pm 0.42 \pm 0.30) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² NAIK 08 reports $(3.25 \pm 0.57 \pm 0.43) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Sigma(1385)^+ \bar{\Sigma}(1385)^-)/\Gamma_{\text{total}}$ Γ_{79}/Γ

<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
15.9±5.7±0.4				
	27	¹ ABLIKIM	12i BES3	$\psi(2S) \rightarrow \gamma \Lambda \bar{\Lambda} \pi^+ \pi^-$

¹ ABLIKIM 12i reports $(16.4 \pm 5.7 \pm 1.6) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma(1385)^+ \bar{\Sigma}(1385)^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Sigma(1385)^- \bar{\Sigma}(1385)^+)/\Gamma_{\text{total}}$ Γ_{80}/Γ

<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
23±6±1				
	33	¹ ABLIKIM	12i BES3	$\psi(2S) \rightarrow \gamma \Lambda \bar{\Lambda} \pi^+ \pi^-$

¹ ABLIKIM 12I reports $(23.5 \pm 6.2 \pm 2.3) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma(1385)^- \bar{\Sigma}(1385)^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^- \Lambda \bar{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{81}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
1.90±0.34±0.05	57	¹ ABLIKIM	15I BES3	$\psi(2S) \rightarrow \gamma K^- \Lambda \bar{\Xi}^+ + \text{c.c.}$

¹ ABLIKIM 15I reports $[\Gamma(\chi_{c0}(1P) \rightarrow K^- \Lambda \bar{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ $= (1.90 \pm 0.30 \pm 0.16) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Xi^0 \Xi^0)/\Gamma_{\text{total}}$ Γ_{82}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
3.1±0.8±0.1	23.3 ± 4.9	¹ NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Xi^0 \Xi^0$

¹ NAIK 08 reports $(3.34 \pm 0.70 \pm 0.48) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Xi^0 \Xi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Xi^- \Xi^+)/\Gamma_{\text{total}}$ Γ_{83}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
4.7±0.7±0.1		95 ± 11	¹ NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Xi^+ \Xi^-$

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

<10.3	90	² ABLIKIM	06D BES2	$\psi(2S) \rightarrow \chi_{c0} \gamma$
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¹ NAIK 08 reports $(5.14 \pm 0.60 \pm 0.47) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Xi^- \Xi^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ 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 $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² Using $B(\psi(2S) \rightarrow \chi_{c0} \gamma) = (9.2 \pm 0.5)\%$

$\Gamma(\eta_c \pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{84}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 7 × 10⁻⁴	90	^{1,2} ABLIKIM	13B BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c0}$

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

<41 × 10 ⁻⁴	90	^{1,3} ABLIKIM	13B BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c0}$
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¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c0} \gamma) = (9.68 \pm 0.31)\%$.

² From the $\eta_c \rightarrow K_S^0 K^\pm \pi^\mp$ decays.

³ From the $\eta_c \rightarrow K^+ K^- \pi^0$ decays.

$$\Gamma(\rho\bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\pi\pi)/\Gamma_{\text{total}} \qquad \Gamma_{56}/\Gamma \times \Gamma_{32}/\Gamma$$

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
18.8±1.2 OUR FIT			
15.3±2.4±0.8	¹ ANDREOTTI 03	E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow \pi^0\pi^0$

¹ We have multiplied $B(\rho\bar{\rho}) \cdot B(\pi^0\pi^0)$ measurement by 3 to obtain $B(\rho\bar{\rho}) \cdot B(\pi\pi)$.

$$\Gamma(\rho\bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\pi^0\eta)/\Gamma_{\text{total}} \qquad \Gamma_{56}/\Gamma \times \Gamma_{33}/\Gamma$$

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

$$\Gamma(\rho\bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\pi^0\eta')/\Gamma_{\text{total}} \qquad \Gamma_{56}/\Gamma \times \Gamma_{34}/\Gamma$$

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

$$\Gamma(\rho\bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\eta\eta)/\Gamma_{\text{total}} \qquad \Gamma_{56}/\Gamma \times \Gamma_{36}/\Gamma$$

