

$\chi_{c0}(1P)$ 

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

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

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>3414.71 ± 0.30 OUR AVERAGE</b>				
3413.0 ± 1.9 ± 0.6	933	<sup>1</sup> AAIJ	17BB LHCb	$pp \rightarrow b\bar{b}X \rightarrow 2(K^+K^-)X$
3414.2 ± 0.5 ± 2.3	5.4k	UEHARA	08 BELL	$\gamma\gamma \rightarrow \chi_{c0} \rightarrow \text{hadrons}$
3406 ± 7 ± 6	230	<sup>2</sup> 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 <sup>+0.7</sup> <sub>-0.6</sub> ± 0.2		<sup>3</sup> ANDREOTTI	03 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow \pi^0\pi^0$
3415.5 ± 0.4 ± 0.4	392	<sup>4</sup> BAGNASCO	02 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$
3417.4 <sup>+1.8</sup> <sub>-1.9</sub> ± 0.2		<sup>3</sup> 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		<sup>3</sup> GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X$
3416 ± 3 ± 4		<sup>5</sup> 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		<sup>5</sup> BARTEL	78B CNTR	$e^+e^- \rightarrow J/\psi 2\gamma$
3415 ± 9		<sup>5</sup> BIDDICK	77 CNTR	$e^+e^- \rightarrow \gamma X$

<sup>1</sup> From a fit of the  $\phi\phi$  invariant mass with the width of  $\chi_{c0}(1P)$  fixed to the PDG 16 value.

<sup>2</sup> From a fit of the  $J/\psi$  recoil mass spectrum. Supersedes ABE,K 02 and ABE 04G.

<sup>3</sup> Using mass of  $\psi(2S) = 3686.0$  MeV.

<sup>4</sup> Recalculated by ANDREOTTI 05A, using the value of  $\psi(2S)$  mass from AULCHENKO 03.

<sup>5</sup> 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
<b>10.8 ± 0.6 OUR FIT</b>				
<b>10.5 ± 0.8 OUR AVERAGE</b> 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 <sup>+1.5+0.9</sup> <sub>-1.6-1.1</sub>		ABLIKIM	05G BES2	$\psi(2S) \rightarrow \gamma\chi_{c0}$
8.6 <sup>+1.7</sup> <sub>-1.3</sub> ± 0.1		ANDREOTTI	03 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow \pi^0\pi^0$
9.7 ± 1.0	392	<sup>1</sup> BAGNASCO	02 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$
16.6 <sup>+5.2</sup> <sub>-3.7</sub> ± 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	$\gamma\gamma \rightarrow K_S^0 K_S^0$

<sup>1</sup>Recalculated by ANDREOTTI 05A. **$\chi_{c0}(1P)$  DECAY MODES**

Mode	Fraction ( $\Gamma_i/\Gamma$ )	Scale factor/ Confidence level
<b>Hadronic decays</b>		
$\Gamma_1$ $2(\pi^+\pi^-)$	$(2.34 \pm 0.18) \%$	
$\Gamma_2$ $\rho^0\pi^+\pi^-$	$(9.1 \pm 2.9) \times 10^{-3}$	
$\Gamma_3$ $\rho^0\rho^0$		
$\Gamma_4$ $f_0(980)f_0(980)$	$(6.6 \pm 2.1) \times 10^{-4}$	
$\Gamma_5$ $\pi^+\pi^-\pi^0\pi^0$	$(3.3 \pm 0.4) \%$	
$\Gamma_6$ $\rho^+\pi^-\pi^0 + \text{c.c.}$	$(2.9 \pm 0.4) \%$	
$\Gamma_7$ $4\pi^0$	$(3.3 \pm 0.4) \times 10^{-3}$	
$\Gamma_8$ $\pi^+\pi^-K^+K^-$	$(1.81 \pm 0.14) \%$	
$\Gamma_9$ $K_0^*(1430)^0\bar{K}_0^*(1430)^0 \rightarrow$ $\pi^+\pi^-K^+K^-$	$(9.8 \begin{smallmatrix} +4.0 \\ -2.8 \end{smallmatrix}) \times 10^{-4}$	
$\Gamma_{10}$ $K_0^*(1430)^0\bar{K}_2^*(1430)^0 + \text{c.c.} \rightarrow$ $\pi^+\pi^-K^+K^-$	$(8.0 \begin{smallmatrix} +2.0 \\ -2.4 \end{smallmatrix}) \times 10^{-4}$	
$\Gamma_{11}$ $K_1(1270)^+K^- + \text{c.c.} \rightarrow$ $\pi^+\pi^-K^+K^-$	$(6.3 \pm 1.9) \times 10^{-3}$	
$\Gamma_{12}$ $K_1(1400)^+K^- + \text{c.c.} \rightarrow$ $\pi^+\pi^-K^+K^-$	$< 2.7 \times 10^{-3}$	CL=90%
$\Gamma_{13}$ $f_0(980)f_0(980)$	$(1.6 \begin{smallmatrix} +1.0 \\ -0.9 \end{smallmatrix}) \times 10^{-4}$	
$\Gamma_{14}$ $f_0(980)f_0(2200)$	$(7.9 \begin{smallmatrix} +2.0 \\ -2.5 \end{smallmatrix}) \times 10^{-4}$	
$\Gamma_{15}$ $f_0(1370)f_0(1370)$	$< 2.7 \times 10^{-4}$	CL=90%
$\Gamma_{16}$ $f_0(1370)f_0(1500)$	$< 1.7 \times 10^{-4}$	CL=90%
$\Gamma_{17}$ $f_0(1370)f_0(1710)$	$(6.7 \begin{smallmatrix} +3.5 \\ -2.3 \end{smallmatrix}) \times 10^{-4}$	
$\Gamma_{18}$ $f_0(1500)f_0(1370)$	$< 1.3 \times 10^{-4}$	CL=90%
$\Gamma_{19}$ $f_0(1500)f_0(1500)$	$< 5 \times 10^{-5}$	CL=90%
$\Gamma_{20}$ $f_0(1500)f_0(1710)$	$< 7 \times 10^{-5}$	CL=90%
$\Gamma_{21}$ $K^+K^-\pi^+\pi^-\pi^0$	$(8.6 \pm 0.9) \times 10^{-3}$	
$\Gamma_{22}$ $K_S^0K^\pm\pi^\mp\pi^+\pi^-$	$(4.2 \pm 0.4) \times 10^{-3}$	
$\Gamma_{23}$ $K^+K^-\pi^0\pi^0$	$(5.6 \pm 0.9) \times 10^{-3}$	
$\Gamma_{24}$ $K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	$(2.49 \pm 0.33) \%$	
$\Gamma_{25}$ $\rho^+K^-K^0 + \text{c.c.}$	$(1.21 \pm 0.21) \%$	
$\Gamma_{26}$ $K^*(892)^-K^+\pi^0 \rightarrow$ $K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	$(4.6 \pm 1.2) \times 10^{-3}$	
$\Gamma_{27}$ $K_S^0K_S^0\pi^+\pi^-$	$(5.7 \pm 1.1) \times 10^{-3}$	
$\Gamma_{28}$ $K^+K^-\eta\pi^0$	$(3.0 \pm 0.7) \times 10^{-3}$	
$\Gamma_{29}$ $3(\pi^+\pi^-)$	$(1.20 \pm 0.18) \%$	
$\Gamma_{30}$ $K^+\bar{K}^*(892)^0\pi^- + \text{c.c.}$	$(7.5 \pm 1.6) \times 10^{-3}$	

