



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

### $\chi_{c0}(1P)$ 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 + 0.7 - 0.6 ± 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 + 1.8 - 1.9 ± 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 + 1.5 + 0.9 - 1.6 - 1.1		ABLIKIM	05G BES2	$\psi(2S) \rightarrow \gamma\chi_{c0}$
8.6 + 1.7 - 1.3 ± 0.1		ANDREOTTI	03 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow \pi^0\pi^0$
9.7 ± 1.0	392	<sup>1</sup> BAGNASCO	02 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$
16.6 + 5.2 - 3.7 ± 0.1		AMBROGIANI	99B E835	$\bar{p}p \rightarrow e^+e^-\gamma$
14.3 ± 2.0 ± 3.0		BAI	98I BES	$\psi(2S) \rightarrow \gamma\pi^+\pi^-$
13.5 ± 3.3 ± 4.2		GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X, \gamma\pi^0\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
13.2 ± 2.1	266	UEHARA	13 BELL	$\gamma\gamma \rightarrow K_S^0 K_S^0$

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

Mode	Fraction ( $\Gamma_j/\Gamma$ )	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%
$\Gamma_{36}$	$\eta\eta$	$(3.01 \pm 0.19) \times 10^{-3}$	
$\Gamma_{37}$	$\eta\eta'$	$(9.1 \pm 1.1) \times 10^{-5}$	
$\Gamma_{38}$	$\eta'\eta'$	$(2.17 \pm 0.12) \times 10^{-3}$	
$\Gamma_{39}$	$\omega\omega$	$(9.7 \pm 1.1) \times 10^{-4}$	
$\Gamma_{40}$	$\omega\phi$	$(1.41 \pm 0.13) \times 10^{-4}$	
$\Gamma_{41}$	$\omega K^+ K^-$	$(1.94 \pm 0.21) \times 10^{-3}$	
$\Gamma_{42}$	$K^+ K^-$	$(6.05 \pm 0.31) \times 10^{-3}$	
$\Gamma_{43}$	$K_S^0 K_S^0$	$(3.16 \pm 0.17) \times 10^{-3}$	
$\Gamma_{44}$	$\pi^+ \pi^- \eta$	$< 2.0 \times 10^{-4}$	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%
$\Gamma_{49}$	$K^+ K^- K_S^0 K_S^0$	$(1.4 \pm 0.5) \times 10^{-3}$	
$\Gamma_{50}$	$K_S^0 K_S^0 K_S^0 K_S^0$	$(5.8 \pm 0.5) \times 10^{-4}$	
$\Gamma_{51}$	$K^+ K^- K^+ K^-$	$(2.82 \pm 0.29) \times 10^{-3}$	
$\Gamma_{52}$	$K^+ K^- \phi$	$(9.7 \pm 2.5) \times 10^{-4}$	
$\Gamma_{53}$	$\bar{K}^0 K^+ \pi^- \phi + \text{c.c.}$	$(3.7 \pm 0.6) \times 10^{-3}$	
$\Gamma_{54}$	$K^+ K^- \pi^0 \phi$	$(1.90 \pm 0.35) \times 10^{-3}$	
$\Gamma_{55}$	$\phi \pi^+ \pi^- \pi^0$	$(1.18 \pm 0.15) \times 10^{-3}$	
$\Gamma_{56}$	$\phi\phi$	$(8.0 \pm 0.7) \times 10^{-4}$	
$\Gamma_{57}$	$\phi\phi\eta$	$(8.4 \pm 1.0) \times 10^{-4}$	
$\Gamma_{58}$	$\rho\bar{\rho}$	$(2.21 \pm 0.08) \times 10^{-4}$	
$\Gamma_{59}$	$\rho\bar{\rho}\pi^0$	$(7.0 \pm 0.7) \times 10^{-4}$	S=1.3
$\Gamma_{60}$	$\rho\bar{\rho}\eta$	$(3.5 \pm 0.4) \times 10^{-4}$	
$\Gamma_{61}$	$\rho\bar{\rho}\omega$	$(5.2 \pm 0.6) \times 10^{-4}$	
$\Gamma_{62}$	$\rho\bar{\rho}\phi$	$(6.0 \pm 1.4) \times 10^{-5}$	
$\Gamma_{63}$	$\rho\bar{\rho}\pi^+\pi^-$	$(2.1 \pm 0.7) \times 10^{-3}$	S=1.4
$\Gamma_{64}$	$\rho\bar{\rho}\pi^0\pi^0$	$(1.04 \pm 0.28) \times 10^{-3}$	
$\Gamma_{65}$	$\rho\bar{\rho}K^+K^-$ (non-resonant)	$(1.22 \pm 0.26) \times 10^{-4}$	
$\Gamma_{66}$	$\rho\bar{\rho}K_S^0 K_S^0$	$< 8.8 \times 10^{-4}$	CL=90%
$\Gamma_{67}$	$\rho\bar{n}\pi^-$	$(1.27 \pm 0.11) \times 10^{-3}$	
$\Gamma_{68}$	$\bar{\rho}n\pi^+$	$(1.37 \pm 0.12) \times 10^{-3}$	
$\Gamma_{69}$	$\rho\bar{n}\pi^-\pi^0$	$(2.34 \pm 0.21) \times 10^{-3}$	
$\Gamma_{70}$	$\bar{\rho}n\pi^+\pi^0$	$(2.21 \pm 0.18) \times 10^{-3}$	
$\Gamma_{71}$	$\Lambda\bar{\Lambda}$	$(3.27 \pm 0.24) \times 10^{-4}$	
$\Gamma_{72}$	$\Lambda\bar{\Lambda}\pi^+\pi^-$	$(1.18 \pm 0.13) \times 10^{-3}$	
$\Gamma_{73}$	$\Lambda\bar{\Lambda}\pi^+\pi^-$ (non-resonant)	$< 5 \times 10^{-4}$	CL=90%
$\Gamma_{74}$	$\Sigma(1385)^+ \bar{\Lambda}\pi^- + \text{c.c.}$	$< 5 \times 10^{-4}$	CL=90%