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
6.6±0.5 OUR FIT			
4.0±1.2^{+0.5}_{-0.3}	ANDREOTTI 05C	E835	$\bar{p}p \rightarrow \eta\eta$

$$\Gamma(\rho\bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\eta\eta')/\Gamma_{\text{total}} \qquad \Gamma_{56}/\Gamma \times \Gamma_{37}/\Gamma$$

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	$\bar{p}p \rightarrow \pi^0\eta$

————— RADIATIVE DECAYS —————

$$\Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}} \qquad \Gamma_{85}/\Gamma$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
127± 6 OUR FIT			
• • • We do not use the following data for averages, fits, limits, etc. • • •			
200±20±20	¹ ADAM 05A	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$

¹ 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.

$$\Gamma(\gamma\rho^0)/\Gamma_{\text{total}} \qquad \Gamma_{86}/\Gamma$$

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
< 9	90	1.2 ± 4.5	¹ BENNETT 08A	CLEO	$\psi(2S) \rightarrow \gamma\gamma\rho^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<10	90	6 ± 12	² ABLIKIM 11E	BES3	$\psi(2S) \rightarrow \gamma\gamma\rho^0$

¹ BENNETT 08A reports $< 9.6 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma\rho^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

² ABLIKIM 11E reports $< 10.5 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma\rho^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

$\Gamma(\gamma\omega)/\Gamma_{\text{total}}$ Γ_{87}/Γ

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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< 8	90	0.0 ± 2.8	¹ BENNETT	08A CLEO	$\psi(2S) \rightarrow \gamma\gamma\omega$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<12	90	5 ± 11	² ABLIKIM	11E BES3	$\psi(2S) \rightarrow \gamma\gamma\omega$
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¹ BENNETT 08A reports $< 8.8 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

² ABLIKIM 11E reports $< 12.9 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

 $\Gamma(\gamma\phi)/\Gamma_{\text{total}}$ Γ_{88}/Γ

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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< 6	90	0.1 ± 1.6	¹ BENNETT	08A CLEO	$\psi(2S) \rightarrow \gamma\gamma\phi$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<16	90	15 ± 7	² ABLIKIM	11E BES3	$\psi(2S) \rightarrow \gamma\gamma\phi$
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¹ BENNETT 08A reports $< 6.4 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

² ABLIKIM 11E reports $< 16.2 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.99 \times 10^{-2}$.

 $\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ Γ_{89}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
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2.23 ± 0.13 OUR FIT

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

<7	90	¹ WICHT	08 BELL	$B^\pm \rightarrow K^\pm \gamma\gamma$
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¹ WICHT 08 reports $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma\gamma)/\Gamma_{\text{total}}] \times [B(B^\pm \rightarrow \chi_{c0}(1P) K^\pm)] < 0.11 \times 10^{-6}$ which we divide by our best value $B(B^\pm \rightarrow \chi_{c0}(1P) K^\pm) = 1.50 \times 10^{-4}$.

 $\Gamma(\gamma\gamma)/\Gamma(\gamma J/\psi(1S))$ Γ_{89}/Γ_{85}

VALUE (units 10^{-2})	DOCUMENT ID	TECN	COMMENT
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1.76 ± 0.13 OUR FIT

2.0 ± 0.4 OUR AVERAGE

2.2 ± 0.4	¹ ANDREOTTI 04	E835	$p\bar{p} \rightarrow \chi_{c0} \rightarrow \gamma\gamma$
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1.45 ± 0.74	² AMBROGIANI 00B	E835	$\bar{p}p \rightarrow \chi_{c2} \rightarrow \gamma\gamma, \gamma J/\psi$
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¹ The values of $B(p\bar{p})B(\gamma\gamma)$ 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.