$\Gamma_{31}$	$K^*(892)^0 \bar{K}^*(892)^0$	$(1.7 \pm 0.6) \times 10^{-3}$	
$\Gamma_{32}$	$\pi\pi$	$(8.51 \pm 0.33) \times 10^{-3}$	
$\Gamma_{33}$	$\pi^0\eta$	$< 1.8 \times 10^{-4}$	
$\Gamma_{34}$	$\pi^0\eta'$	$< 1.1 \times 10^{-3}$	
$\Gamma_{35}$	$\pi^0\eta_c$	$< 1.6 \times 10^{-3}$	CL=90%
$\Gamma_{36}$	$\eta\eta$	$(3.01 \pm 0.19) \times 10^{-3}$	
$\Gamma_{37}$	$\eta\eta'$	$(9.1 \pm 1.1) \times 10^{-5}$	
$\Gamma_{38}$	$\eta'\eta'$	$(2.17 \pm 0.12) \times 10^{-3}$	
$\Gamma_{39}$	$\omega\omega$	$(9.7 \pm 1.1) \times 10^{-4}$	
$\Gamma_{40}$	$\omega\phi$	$(1.18 \pm 0.22) \times 10^{-4}$	
$\Gamma_{41}$	$\omega K^+ K^-$	$(1.94 \pm 0.21) \times 10^{-3}$	
$\Gamma_{42}$	$K^+ K^-$	$(6.05 \pm 0.31) \times 10^{-3}$	
$\Gamma_{43}$	$K_S^0 K_S^0$	$(3.16 \pm 0.17) \times 10^{-3}$	
$\Gamma_{44}$	$\pi^+ \pi^- \eta$	$< 2.0 \times 10^{-4}$	CL=90%
$\Gamma_{45}$	$\pi^+ \pi^- \eta'$	$< 4 \times 10^{-4}$	CL=90%
$\Gamma_{46}$	$\bar{K}^0 K^+ \pi^- + \text{c.c.}$	$< 9 \times 10^{-5}$	CL=90%
$\Gamma_{47}$	$K^+ K^- \pi^0$	$< 6 \times 10^{-5}$	CL=90%
$\Gamma_{48}$	$K^+ K^- \eta$	$< 2.3 \times 10^{-4}$	CL=90%
$\Gamma_{49}$	$K^+ K^- K_S^0 K_S^0$	$(1.4 \pm 0.5) \times 10^{-3}$	
$\Gamma_{50}$	$K^+ K^- K^+ K^-$	$(2.82 \pm 0.29) \times 10^{-3}$	
$\Gamma_{51}$	$K^+ K^- \phi$	$(9.7 \pm 2.5) \times 10^{-4}$	
$\Gamma_{52}$	$\bar{K}^0 K^+ \pi^- \phi + \text{c.c.}$	$(3.7 \pm 0.6) \times 10^{-3}$	
$\Gamma_{53}$	$K^+ K^- \pi^0 \phi$	$(1.90 \pm 0.35) \times 10^{-3}$	
$\Gamma_{54}$	$\phi \pi^+ \pi^- \pi^0$	$(1.18 \pm 0.15) \times 10^{-3}$	
$\Gamma_{55}$	$\phi\phi$	$(8.0 \pm 0.7) \times 10^{-4}$	
$\Gamma_{56}$	$\rho\bar{\rho}$	$(2.21 \pm 0.08) \times 10^{-4}$	
$\Gamma_{57}$	$\rho\bar{\rho}\pi^0$	$(7.0 \pm 0.7) \times 10^{-4}$	S=1.3
$\Gamma_{58}$	$\rho\bar{\rho}\eta$	$(3.5 \pm 0.4) \times 10^{-4}$	
$\Gamma_{59}$	$\rho\bar{\rho}\omega$	$(5.2 \pm 0.6) \times 10^{-4}$	
$\Gamma_{60}$	$\rho\bar{\rho}\phi$	$(6.0 \pm 1.4) \times 10^{-5}$	
$\Gamma_{61}$	$\rho\bar{\rho}\pi^+\pi^-$	$(2.1 \pm 0.7) \times 10^{-3}$	S=1.4
$\Gamma_{62}$	$\rho\bar{\rho}\pi^0\pi^0$	$(1.04 \pm 0.28) \times 10^{-3}$	
$\Gamma_{63}$	$\rho\bar{\rho}K^+K^-$ (non-resonant)	$(1.22 \pm 0.26) \times 10^{-4}$	
$\Gamma_{64}$	$\rho\bar{\rho}K_S^0 K_S^0$	$< 8.8 \times 10^{-4}$	CL=90%
$\Gamma_{65}$	$\rho\bar{n}\pi^-$	$(1.27 \pm 0.11) \times 10^{-3}$	
$\Gamma_{66}$	$\bar{\rho}n\pi^+$	$(1.37 \pm 0.12) \times 10^{-3}$	
$\Gamma_{67}$	$\rho\bar{n}\pi^-\pi^0$	$(2.34 \pm 0.21) \times 10^{-3}$	
$\Gamma_{68}$	$\bar{\rho}n\pi^+\pi^0$	$(2.21 \pm 0.18) \times 10^{-3}$	
$\Gamma_{69}$	$\Lambda\bar{\Lambda}$	$(3.27 \pm 0.24) \times 10^{-4}$	
$\Gamma_{70}$	$\Lambda\bar{\Lambda}\pi^+\pi^-$	$(1.18 \pm 0.13) \times 10^{-3}$	
$\Gamma_{71}$	$\Lambda\bar{\Lambda}\pi^+\pi^-$ (non-resonant)	$< 5 \times 10^{-4}$	CL=90%
$\Gamma_{72}$	$\Sigma(1385)^+ \bar{\Lambda}\pi^- + \text{c.c.}$	$< 5 \times 10^{-4}$	CL=90%
$\Gamma_{73}$	$\Sigma(1385)^- \bar{\Lambda}\pi^+ + \text{c.c.}$	$< 5 \times 10^{-4}$	CL=90%
$\Gamma_{74}$	$K^+ \bar{\rho}\Lambda + \text{c.c.}$	$(1.25 \pm 0.12) \times 10^{-3}$	S=1.3