$\Gamma_{75}$	$\Sigma(1385)^-\bar{\Lambda}\pi^+ + \text{c.c.}$	$< 5 \times 10^{-4}$	CL=90%
$\Gamma_{76}$	$K^+\bar{p}\Lambda + \text{c.c.}$	$(1.25 \pm 0.12) \times 10^{-3}$	S=1.3
$\Gamma_{77}$	$K^*(892)^+\bar{p}\Lambda + \text{c.c.}$	$(4.8 \pm 0.9) \times 10^{-4}$	
$\Gamma_{78}$	$K^+\bar{p}\Lambda(1520) + \text{c.c.}$	$(2.9 \pm 0.7) \times 10^{-4}$	
$\Gamma_{79}$	$\Lambda(1520)\bar{\Lambda}(1520)$	$(3.1 \pm 1.2) \times 10^{-4}$	
$\Gamma_{80}$	$\Sigma^0\bar{\Sigma}^0$	$(4.68 \pm 0.32) \times 10^{-4}$	
$\Gamma_{81}$	$\Sigma^+\bar{p}K_S^0 + \text{c.c.}$	$(3.52 \pm 0.27) \times 10^{-4}$	
$\Gamma_{82}$	$\Sigma^0\bar{p}K^+ + \text{c.c.}$	$(3.03 \pm 0.20) \times 10^{-4}$	
$\Gamma_{83}$	$\Sigma^+\bar{\Sigma}^-$	$(4.6 \pm 0.8) \times 10^{-4}$	S=2.6
$\Gamma_{84}$	$\Sigma^-\bar{\Sigma}^+$	$(5.1 \pm 0.5) \times 10^{-4}$	
$\Gamma_{85}$	$\Sigma(1385)^+\bar{\Sigma}(1385)^-$	$(1.6 \pm 0.6) \times 10^{-4}$	
$\Gamma_{86}$	$\Sigma(1385)^-\bar{\Sigma}(1385)^+$	$(2.3 \pm 0.7) \times 10^{-4}$	
$\Gamma_{87}$	$K^-\Lambda\bar{\Xi}^+ + \text{c.c.}$	$(1.94 \pm 0.35) \times 10^{-4}$	
$\Gamma_{88}$	$\Xi^0\bar{\Xi}^0$	$(3.1 \pm 0.8) \times 10^{-4}$	
$\Gamma_{89}$	$\Xi^-\bar{\Xi}^+$	$(4.8 \pm 0.7) \times 10^{-4}$	
$\Gamma_{90}$	$\eta_c\pi^+\pi^-$	$< 7 \times 10^{-4}$	CL=90%

### Radiative decays

$\Gamma_{91}$	$\gamma J/\psi(1S)$	$(1.40 \pm 0.05) \%$	
$\Gamma_{92}$	$\gamma\rho^0$	$< 9 \times 10^{-6}$	CL=90%
$\Gamma_{93}$	$\gamma\omega$	$< 8 \times 10^{-6}$	CL=90%
$\Gamma_{94}$	$\gamma\phi$	$< 6 \times 10^{-6}$	CL=90%
$\Gamma_{95}$	$\gamma\gamma$	$(2.04 \pm 0.09) \times 10^{-4}$	
$\Gamma_{96}$	$e^+e^- J/\psi(1S)$	$(1.33 \pm 0.29) \times 10^{-4}$	
$\Gamma_{97}$	$\mu^+\mu^- J/\psi(1S)$	$< 1.9 \times 10^{-5}$	CL=90%