² Calculated by us using $B(J/\psi(1S) \rightarrow e^+e^-) = 0.0593 \pm 0.0010$.

$$\frac{\Gamma(p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}}{\Gamma_{56}/\Gamma \times \Gamma_{85}/\Gamma}$$

VALUE (units 10^{-7})	EVTS	DOCUMENT ID	TECN	COMMENT
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28.5 ± 1.6 OUR FIT

28.2 ± 2.1 OUR AVERAGE

28.0 ± 1.9 ± 1.3	392	1,2,3 BAGNASCO	02 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$
29.3 ^{+5.7} _{-4.7} ± 1.5	89	1,2 AMBROGIANI	99B	$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$

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

² Calculated by us using $B(J/\psi(1S) \rightarrow e^+e^-) = 0.0593 \pm 0.0010$.

³ Recalculated by ANDREOTTI 05A.

$$\frac{\Gamma(p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}}{\Gamma_{56}/\Gamma \times \Gamma_{89}/\Gamma}$$

VALUE (units 10^{-8})	DOCUMENT ID	TECN	COMMENT
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5.0 ± 0.4 OUR FIT

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

6.52 ± 1.18 ^{+0.48} _{-0.72}	¹ ANDREOTTI	04 E835	$p\bar{p} \rightarrow \chi_{c0} \rightarrow \gamma\gamma$
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¹ The values of $B(p\bar{p})B(\gamma\gamma)$ 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

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma_{56}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{\psi(2S)}}$$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
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22.5 ± 0.9 OUR FIT

23.7 ± 1.0 OUR AVERAGE

23.7 ± 0.8 ± 0.9	1222	ABLIKIM	13v BES3	$\psi(2S) \rightarrow \gamma p\bar{p}$
23.7 ± 1.4 ± 1.4	383 ± 22	¹ NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma p\bar{p}$
23.6 ^{+3.7} _{-3.4} ± 3.4	89.5 ⁺¹⁴ ₋₁₃	BAI	04F BES	$\psi(2S) \rightarrow \gamma\chi_{c0}(1P) \rightarrow \gamma\bar{p}p$

¹ Calculated by us. NAIK 08 reports $B(\chi_{c0} \rightarrow p\bar{p}) = (25.7 \pm 1.5 \pm 1.5 \pm 1.3) \times 10^{-5}$ using $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_{56}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-5})	DOCUMENT ID	TECN	COMMENT
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6.53 ± 0.27 OUR FIT

4.6 ± 1.9

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

$$\Gamma(\chi_{c0}(1P) \rightarrow \Lambda\bar{\Lambda})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}$$

$$\Gamma_{69}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{\psi(2S)}$$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
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32.0±2.3 OUR FIT

31.7±2.3 OUR AVERAGE

32.0±1.9±2.2	369	¹ ABLIKIM	13H	BES3	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}$
31.2±3.3±2.0	131 ± 12	² NAIK	08	CLEO	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}$

¹ Calculated by us. ABLIKIM 13H reports $B(\chi_{c0} \rightarrow \Lambda\bar{\Lambda}) = (33.3 \pm 2.0 \pm 2.6) \times 10^{-5}$ from a measurement of $B(\chi_{c0} \rightarrow \Lambda\bar{\Lambda}) \times B(\psi(2S) \rightarrow \gamma\chi_{c0})$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.62 \pm 0.31)\%$.

² Calculated by us. NAIK 08 reports $B(\chi_{c0} \rightarrow \Lambda\bar{\Lambda}) = (33.8 \pm 3.6 \pm 2.2 \pm 1.7) \times 10^{-5}$ using $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$.

$$\Gamma(\chi_{c0}(1P) \rightarrow \Lambda\bar{\Lambda})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)$$

$$\Gamma_{69}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
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9.3±0.7 OUR FIT

$13.0^{+3.6}_{-3.5} \pm 2.5$	$15.2^{+4.2}_{-4.0}$	¹ BAI	03E	BES	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}$
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¹ BAI 03E reports $[B(\chi_{c0} \rightarrow \Lambda\bar{\Lambda}) B(\psi(2S) \rightarrow \gamma\chi_{c0}) / B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-)] \times [B^2(\Lambda \rightarrow \pi^-p) / B(J/\psi \rightarrow p\bar{p})] = (2.45^{+0.68}_{-0.65} \pm 0.46)\%$. We calculate from this measurement the presented value using $B(\Lambda \rightarrow \pi^-p) = (63.9 \pm 0.5)\%$ and $B(J/\psi \rightarrow p\bar{p}) = (2.17 \pm 0.07) \times 10^{-3}$.