$\Gamma_{75}$	$K^+ \bar{p} \Lambda(1520)^+ + \text{c.c.}$	$(2.9 \pm 0.7) \times 10^{-4}$	
$\Gamma_{76}$	$\Lambda(1520) \bar{\Lambda}(1520)$	$(3.1 \pm 1.2) \times 10^{-4}$	
$\Gamma_{77}$	$\Sigma^0 \bar{\Sigma}^0$	$(4.5 \pm 0.4) \times 10^{-4}$	
$\Gamma_{78}$	$\Sigma^+ \bar{\Sigma}^-$	$(4.0 \pm 0.7) \times 10^{-4}$	S=1.7
$\Gamma_{79}$	$\Sigma(1385)^+ \bar{\Sigma}(1385)^-$	$(1.6 \pm 0.6) \times 10^{-4}$	
$\Gamma_{80}$	$\Sigma(1385)^- \bar{\Sigma}(1385)^+$	$(2.3 \pm 0.7) \times 10^{-4}$	
$\Gamma_{81}$	$K^- \Lambda \bar{\Xi}^+ + \text{c.c.}$	$(1.94 \pm 0.35) \times 10^{-4}$	
$\Gamma_{82}$	$\Xi^0 \bar{\Xi}^0$	$(3.1 \pm 0.8) \times 10^{-4}$	
$\Gamma_{83}$	$\Xi^- \bar{\Xi}^+$	$(4.8 \pm 0.7) \times 10^{-4}$	
$\Gamma_{84}$	$\eta_c \pi^+ \pi^-$	$< 7 \times 10^{-4}$	CL=90%

### Radiative decays

$\Gamma_{85}$	$\gamma J/\psi(1S)$	$(1.40 \pm 0.05) \%$	
$\Gamma_{86}$	$\gamma \rho^0$	$< 9 \times 10^{-6}$	CL=90%
$\Gamma_{87}$	$\gamma \omega$	$< 8 \times 10^{-6}$	CL=90%
$\Gamma_{88}$	$\gamma \phi$	$< 6 \times 10^{-6}$	CL=90%
$\Gamma_{89}$	$\gamma \gamma$	$(2.04 \pm 0.09) \times 10^{-4}$	
$\Gamma_{90}$	$e^+ e^- J/\psi(1S)$	$(1.54 \pm 0.33) \times 10^{-4}$	

### 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 247 measurements to determine 49 parameters. The overall fit has a  $\chi^2 = 376.9$  for 198 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,  $x_i \equiv \Gamma_i / \Gamma_{\text{total}}$ .

$x_2$	24									
$x_8$	9	2								
$x_{30}$	5	1	28							
$x_{32}$	8	2	10	3						
$x_{36}$	4	1	5	1	14					
$x_{42}$	8	2	8	3	18	11				
$x_{43}$	7	2	8	2	18	10	14			
$x_{50}$	5	1	5	2	9	5	7	7		
$x_{55}$	7	2	6	2	9	5	7	7	4	
$x_{56}$	3	1	4	1	3	-1	7	7	3	3
$x_{69}$	4	1	5	1	13	8	10	10	5	5
$x_{85}$	5	1	6	2	17	11	13	12	6	6
$x_{89}$	-8	-2	-2	-3	14	9	10	10	3	1
$\Gamma$	-26	-6	-19	-10	-15	-7	-14	-12	-10	-13
	$x_1$	$x_2$	$x_8$	$x_{30}$	$x_{32}$	$x_{36}$	$x_{42}$	$x_{43}$	$x_{50}$	$x_{55}$

$\chi_{69}$	5			
$\chi_{85}$	-19	9		
$\chi_{89}$	6	9	13	
$\Gamma$	-4	-7	-9	-38
	$\chi_{56}$	$\chi_{69}$	$\chi_{85}$	$\chi_{89}$

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

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

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

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
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**33.6 ± 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 <sup>+11.3</sup> <sub>-8.9</sub> ± 2.4		1,2 AMBROGIANI 99B	E835	$\bar{p}p \rightarrow \gamma J/\psi$

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

<sup>2</sup> Values in  $(\Gamma(\rho\bar{\rho}) \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}})$  and  $(\Gamma(\rho\bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}})$  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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**52 ± 4 OUR FIT**

**49 ± 10 OUR AVERAGE** Error includes scale factor of 1.8.

44.7 ± 3.6 ± 4.9	3.6k	UEHARA 08	BELL	$\gamma\gamma \rightarrow \chi_{c0} \rightarrow 2(\pi^+\pi^-)$
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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**40.0 ± 3.5 OUR FIT**

<b>38.8 ± 3.7 ± 4.7</b>	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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<b>26 ± 4 ± 4</b>	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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**16 ± 4 OUR FIT**

<b>16.7 ± 6.1 ± 3.0</b>	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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**18.8 ± 1.3 OUR FIT**

**23 ± 5 OUR AVERAGE**

29.7 <sup>+17.4</sup> <sub>-12.0</sub> ± 4.8	103 <sup>+60</sup> <sub>-42</sub>		<sup>1</sup> 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		<sup>2</sup> NAKAZAWA	05	BELL 10.6 $e^+ e^- \rightarrow e^+ e^- \pi^+ \pi^-$
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<sup>1</sup> We multiplied the measurement by 3 to convert from  $\pi^0 \pi^0$  to  $\pi\pi$ . Interference with the continuum included.

<sup>2</sup> 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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<b>9.4 ± 2.3 ± 1.2</b>		22	<sup>1</sup> UEHARA	10A	BELL 10.6 $e^+ e^- \rightarrow e^+ e^- \eta\eta$
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<sup>1</sup> 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		<sup>1</sup> LIU	12B	BELL $\gamma\gamma \rightarrow 2(\pi^+ \pi^- \pi^0)$
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<sup>1</sup> 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		<sup>1</sup> LIU	12B	BELL $\gamma\gamma \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$
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<sup>1</sup> 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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**13.4 ± 1.0 OUR FIT**

<b>14.3 ± 1.6 ± 2.3</b>		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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**7.0 ± 0.5 OUR FIT**

<b>8.7 ± 1.7 ± 0.9</b>		266	<sup>1</sup> 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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<sup>1</sup> 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	
<b>6.2±0.7 OUR FIT</b>					
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	
<b>1.76±0.18 OUR FIT</b>					
1.72±0.33±0.14	56 ± 11	<sup>1</sup> 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	$\gamma\gamma \rightarrow \chi_{c0} \rightarrow 2(K^+K^-)$	
<sup>1</sup> Supersedes UEHARA 08. Using $B(\phi \rightarrow K^+K^-) = (48.9 \pm 0.5)\%$ .					