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

$$\Gamma_{85}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{\psi(2S)}$$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
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0.127±0.006 OUR FIT

0.131±0.035 OUR AVERAGE Error includes scale factor of 3.9.

0.151±0.003±0.010	4.3k	ABLIKIM	120	BES3	$\psi(2S) \rightarrow \gamma\chi_{c0}$
0.069±0.018		¹ OREGLIA	82	CBAL	$\psi(2S) \rightarrow \gamma\chi_{c0}$
0.4 ± 0.3		² BRANDELIK	79B	DASP	$\psi(2S) \rightarrow \gamma\chi_{c0}$
0.16 ± 0.11		² BARTEL	78B	CNTR	$\psi(2S) \rightarrow \gamma\chi_{c0}$
3.3 ± 1.7		³ BIDDICK	77	CNTR	$e^+e^- \rightarrow \gamma X$

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

0.125±0.007±0.013	560	⁴ MENDEZ	08	CLEO	$\psi(2S) \rightarrow \gamma\chi_{c0}$
0.18 ± 0.01 ± 0.02	172	⁵ ADAM	05A	CLEO	Repl. by MENDEZ 08

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

² Recalculated by us using $B(J/\psi(1S) \rightarrow \mu^+\mu^-) = 0.0588 \pm 0.0010$.

³ Assumes isotropic gamma distribution.

⁴ Not independent from other measurements of MENDEZ 08.

⁵ Not independent from other values reported by ADAM 05A.

$$\Gamma(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S) \text{ anything})$$

$$\frac{\Gamma_{85}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{9}^{\psi(2S)}}{\Gamma_{85}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{9}^{\psi(2S)} + \Gamma_{11}^{\psi(2S)} + \Gamma_{12}^{\psi(2S)} + \Gamma_{13}^{\psi(2S)} + 0.339\Gamma_{133}^{\psi(2S)} + 0.192\Gamma_{134}^{\psi(2S)}}$$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
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0.207 ± 0.011 OUR FIT

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

0.201 ± 0.011 ± 0.021	560	¹ MENDEZ	08	CLEO	$\psi(2S) \rightarrow \gamma \chi_{c0}$
0.31 ± 0.02 ± 0.03	172	ADAM	05A	CLEO	Repl. by MENDEZ 08

¹ Not independent from other measurements of MENDEZ 08.

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

$$\frac{\Gamma_{85}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}{\Gamma_{85}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
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0.367 ± 0.019 OUR FIT

0.358 ± 0.020 ± 0.037 560 MENDEZ 08 CLEO $\psi(2S) \rightarrow \gamma \chi_{c0}$

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

0.55 ± 0.04 ± 0.06	172	¹ ADAM	05A	CLEO	Repl. by MENDEZ 08
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¹ Not independent from other values reported by ADAM 05A.

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

$$\frac{\Gamma_{89}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma^{\psi(2S)}}{\Gamma_{89}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma^{\psi(2S)}}$$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
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2.23 ± 0.14 OUR FIT

2.18 ± 0.18 OUR AVERAGE

2.17 ± 0.17 ± 0.12	0.8k	ABLIKIM	12A	BES3	$\psi(2S) \rightarrow \gamma \chi_{c0} \rightarrow 3\gamma$
2.17 ± 0.32 ± 0.10	0.2k	ECKLUND	08A	CLEO	$\psi(2S) \rightarrow \gamma \chi_{c0} \rightarrow 3\gamma$
3.7 ± 1.8 ± 1.0		LEE	85	CBAL	$\psi(2S) \rightarrow \gamma \chi_{c0}$

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

$$\frac{\Gamma_{32}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma^{\psi(2S)}}{\Gamma_{32}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma^{\psi(2S)}}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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8.32 ± 0.29 OUR FIT

8.80 ± 0.34 OUR AVERAGE

9.11 ± 0.08 ± 0.65	17k	¹ ABLIKIM	10A	BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c0}$
8.81 ± 0.11 ± 0.43	8.9k	² ASNER	09	CLEO	$\psi(2S) \rightarrow \gamma \pi^+ \pi^-$
8.13 ± 0.19 ± 0.89	2.8k	³ ASNER	09	CLEO	$\psi(2S) \rightarrow \gamma \pi^0 \pi^0$

¹ Calculated by us. ABLIKIM 10A reports $B(\chi_{c0} \rightarrow \pi^0 \pi^0) = (3.23 \pm 0.03 \pm 0.23 \pm 0.14) \times 10^{-3}$ using $B(\psi(2S) \rightarrow \gamma \chi_{c0}) = (9.4 \pm 0.4)\%$. We have multiplied the $\pi^0 \pi^0$ measurement by 3 to obtain $\pi \pi$.

² Calculated by us. ASNER 09 reports $B(\chi_{c0} \rightarrow \pi^+ \pi^-) = (6.37 \pm 0.08 \pm 0.31 \pm 0.32) \times 10^{-3}$ using $B(\psi(2S) \rightarrow \gamma \chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$. We have multiplied the $\pi^+ \pi^-$ measurement by 3/2 to obtain $\pi \pi$.

³ Calculated by us. ASNER 09 reports $B(\chi_{c0} \rightarrow \pi^0 \pi^0) = (2.94 \pm 0.07 \pm 0.32 \pm 0.15) \times 10^{-3}$ using $B(\psi(2S) \rightarrow \gamma \chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$. We have multiplied the $\pi^0 \pi^0$ measurement by 3 to obtain $\pi \pi$.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \pi\pi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_{32}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10⁻⁴) EVTS DOCUMENT ID TECN COMMENT

24.1±0.8 OUR FIT

20.7±1.7 OUR AVERAGE

23.9±2.7±4.1	97 ± 11	¹ BAI	03C BES	$\psi(2S) \rightarrow \gamma\chi_{c0} \rightarrow \gamma\pi^0\pi^0$
20.2±1.1±1.5	720 ± 32	² BAI	98I BES	$\psi(2S) \rightarrow \gamma\chi_{c0} \rightarrow \gamma\pi^+\pi^-$

¹ We have multiplied $\pi^0\pi^0$ measurement by 3 to obtain $\pi\pi$.

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

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma_{36}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10⁻⁴) EVTS DOCUMENT ID TECN COMMENT

2.95±0.18 OUR FIT

3.12±0.19 OUR AVERAGE

3.23±0.09±0.23	2132	¹ ABLIKIM	10A BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$
2.93±0.12±0.29	0.9k	² ASNER	09 CLEO	$\psi(2S) \rightarrow \gamma\eta\eta$

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

2.86±0.46±0.37	48	³ ADAMS	07 CLEO	$\psi(2S) \rightarrow \gamma\chi_{c0}$
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¹ Calculated by us. ABLIKIM 10A reports $B(\chi_{c0} \rightarrow \eta\eta) = (3.44 \pm 0.10 \pm 0.24 \pm 0.13) \times 10^{-3}$ using $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.4 \pm 0.4)\%$.

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

³ Superseded by ASNER 09. Calculated by us. The value of $B(\chi_{c0}(1P) \rightarrow \eta\eta)$ reported by ADAMS 07 was derived using $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46)\%$ (ATHAR 04).