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

#### HADRONIC DECAYS

$\Gamma(2(\pi^+\pi^-))/\Gamma_{\text{total}}$		$\Gamma_1/\Gamma$
VALUE	DOCUMENT ID	
<b>0.0234±0.0018 OUR FIT</b>		

$\Gamma(\rho^0\pi^+\pi^-)/\Gamma(2(\pi^+\pi^-))$			$\Gamma_2/\Gamma_1$
VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.39±0.12 OUR FIT</b>			
0.39±0.12	TANENBAUM	78 MRK1	$\psi(2S) \rightarrow \gamma\chi_{c0}$

$\Gamma(\rho^0\pi^+\pi^-)/\Gamma_{\text{total}}$		$\Gamma_2/\Gamma$
VALUE	DOCUMENT ID	
<b>0.0091±0.0029 OUR FIT</b>		

$\Gamma(f_0(980)f_0(980))/\Gamma_{\text{total}}$					$\Gamma_4/\Gamma$
VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT	
6.6±2.1±0.1	36 ± 9	<sup>1</sup> ABLIKIM	04G BES	$\psi(2S) \rightarrow \gamma 2\pi^+ 2\pi^-$	

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\pi^+\pi^-\pi^0\pi^0)/\Gamma_{\text{total}}$					$\Gamma_5/\Gamma$
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
3.3±0.4±0.1	1751.4	<sup>1</sup> HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$	

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . 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
<b>2.9±0.4±0.1</b>	1358.5	<sup>1,2</sup> HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> 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
<b>3.3±0.4±0.1</b>	3296	<sup>1</sup> ABLIKIM	11A BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . 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
<b>18.1±1.4 OUR FIT</b>	

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

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.41±0.09 OUR FIT</b>			
<b>0.41±0.10</b>	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
<b>9.8<sup>+3.6</sup><sub>-2.8</sub>±0.2</b>	83	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . 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
<b>8.0<sup>+2.0</sup><sub>-2.4</sub>±0.2</b>	62	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

<sup>1</sup> ABLIKIM 05Q reports  $(8.49 \pm 1.66^{+1.32}_{-1.99}) \times 10^{-4}$  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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>6.3 \pm 1.9 \pm 0.1</math></b>	68	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

<sup>1</sup> ABLIKIM 05Q reports  $(6.66 \pm 1.31^{+1.60}_{-1.51}) \times 10^{-3}$  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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. The measurement assumes  $B(K_1(1270) \rightarrow K\rho(770)) = 42 \pm 6\%$ .

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

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt; 2.7</math></b>	90	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ . The measurement assumes  $B(K_1(1400) \rightarrow K^*(892)\pi) = 94 \pm 6\%$ .

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

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>16.2^{+10.4}_{-9.0} \pm 0.3</math></b>	28	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

<sup>1</sup> ABLIKIM 05Q reports  $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(980) f_0(980)) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))] = (1.59 \pm 0.50^{+0.89}_{-0.72}) \times 10^{-5}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . 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.

### $\Gamma(f_0(980) f_0(2200)) / \Gamma_{\text{total}}$ $\Gamma_{14} / \Gamma$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>7.9^{+2.0}_{-2.5} \pm 0.2</math></b>	77	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

<sup>1</sup> ABLIKIM 05Q reports  $(8.42 \pm 1.42^{+1.65}_{-2.29}) \times 10^{-4}$  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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . 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.

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

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;2.7</b>	90	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$
<sup>1</sup> 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ . 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.				

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

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;1.7</b>	90	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$
<sup>1</sup> 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ . 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.				

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

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>6.7^{+3.5}_{-2.3} \pm 0.1</math></b>	61	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$
<sup>1</sup> 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . 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.				

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

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;1.3</b>	90	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$
<sup>1</sup> 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ . 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.				

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

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;0.5</b>	90	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$ . 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.

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

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

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$ . 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.

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

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

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

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

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

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

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>0.56 \pm 0.09 \pm 0.01</math></b>	213.5	<sup>1</sup> HE	08B	CLEO $e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>2.49 \pm 0.33 \pm 0.05</math></b>	401.7	<sup>1</sup> HE	08B	CLEO $e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(\rho^+ K^- K^0 + \text{c.c.})/\Gamma_{\text{total}} \quad \Gamma_{25}/\Gamma$$

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.21±0.21±0.02</b>	179.7	<sup>1</sup> HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.46±0.12±0.01</b>	64.1	<sup>1</sup> HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>5.7±1.0±0.1</b>	152 ± 14	<sup>1</sup> ABLIKIM	050 BES2	$\psi(2S) \rightarrow \gamma \chi_{c0}$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

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

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(3(\pi^+ \pi^-))/\Gamma_{\text{total}} \quad \Gamma_{29}/\Gamma$$

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>12.0±1.8 OUR EVALUATION</b>	Treating systematic error as correlated.		
<b>12.0±1.7 OUR AVERAGE</b>			

11.7±1.0±1.9	<sup>1</sup> BAI	99B BES	$\psi(2S) \rightarrow \gamma \chi_{c0}$
12.5±2.9±0.5	<sup>1</sup> TANENBAUM	78 MRK1	$\psi(2S) \rightarrow \gamma \chi_{c0}$

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

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

<u>VALUE</u>	<u>DOCUMENT ID</u>
<b>0.0075±0.0016 OUR FIT</b>	

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

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
$1.72^{+0.60}_{-0.54} \pm 0.04$	64	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$

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

$1.56 \pm 0.40 \pm 0.03$      $30 \pm 6$     <sup>2,3</sup> ABLIKIM    04H BES    Repl. by ABLIKIM 05Q

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<sup>3</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-3}$ )	DOCUMENT ID
<b><math>8.51 \pm 0.33</math> OUR FIT</b>	

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

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

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

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

VALUE (units $10^{-3}$ )	DOCUMENT ID
<b><math>3.01 \pm 0.19</math> OUR FIT</b>	

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

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.353 \pm 0.025</math> OUR FIT</b>			

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

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

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

<sup>1</sup> We have multiplied  $\pi^0 \pi^0$  measurement by 3 to obtain  $\pi\pi$ .

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

VALUE (units $10^{-5}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>9.1 \pm 1.1 \pm 0.2</math></b>		85	<sup>1</sup> ABLIKIM	17AI BES3	$\psi(2S) \rightarrow \gamma \eta' \eta$

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

$< 24$     90     $35 \pm 13$     <sup>2</sup> ASNER    09 CLEO     $\psi(2S) \rightarrow \gamma \eta' \eta$

$< 50$     90    <sup>3</sup> ADAMS    07 CLEO     $\psi(2S) \rightarrow \gamma \chi_{c0}$

<sup>1</sup> ABLIKIM 17AI reports  $(8.92 \pm 0.84 \pm 0.65) \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

<sup>3</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

$\Gamma(\eta'\eta')/\Gamma_{\text{total}}$		$\Gamma_{38}/\Gamma$			
VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT	

**2.17 ± 0.12 OUR AVERAGE**

2.23 ± 0.13 ± 0.05	2.5k	<sup>1</sup> ABLIKIM	17AI	BES3	$\psi(2S) \rightarrow \gamma\eta'\eta'$
2.00 ± 0.21 ± 0.04	0.4k	<sup>2</sup> ASNER	09	CLEO	$\psi(2S) \rightarrow \gamma\eta'\eta'$

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

1.60 ± 0.41 ± 0.03	23	<sup>3</sup> ADAMS	07	CLEO	$\psi(2S) \rightarrow \gamma\chi_{c0}$
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<sup>1</sup> ABLIKIM 17AI reports  $(2.19 \pm 0.03 \pm 0.14) \times 10^{-3}$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow \eta'\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\omega\omega)/\Gamma_{\text{total}}$		$\Gamma_{39}/\Gamma$			
VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT	

**0.97 ± 0.11 OUR AVERAGE**

0.93 ± 0.11 ± 0.02	991	<sup>1</sup> ABLIKIM	11K	BES3	$\psi(2S) \rightarrow \gamma$ hadrons
2.16 ± 0.66 ± 0.04	38.1 ± 9.6	<sup>2</sup> ABLIKIM	05N	BES2	$\psi(2S) \rightarrow \gamma\chi_{c0} \rightarrow \gamma 6\pi$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.18±0.22±0.02</b>	76	<sup>1</sup> ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma$ hadrons

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

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

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

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

VALUE (units $10^{-3}$ )	DOCUMENT ID
<b>6.05±0.31 OUR FIT</b>	

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

VALUE (units $10^{-3}$ )	DOCUMENT ID
<b>3.16±0.17 OUR FIT</b>	

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

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.372±0.023 OUR FIT</b>			

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

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

<sup>2</sup> Not independent from other measurements.