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_{36}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10⁻³) DOCUMENT ID TECN COMMENT

0.85 ±0.05 OUR FIT

0.578±0.241±0.158	BAI	03C BES	$\psi(2S) \rightarrow \gamma\eta\eta$
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$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K^+K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma_{42}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10⁻⁴) EVTS DOCUMENT ID TECN COMMENT

5.91±0.28 OUR FIT

5.97±0.07±0.32	8.1k	¹ ASNER	09 CLEO	$\psi(2S) \rightarrow \gamma K^+K^-$
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¹ Calculated by us. ASNER 09 reports $B(\chi_{c0} \rightarrow K^+K^-) = (6.47 \pm 0.08 \pm 0.35 \pm 0.32) \times 10^{-3}$ using $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)}{\Gamma_{42} / \Gamma \times \Gamma_{132}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
1.71±0.08 OUR FIT				
1.63±0.10±0.15	774 ± 38	¹ BAI	98I BES	$\psi(2S) \rightarrow \gamma K^+ K^-$

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

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K_S^0 K_S^0) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma_{\text{total}}}{\Gamma_{43} / \Gamma \times \Gamma_{132}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
3.09±0.16 OUR FIT				
3.18±0.17 OUR AVERAGE				
3.22±0.07±0.17	2.1k	¹ ASNER	09 CLEO	$\psi(2S) \rightarrow \gamma K_S^0 K_S^0$
3.02±0.19±0.33	322	ABLIKIM	05O BES2	$\psi(2S) \rightarrow \gamma K_S^0 K_S^0$

¹ Calculated by us. ASNER 09 reports $B(\chi_{c0} \rightarrow K_S^0 K_S^0) = (3.49 \pm 0.08 \pm 0.18 \pm 0.17) \times 10^{-3}$ using $B(\psi(2S) \rightarrow \gamma \chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K_S^0 K_S^0) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)}{\Gamma_{43} / \Gamma \times \Gamma_{132}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
9.0±0.5 OUR FIT			
5.6±0.8±1.3	¹ BAI	99B BES	$\psi(2S) \rightarrow \gamma K_S^0 K_S^0$

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

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow 2(\pi^+ \pi^-)) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)}{\Gamma_1 / \Gamma \times \Gamma_{132}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

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	¹ BAI	99B BES	$\psi(2S) \rightarrow \gamma \chi_{c0}$
9.3±0.9	² TANENBAUM	78 MRK1	$\psi(2S) \rightarrow \gamma \chi_{c0}$

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

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

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma_{\text{total}}}{\Gamma_8 / \Gamma \times \Gamma_{132}^{\psi(2S)} / \Gamma_{\psi(2S)}}$$

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
1.75 ± 0.14 OUR FIT			
1.64 ± 0.05 ± 0.2	ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \chi_{c0}$

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)}{\Gamma_8 / \Gamma \times \Gamma_{132}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
5.1 ± 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	$\psi(2S) \rightarrow \gamma \chi_{c0}$
7.4 ± 1.0	¹ TANENBAUM	78 MRK1	$\psi(2S) \rightarrow \gamma \chi_{c0}$

¹ 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 $B(J/\psi \rightarrow \ell^+ \ell^-) = 0.1181 \pm 0.0020$.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- K^+ K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma_{\text{total}}}{\Gamma_{50} / \Gamma \times \Gamma_{132}^{\psi(2S)} / \Gamma_{\psi(2S)}}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
2.74 ± 0.28 OUR FIT				
3.20 ± 0.11 ± 0.41	278	¹ ABLIKIM	06T BES2	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

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

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- K^+ K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)}{\Gamma_{50} / \Gamma \times \Gamma_{132}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
8.0 ± 0.8 OUR FIT			
6.1 ± 0.8 ± 0.9	¹ BAI	99B BES	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

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

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \phi\phi) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma_{\text{total}}}{\Gamma_{55} / \Gamma \times \Gamma_{132}^{\psi(2S)} / \Gamma_{\psi(2S)}}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
0.77 ± 0.07 OUR FIT				
0.78 ± 0.08 OUR AVERAGE				
0.77 ± 0.03 ± 0.08	612	¹ ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma$ hadrons
0.86 ± 0.19 ± 0.12	26	² ABLIKIM	06T BES2	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

¹ Calculated by us. The value of $B(\chi_{c0} \rightarrow \phi\phi)$ reported by ABLIKIM 11K was derived using $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.62 \pm 0.31)\%$.