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

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.52±0.04 OUR FIT</b>			

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

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

<sup>2</sup> Not independent from other measurements.

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

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.20</b>	90	<sup>1</sup> 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	<sup>2</sup> ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma\chi_{c0}$
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<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

<sup>2</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

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

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.4</b>	90	<sup>1</sup> ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

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

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.09</b>	90	<sup>1</sup> ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

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

<0.7	90	<sup>2,3</sup> ABLIKIM 06R	BES2	$\psi(2S) \rightarrow \gamma \chi_{c0}$
<0.7	90	<sup>3,4</sup> BAI 99B	BES	$\psi(2S) \rightarrow \gamma \chi_{c0}$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

<sup>2</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

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

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

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

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

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

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

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.23</b>	90	<sup>1</sup> ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

<sup>1</sup>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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

**$\Gamma(K^+ K^- K_S^0 \bar{K}_S^0) / \Gamma_{\text{total}}$   $\Gamma_{49} / \Gamma$**

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.41 ± 0.47 ± 0.03</b>	16.8 ± 4.8	<sup>1</sup> ABLIKIM	050 BES2	$\psi(2S) \rightarrow \gamma \chi_{c0}$

<sup>1</sup>ABLIKIM 050 reports  $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- K_S^0 \bar{K}_S^0) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))] = (0.138 \pm 0.039 \pm 0.025) \times 10^{-3}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>
<b>2.82 ± 0.29 OUR FIT</b>	

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.97 ± 0.25 ± 0.02</b>	38	<sup>1</sup> ABLIKIM	06T BES2	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

<sup>1</sup>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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

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

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

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

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

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

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

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>
<b>0.80 ± 0.07 OUR FIT</b>	

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

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>DOCUMENT ID</u>
<b>2.21 ± 0.08 OUR FIT</b>	

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.70±0.07 OUR AVERAGE</b>	Error includes scale factor of 1.3.		
0.73±0.06±0.01	<sup>1</sup> ONYISI	10 CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$
0.56±0.12±0.01	<sup>2</sup> ATHAR	07 CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.35±0.04 OUR AVERAGE</b>			
0.35±0.04±0.01	<sup>1</sup> ONYISI	10 CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$
0.37±0.11±0.01	<sup>2</sup> ATHAR	07 CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

<sup>1</sup> ONYISI 10 reports  $(3.73 \pm 0.38 \pm 0.28 \pm 0.19) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p}\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> ATHAR 07 reports  $(0.39 \pm 0.11 \pm 0.04) \times 10^{-3}$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p}\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.52±0.06±0.01</b>	<sup>1</sup> ONYISI	10 CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$

<sup>1</sup> ONYISI 10 reports  $(5.57 \pm 0.48 \pm 0.42 \pm 0.14) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p}\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (units <math>10^{-5}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>6.0±1.4±0.1</b>	42 ± 8	<sup>1</sup> ABLIKIM	11F BES3	$\psi(2S) \rightarrow \gamma p\bar{p}K^+ K^-$

<sup>1</sup> ABLIKIM 11F reports  $(6.12 \pm 1.18 \pm 0.86) \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p}\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
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**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 <sup>1</sup>BAI 99B BES  $\psi(2S) \rightarrow \gamma\chi_{c0}$ 4.20 ± 1.15 ± 0.18 <sup>1</sup>TANENBAUM 78 MRK1  $\psi(2S) \rightarrow \gamma\chi_{c0}$ <sup>1</sup>Rescaled by us using  $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.4 \pm 0.4)\%$  and  $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (32.6 \pm 0.5)\%$ . $\Gamma(\rho\bar{p}\pi^0\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{62}/\Gamma$ 

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.104 ± 0.028 ± 0.002** 39.5 <sup>1</sup>HE 08B CLEO  $e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$ <sup>1</sup>HE 08B reports  $0.11 \pm 0.02 \pm 0.02 \pm 0.01\%$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{p}\pi^0\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. $\Gamma(\rho\bar{p}K^+K^- \text{ (non-resonant)})/\Gamma_{\text{total}}$   $\Gamma_{63}/\Gamma$ 

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**1.22 ± 0.26 ± 0.02** 48 ± 8 <sup>1</sup>ABLIKIM 11F BES3  $\psi(2S) \rightarrow \gamma\rho\bar{p}K^+K^-$ <sup>1</sup>ABLIKIM 11F reports  $(1.24 \pm 0.20 \pm 0.18) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{p}K^+K^- \text{ (non-resonant)})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value. $\Gamma(\rho\bar{p}K_S^0K_S^0)/\Gamma_{\text{total}}$   $\Gamma_{64}/\Gamma$ 

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**<8.8** 90 <sup>1</sup>ABLIKIM 06D BES2  $\psi(2S) \rightarrow \chi_{c0}\gamma$ <sup>1</sup>Using  $B(\psi(2S) \rightarrow \chi_{c0}\gamma) = (9.2 \pm 0.5)\%$  $\Gamma(\rho\bar{n}\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{65}/\Gamma$ 

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**12.7 ± 1.1 OUR AVERAGE**12.9 ± 1.1 ± 0.3 5150 <sup>1</sup>ABLIKIM 12J BES3  $\psi(2S) \rightarrow \gamma\rho\bar{n}\pi^-$ 11.2 ± 3.1 ± 0.2 <sup>2</sup>ABLIKIM 06I BES2  $\psi(2S) \rightarrow \gamma\rho\pi^-X$ <sup>1</sup>ABLIKIM 12J reports  $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{n}\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  =  $(1.26 \pm 0.02 \pm 0.11) \times 10^{-4}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.<sup>2</sup>ABLIKIM 06I reports  $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{n}\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  =  $(1.10 \pm 0.24 \pm 0.18) \times 10^{-4}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>13.7±1.2±0.3</b>	5808	<sup>1</sup> ABLIKIM	12J BES3	$\psi(2S) \rightarrow \gamma\bar{p}n\pi^+$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>23.4±2.0±0.5</b>	2480	<sup>1</sup> ABLIKIM	12J BES3	$\psi(2S) \rightarrow \gamma\rho\bar{n}\pi^-\pi^0$

<sup>1</sup> ABLIKIM 12J reports  $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{n}\pi^-\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))] = (2.29 \pm 0.08 \pm 0.18) \times 10^{-4}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>22.1±1.8±0.5</b>	2757	<sup>1</sup> ABLIKIM	12J BES3	$\psi(2S) \rightarrow \gamma\bar{p}n\pi^+\pi^0$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	DOCUMENT ID
<b>3.27±0.24 OUR FIT</b>	

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

VALUE (units $10^{-5}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>118±12±2</b>		426	<sup>1</sup> 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                      <sup>2</sup> ABLIKIM                      06D BES2                       $\psi(2S) \rightarrow \chi_{c0}\gamma$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

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

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

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

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

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

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

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

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

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

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

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>1.25 \pm 0.12</math> OUR AVERAGE</b>				Error includes scale factor of 1.3.
$1.30 \pm 0.09 \pm 0.03$	9k	<sup>1,2</sup> ABLIKIM	13D	BES3 $\psi(2S) \rightarrow \gamma \Lambda \bar{p} K^+$
$1.01 \pm 0.19 \pm 0.02$		<sup>3</sup> ATHAR	07	CLEO $\psi(2S) \rightarrow \gamma h^+ h^- h^0$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<sup>3</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

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

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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<b><math>3.1 \pm 1.2 \pm 0.1</math></b>	$28 \pm 10$	<sup>1</sup> ABLIKIM	11F BES3	$\psi(2S) \rightarrow \gamma p \bar{p} K^+ K^-$
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<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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<b><math>4.5 \pm 0.4</math> OUR AVERAGE</b>				
$4.7 \pm 0.5 \pm 0.1$	243	<sup>1</sup> ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$
$4.2 \pm 0.7 \pm 0.1$	$78 \pm 10$	<sup>2</sup> NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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<b><math>4.0 \pm 0.7</math> OUR AVERAGE</b>	Error includes scale factor of 1.7.			
$4.5 \pm 0.5 \pm 0.1$	148	<sup>1</sup> ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$
$3.1 \pm 0.7 \pm 0.1$	$39 \pm 7$	<sup>2</sup> NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>2</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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<b><math>16.2 \pm 5.8 \pm 0.3</math></b>	27	<sup>1</sup> ABLIKIM	12i BES3	$\psi(2S) \rightarrow \gamma \Lambda \bar{\Lambda} \pi^+ \pi^-$
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<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>23.2±6.5±0.5</b>	33	<sup>1</sup> ABLIKIM	12I	BES3 $\psi(2S) \rightarrow \gamma \Lambda \bar{\Lambda} \pi^+ \pi^-$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.94±0.35±0.04</b>	57	<sup>1</sup> ABLIKIM	15I	BES3 $\psi(2S) \rightarrow \gamma K^-\Lambda\bar{\Xi}^+ + \text{c.c.}$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

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

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>4.8±0.7±0.1</b>	95 ± 11		<sup>1</sup> NAIK	08	CLEO $\psi(2S) \rightarrow \gamma \Xi^-\bar{\Xi}^+$

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

<10.3      90      <sup>2</sup> ABLIKIM      06D      BES2       $\psi(2S) \rightarrow \chi_{c0}\gamma$

<sup>1</sup> NAIK 08 reports  $(5.14 \pm 0.60 \pm 0.47) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow \Xi^-\bar{\Xi}^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$  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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

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

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 7 × 10<sup>-4</sup></b>	90	<sup>1,2</sup> 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<sup>-4</sup>      90      <sup>1,3</sup> ABLIKIM      13B      BES3       $e^+e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c0}$

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

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

<sup>3</sup> 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
<b>18.8±1.0 OUR FIT</b>			
<b>15.3±2.4±0.8</b>	<sup>1</sup> ANDREOTTI 03	E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow \pi^0\pi^0$
<sup>1</sup> 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
<b>&lt;0.4</b>	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
<b>&lt;2.5</b>	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
<b>6.7±0.5 OUR FIT</b>			
<b>4.0±1.2<sup>+0.5</sup><sub>-0.3</sub></b>	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
<b>• • •</b>	We do not use the following data for averages, fits, limits, etc. • • •		
<b>2.1<sup>+2.3</sup><sub>-1.5</sub></b>	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 $10^{-2}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.40±0.05 OUR FIT</b>				
<b>• • •</b>	We do not use the following data for averages, fits, limits, etc. • • •			
0.25±0.16±2.15	12k	<sup>1</sup> ABLIKIM 17U	BES3	$e^+e^- \rightarrow \gamma X$
2.0 ±0.2 ±0.2		<sup>2</sup> ADAM 05A	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$
<sup>1</sup> Not independent from $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))$ and the product $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) \times B(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S))$ also measured in ABLIKIM 17U.				
<sup>2</sup> 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
<b>&lt; 9</b>	90	1.2 ± 4.5	<sup>1</sup> BENNETT 08A	CLEO	$\psi(2S) \rightarrow \gamma\gamma\rho^0$
<b>• • •</b>	We do not use the following data for averages, fits, limits, etc. • • •				
<10	90	6 ± 12	<sup>2</sup> ABLIKIM 11E	BES3	$\psi(2S) \rightarrow \gamma\gamma\rho^0$
<sup>1</sup> 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .					
<sup>2</sup> 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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .					

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

VALUE (units $10^{-6}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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<b>&lt; 8</b>	90	$0.0 \pm 2.8$	<sup>1</sup> 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. • • •

<13	90	$5 \pm 11$	<sup>2</sup> ABLIKIM	11E BES3	$\psi(2S) \rightarrow \gamma\gamma\omega$
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<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

<sup>2</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

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

VALUE (units $10^{-6}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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<b>&lt; 6</b>	90	$0.1 \pm 1.6$	<sup>1</sup> 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	$15 \pm 7$	<sup>2</sup> ABLIKIM	11E BES3	$\psi(2S) \rightarrow \gamma\gamma\phi$
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<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

<sup>2</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

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

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
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**$2.04 \pm 0.09$  OUR FIT**

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

<7	90	<sup>1</sup> WICHT	08 BELL	$B^\pm \rightarrow K^\pm \gamma\gamma$
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<sup>1</sup> WICHT 08 reports  $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma\gamma)/\Gamma_{\text{total}}] \times [B(B^\pm \rightarrow \chi_{c0} K^\pm)] < 0.11 \times 10^{-6}$  which we divide by our best value  $B(B^\pm \rightarrow \chi_{c0} K^\pm) = 1.49 \times 10^{-4}$ .

 $\Gamma(e^+ e^- J/\psi(1S))/\Gamma_{\text{total}}$   $\Gamma_{90}/\Gamma$ 

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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<b><math>1.54 \pm 0.33 \pm 0.03</math></b>	56	<sup>1</sup> ABLIKIM	17i BES3	$\psi(2S) \rightarrow \gamma e^+ e^- J/\psi$
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<sup>1</sup> ABLIKIM 17i reports  $(1.51 \pm 0.30 \pm 0.13) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow e^+ e^- J/\psi(1S))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(e^+ e^- J/\psi(1S))/\Gamma(\gamma J/\psi(1S))$   $\Gamma_{90}/\Gamma_{85}$ 

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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<b><math>9.5 \pm 1.9 \pm 0.7</math></b>	56	<sup>1</sup> ABLIKIM	17i BES3	$\psi(2S) \rightarrow e^+ e^- \gamma J/\psi$
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<sup>1</sup> Uses  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) \times B(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S)) = (15.8 \pm 0.3 \pm 0.6) \times 10^{-4}$  from ABLIKIM 17N and accounts for common systematic errors.