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

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \phi\phi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_{55}/\Gamma \times \Gamma_{132}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-4})

DOCUMENT ID

TECN

COMMENT

2.24 ± 0.21 OUR FIT

2.6 ± 1.0 ± 1.1

¹BAI

99B BES

$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

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

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

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ABLIKIM	15M	PR D91 112008	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	15N	PR D91 112018	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	13B	PR D87 012002	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	13D	PR D87 012007	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	13H	PR D87 032007	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	13V	PR D88 112001	M. Ablikim <i>et al.</i>	(BES III Collab.)
UEHARA	13	PTEP 2013 123C01	S. Uehara <i>et al.</i>	(BELLE Collab.)
ABLIKIM	12A	PR D85 112008	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	12I	PR D86 052004	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	12J	PR D86 052011	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	12O	PRL 109 172002	M. Ablikim <i>et al.</i>	(BES III Collab.)
LIU	12B	PRL 108 232001	Z.Q. Liu <i>et al.</i>	(BELLE Collab.)
ABLIKIM	11A	PR D83 012006	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	11E	PR D83 112005	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	11F	PR D83 112009	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	11K	PRL 107 092001	M. Ablikim <i>et al.</i>	(BES III Collab.)
DEL-AMO-SA...	11M	PR D84 012004	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
ABLIKIM	10A	PR D81 052005	M. Ablikim <i>et al.</i>	(BES III Collab.)
ONYISI	10	PR D82 011103	P.U.E. Onyisi <i>et al.</i>	(CLEO Collab.)
UEHARA	10A	PR D82 114031	S. Uehara <i>et al.</i>	(BELLE Collab.)
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BENNETT	08A	PRL 101 151801	J.V. Bennett <i>et al.</i>	(CLEO Collab.)
ECKLUND	08A	PR D78 091501	K.M. Ecklund <i>et al.</i>	(CLEO Collab.)
HE	08B	PR D78 092004	Q. He <i>et al.</i>	(CLEO Collab.)
MENDEZ	08	PR D78 011102	H. Mendez <i>et al.</i>	(CLEO Collab.)
NAIK	08	PR D78 031101	P. Naik <i>et al.</i>	(CLEO Collab.)
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WICHT	08	PL B662 323	J. Wicht <i>et al.</i>	(BELLE Collab.)
ABE	07	PRL 98 082001	K. Abe <i>et al.</i>	(BELLE Collab.)
ADAMS	07	PR D75 071101	G.S. Adams <i>et al.</i>	(CLEO Collab.)
ATHAR	07	PR D75 032002	S.B. Athar <i>et al.</i>	(CLEO Collab.)
CHEN	07B	PL B651 15	W.T. Chen <i>et al.</i>	(BELLE Collab.)
ABLIKIM	06D	PR D73 052006	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06I	PR D74 012004	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06R	PR D74 072001	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06T	PL B642 197	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	05G	PR D71 092002	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	05N	PL B630 7	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	05O	PL B630 21	M. Ablikim <i>et al.</i>	(BES Collab.)
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ANDREOTTI	04	PL B584 16	M. Andreotti <i>et al.</i>	(E835 Collab.)
ATHAR	04	PR D70 112002	S.B. Athar <i>et al.</i>	(CLEO Collab.)
BAI	04F	PR D69 092001	J.Z. Bai <i>et al.</i>	(BES Collab.)
ANDREOTTI	03	PRL 91 091801	M. Andreotti <i>et al.</i>	(FNAL E835 Collab.)

AULCHENKO	03	PL B573 63	V.M. Aulchenko <i>et al.</i>	(KEDR Collab.)
BAI	03C	PR D67 032004	J.Z. Bai <i>et al.</i>	(BES Collab.)
BAI	03E	PR D67 112001	J.Z. Bai <i>et al.</i>	(BES Collab.)
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EISENSTEIN	01	PRL 87 061801	B.I. Eisenstein <i>et al.</i>	(CLEO Collab.)
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