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

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
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**1.45 ± 0.08 OUR FIT****2.0 ± 0.4 OUR AVERAGE**

2.2 ± 0.4 $\begin{smallmatrix} +0.1 \\ -0.2 \end{smallmatrix}$	<sup>1</sup> ANDREOTTI 04	E835	$p\bar{p} \rightarrow \chi_{c0} \rightarrow \gamma\gamma$
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1.45 ± 0.74	<sup>2</sup> AMBROGIANI 00B	E835	$\bar{p}p \rightarrow \chi_{c2} \rightarrow \gamma\gamma, \gamma J/\psi$
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<sup>1</sup> 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.

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

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

VALUE (units $10^{-7}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**31.1 ± 1.5 OUR FIT****28.2 ± 2.1 OUR AVERAGE**

28.0 ± 1.9 ± 1.3	392	<sup>1,2,3</sup> BAGNASCO 02	E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$
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29.3 $\begin{smallmatrix} +5.7 \\ -4.7 \end{smallmatrix}$ ± 1.5	89	<sup>1,2</sup> AMBROGIANI 99B		$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$
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<sup>1</sup> 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.

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

<sup>3</sup> Recalculated by ANDREOTTI 05A.

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

VALUE (units $10^{-8}$ )	DOCUMENT ID	TECN	COMMENT
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**4.52 ± 0.27 OUR FIT**

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

6.52 ± 1.18 $\begin{smallmatrix} +0.48 \\ -0.72 \end{smallmatrix}$	<sup>1</sup> ANDREOTTI 04	E835	$p\bar{p} \rightarrow \chi_{c0} \rightarrow \gamma\gamma$
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<sup>1</sup> 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 $\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}$  $\Gamma_{56}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{\psi(2S)}$ 

VALUE (units $10^{-6}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**21.7 ± 0.9 OUR FIT****23.7 ± 1.0 OUR AVERAGE**

23.7 ± 0.8 ± 0.9	1222	ABLIKIM 13v	BES3	$\psi(2S) \rightarrow \gamma p\bar{p}$
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23.7 ± 1.4 ± 1.4	383 ± 22	<sup>1</sup> NAIK 08	CLEO	$\psi(2S) \rightarrow \gamma p\bar{p}$
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23.6 $\begin{smallmatrix} +3.7 \\ -3.4 \end{smallmatrix}$ ± 3.4	89.5 $\begin{smallmatrix} +14 \\ -13 \end{smallmatrix}$	BAI 04F	BES	$\psi(2S) \rightarrow \gamma\chi_{c0}(1P) \rightarrow \gamma p\bar{p}$
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<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$ .

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_{56}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
<b>6.25±0.26 OUR FIT</b>			
<b>4.6 ±1.9</b>	<sup>1</sup> BAI	98I	BES $\psi(2S) \rightarrow \gamma\chi_{c0} \rightarrow \gamma\rho\bar{\rho}$

<sup>1</sup> Calculated by us. The value for  $B(\chi_{c0} \rightarrow \rho\bar{\rho})$  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].

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \Lambda\bar{\Lambda})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma_{69}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-6}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>32.0±2.3 OUR FIT</b>				
<b>31.7±2.3 OUR AVERAGE</b>				

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

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.62 \pm 0.31)\%$ .

<sup>2</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$ .

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \Lambda\bar{\Lambda})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_{69}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>9.2±0.7 OUR FIT</b>				
<b>13.0<sup>+3.6</sup><sub>-3.5</sub>±2.5</b>	15.2 <sup>+4.2</sup> <sub>-4.0</sub>	<sup>1</sup> BAI	03E	BES $\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}$

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

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma_{85}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-2}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.138±0.005 OUR FIT</b>				
<b>0.147±0.029 OUR AVERAGE</b>				Error includes scale factor of 4.6.
0.158±0.003±0.006	4.8k	<sup>1</sup> ABLIKIM	17N	BES3 $\psi(2S) \rightarrow \gamma\gamma J/\psi$
0.024±0.015±0.205	12k	ABLIKIM	17U	BES3 $e^+e^- \rightarrow \gamma X$
0.069±0.018		<sup>2</sup> OREGLIA	82	CBAL $\psi(2S) \rightarrow \gamma\chi_{c0}$
0.4 ±0.3		<sup>3</sup> BRANDELIK	79B	DASP $\psi(2S) \rightarrow \gamma\chi_{c0}$
0.16 ±0.11		<sup>3</sup> BARTEL	78B	CNTR $\psi(2S) \rightarrow \gamma\chi_{c0}$
3.3 ±1.7		<sup>4</sup> BIDDICK	77	CNTR $e^+e^- \rightarrow \gamma X$

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

0.151±0.003±0.010	4.3k	<sup>5</sup> ABLIKIM	120	BES3	$\psi(2S) \rightarrow \gamma\chi_{c0}$
0.125±0.007±0.013	560	<sup>6</sup> MENDEZ	08	CLEO	$\psi(2S) \rightarrow \gamma\chi_{c0}$
0.18 ±0.01 ±0.02	172	<sup>7</sup> ADAM	05A	CLEO	Repl. by MENDEZ 08

<sup>1</sup> Uses  $B(J/\psi \rightarrow e^+e^-) = (5.971 \pm 0.032)\%$  and  $B(J/\psi \rightarrow \mu^+\mu^-) = (5.961 \pm 0.033)\%$ .

<sup>2</sup> Recalculated by us using  $B(J/\psi(1S) \rightarrow \ell^+\ell^-) = 0.1181 \pm 0.0020$ .

<sup>3</sup> Recalculated by us using  $B(J/\psi(1S) \rightarrow \mu^+\mu^-) = 0.0588 \pm 0.0010$ .

<sup>4</sup> Assumes isotropic gamma distribution.

<sup>5</sup> Superseded by ABLIKIM 17N.

<sup>6</sup> Not independent from other measurements of MENDEZ 08.

<sup>7</sup> Not independent from other values reported by ADAM 05A.

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

$$\frac{\Gamma_{85}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_9^{\psi(2S)}}{\Gamma_{85}/\Gamma \times \Gamma_{139}^{\psi(2S)}/(\Gamma_{11}^{\psi(2S)} + \Gamma_{12}^{\psi(2S)} + \Gamma_{13}^{\psi(2S)} + 0.343\Gamma_{140}^{\psi(2S)} + 0.190\Gamma_{141}^{\psi(2S)})}$$

<u>VALUE (units 10<sup>-2</sup>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.224±0.009 OUR FIT</b>				

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

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

<sup>1</sup> Not independent from other measurements of MENDEZ 08.

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

$$\frac{\Gamma_{85}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}{\Gamma_{85}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

<u>VALUE (units 10<sup>-2</sup>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.397±0.015 OUR FIT</b>				

**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	<sup>1</sup> ADAM	05A	CLEO	Repl. by MENDEZ 08
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<sup>1</sup> Not independent from other values reported by ADAM 05A.

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

$$\frac{\Gamma_{89}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma^{\psi(2S)}}{\Gamma_{89}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma^{\psi(2S)}}$$

<u>VALUE (units 10<sup>-5</sup>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>2.00±0.08 OUR FIT</b>				

**1.95±0.09 OUR AVERAGE**

1.93±0.08±0.05	3.5k	ABLIKIM	17AE	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	$\psi(2S) \rightarrow \gamma\chi_{c0}$

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

2.17±0.17±0.12	0.8k	<sup>1</sup> ABLIKIM	12A	BES3	$\psi(2S) \rightarrow \gamma\chi_{c0} \rightarrow 3\gamma$
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<sup>1</sup> Superseded by ABLIKIM 17AE.

$$\Gamma(\chi_{c0}(1P) \rightarrow \pi\pi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}} \quad \Gamma_{32}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{\psi(2S)}$$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>8.34±0.29 OUR FIT</b>				
<b>8.80±0.34 OUR AVERAGE</b>				
9.11±0.08±0.65	17k	<sup>1</sup> ABLIKIM	10A BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$
8.81±0.11±0.43	8.9k	<sup>2</sup> ASNER	09 CLEO	$\psi(2S) \rightarrow \gamma\pi^+\pi^-$
8.13±0.19±0.89	2.8k	<sup>3</sup> ASNER	09 CLEO	$\psi(2S) \rightarrow \gamma\pi^0\pi^0$

<sup>1</sup> 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  $\pi\pi$ .

<sup>2</sup> 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  $\pi\pi$ .

<sup>3</sup> 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  $\pi\pi$ .

$$\Gamma(\chi_{c0}(1P) \rightarrow \pi\pi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \quad \Gamma_{32}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>24.0±0.8 OUR FIT</b>				
<b>20.7±1.7 OUR AVERAGE</b>				
23.9±2.7±4.1	97 ± 11	<sup>1</sup> BAI	03C BES	$\psi(2S) \rightarrow \gamma\chi_{c0} \rightarrow \gamma\pi^0\pi^0$
20.2±1.1±1.5	720 ± 32	<sup>2</sup> BAI	98I BES	$\psi(2S) \rightarrow \gamma\chi_{c0} \rightarrow \gamma\pi^+\pi^-$

<sup>1</sup> We have multiplied  $\pi^0\pi^0$  measurement by 3 to obtain  $\pi\pi$ .

<sup>2</sup> 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  $\pi\pi$ .

$$\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}} \quad \Gamma_{36}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{\psi(2S)}$$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>2.95±0.18 OUR FIT</b>				
<b>3.12±0.19 OUR AVERAGE</b>				
3.23±0.09±0.23	2132	<sup>1</sup> ABLIKIM	10A BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$
2.93±0.12±0.29	0.9k	<sup>2</sup> 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	<sup>3</sup> ADAMS	07 CLEO	$\psi(2S) \rightarrow \gamma\chi_{c0}$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.4 \pm 0.4)\%$ .

<sup>2</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$ .

<sup>3</sup> 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).

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_{36}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>0.85 ± 0.05 OUR FIT</b>			
<b>0.578 ± 0.241 ± 0.158</b>	BAI	03C	BES $\psi(2S) \rightarrow \gamma\eta\eta$

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K^+K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma_{42}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>5.92 ± 0.28 OUR FIT</b>				
<b>5.97 ± 0.07 ± 0.32</b>	8.1k	<sup>1</sup> ASNER	09	CLEO $\psi(2S) \rightarrow \gamma K^+K^-$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$ .

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K^+K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_{42}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

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

<sup>1</sup> 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].

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K_S^0 K_S^0)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma_{43}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>3.10 ± 0.16 OUR FIT</b>				
<b>3.18 ± 0.17 OUR AVERAGE</b>				

3.22 ± 0.07 ± 0.17	2.1k	<sup>1</sup> ASNER	09	CLEO $\psi(2S) \rightarrow \gamma K_S^0 K_S^0$
3.02 ± 0.19 ± 0.33	322	ABLIKIM	050	BES2 $\psi(2S) \rightarrow \gamma K_S^0 K_S^0$

<sup>1</sup> 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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$ .

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K_S^0 K_S^0)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_{43}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>8.9 ± 0.5 OUR FIT</b>			
<b>5.6 ± 0.8 ± 1.3</b>	<sup>1</sup> BAI	99B	BES $\psi(2S) \rightarrow \gamma K_S^0 K_S^0$

<sup>1</sup> 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].

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow 2(\pi^+\pi^-))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_1/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units  $10^{-3}$ )

DOCUMENT ID

TECN

COMMENT

**6.6±0.5 OUR FIT**

**6.9±2.4 OUR AVERAGE** Error includes scale factor of 3.8.

4.4±0.1±0.9

<sup>1</sup> BAI

99B BES

$\psi(2S) \rightarrow \gamma\chi_{c0}$

9.3±0.9

<sup>2</sup> TANENBAUM

78

MRK1

$\psi(2S) \rightarrow \gamma\chi_{c0}$

<sup>1</sup> 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].

<sup>2</sup> 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  $B(J/\psi(1S) \rightarrow \ell^+\ell^-) = 0.1181 \pm 0.0020$ .

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \pi^+\pi^-K^+K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma_8/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units  $10^{-3}$ )

DOCUMENT ID

TECN

COMMENT

**1.78±0.14 OUR FIT**

**1.64±0.05±0.2**

ABLIKIM

05Q

BES2

$\psi(2S) \rightarrow \gamma\chi_{c0}$

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \pi^+\pi^-K^+K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_8/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

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

<sup>1</sup> TANENBAUM

78

MRK1

$\psi(2S) \rightarrow \gamma\chi_{c0}$

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

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K^+K^-K^+K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma_{50}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units  $10^{-4}$ )

EVTS

DOCUMENT ID

TECN

COMMENT

**2.76±0.28 OUR FIT**

**3.20±0.11±0.41**

278

<sup>1</sup> ABLIKIM

06T

BES2

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

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

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K^+K^-K^+K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_{50}/\Gamma \times \Gamma_{139}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units  $10^{-4}$ )

DOCUMENT ID

TECN

COMMENT

**8.0±0.8 OUR FIT**

**6.1±0.8±0.9**

<sup>1</sup> BAI

99B BES

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

<sup>1</sup> 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].

$$\Gamma(\chi_{c0}(1P) \rightarrow \phi\phi) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) / \Gamma_{\text{total}} \times \Gamma_{55} / \Gamma \times \Gamma_{139}^{\psi(2S)} / \Gamma^{\psi(2S)}$$

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

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

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

$$\Gamma(\chi_{c0}(1P) \rightarrow \phi\phi) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \times \Gamma_{55} / \Gamma \times \Gamma_{139}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}$$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>2.25±0.21 OUR FIT</b>			
<b>2.6 ± 1.0 ± 1.1</b>	<sup>1</sup> BAI	99B BES	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

<sup>1</sup> 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].

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ABLIKIM	17AI PR D96 112006	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	17I PRL 118 221802	M. Ablikim <i>et al.</i>	(BES III Collab.)
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CHEN	07B	PL B651 15	W.T. Chen <i>et al.</i>	(BELLE Collab.)
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