### 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 248 measurements to determine 49 parameters. The overall fit has a  $\chi^2 = 378.1$  for 199 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 <sub>2</sub>	24									
x <sub>8</sub>	9	2								
x <sub>30</sub>	5	1	28							
x <sub>32</sub>	8	2	10	3						
x <sub>36</sub>	4	1	5	1	14					
x <sub>42</sub>	8	2	8	3	18	11				
x <sub>43</sub>	7	2	8	2	18	10	14			
x <sub>51</sub>	5	1	5	2	9	5	7	7		
x <sub>56</sub>	7	2	6	2	9	5	7	7	4	
x <sub>58</sub>	3	1	4	1	3	-1	7	7	3	3
x <sub>71</sub>	4	1	5	1	13	8	10	10	5	5
x <sub>91</sub>	5	1	6	2	17	11	13	12	6	6
x <sub>95</sub>	-8	-2	-2	-3	14	9	10	10	3	1
Γ	-26	-6	-19	-10	-15	-7	-14	-12	-10	-13
	x <sub>1</sub>	x <sub>2</sub>	x <sub>8</sub>	x <sub>30</sub>	x <sub>32</sub>	x <sub>36</sub>	x <sub>42</sub>	x <sub>43</sub>	x <sub>51</sub>	x <sub>56</sub>

  

x <sub>71</sub>	5			
x <sub>91</sub>	-19	9		
x <sub>95</sub>	6	9	13	
Γ	-4	-7	-9	-38
	x <sub>58</sub>	x <sub>71</sub>	x <sub>91</sub>	x <sub>95</sub>

### χ<sub>c0</sub>(1P) PARTIAL WIDTHS

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

$$\Gamma(p\bar{p}) \times \Gamma(\gamma J/\psi(1S)) / \Gamma_{\text{total}} \qquad \Gamma_{58} \Gamma_{91} / \Gamma$$

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

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

$$\Gamma(2(\pi^+\pi^-)) \times \Gamma(\gamma\gamma) / \Gamma_{\text{total}} \qquad \Gamma_1 \Gamma_{95} / \Gamma$$

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     $e^+e^- \rightarrow e^+e^- \chi_{c0}$

$\Gamma(\rho^0 \rho^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_3 \Gamma_{95}/\Gamma$

<u>VALUE (eV)</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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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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$\Gamma(\pi^+ \pi^- K^+ K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_8 \Gamma_{95}/\Gamma$

<u>VALUE (eV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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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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$\Gamma(K^+ K^- \pi^+ \pi^- \pi^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{21} \Gamma_{95}/\Gamma$

<u>VALUE (eV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>26 ± 4 ± 4</b>	1094	DEL-AMO-SA..11M	BABR	BELL $\gamma\gamma \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$
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$\Gamma(K^+ \bar{K}^*(892)^0 \pi^- + \text{c.c.}) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{30} \Gamma_{95}/\Gamma$

<u>VALUE (eV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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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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$\Gamma(K^*(892)^0 \bar{K}^*(892)^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{31} \Gamma_{95}/\Gamma$

<u>VALUE (eV)</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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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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$\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{32} \Gamma_{95}/\Gamma$

<u>VALUE (eV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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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  $\pi\pi$ .

$\Gamma(\eta\eta) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{36} \Gamma_{95}/\Gamma$

<u>VALUE (eV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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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.

$\Gamma(\omega\omega) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{39} \Gamma_{95}/\Gamma$

<u>VALUE (eV)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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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  $B(\omega \rightarrow \pi^+ \pi^- \pi^0) = (89.2 \pm 0.7)\%$ .

$\Gamma(\omega\phi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{40}\Gamma_{95}/\Gamma$   
VALUE (eV)      CL%      DOCUMENT ID      TECN      COMMENT

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

<0.34      90      <sup>1</sup> LIU      12B BELL       $\gamma\gamma \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$

<sup>1</sup> Using  $B(\phi \rightarrow K^+ K^-) = (48.9 \pm 0.5)\%$  and  $B(\omega \rightarrow \pi^+ \pi^- \pi^0) = (89.2 \pm 0.7)\%$ .

$\Gamma(K^+ K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{42}\Gamma_{95}/\Gamma$   
VALUE (eV)      EVTS      DOCUMENT ID      TECN      COMMENT

**13.4 ± 1.0 OUR FIT**

**14.3 ± 1.6 ± 2.3**      153 ± 17      NAKAZAWA 05      BELL      10.6  $e^+ e^- \rightarrow e^+ e^- K^+ K^-$

$\Gamma(K_S^0 K_S^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{43}\Gamma_{95}/\Gamma$   
VALUE (eV)      EVTS      DOCUMENT ID      TECN      COMMENT

**7.0 ± 0.5 OUR FIT**

**8.7 ± 1.7 ± 0.9**      266      <sup>1</sup> UEHARA      13 BELL       $\gamma\gamma \rightarrow K_S^0 K_S^0$

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

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

<sup>1</sup> Supersedes CHEN 07B.

$\Gamma(K^+ K^- K^+ K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{51}\Gamma_{95}/\Gamma$   
VALUE (eV)      EVTS      DOCUMENT ID      TECN      COMMENT

**6.2 ± 0.7 OUR FIT**

**7.9 ± 1.3 ± 1.1**      215 ± 36      UEHARA      08 BELL       $\gamma\gamma \rightarrow \chi_{c0} \rightarrow 2(K^+ K^-)$

$\Gamma(\phi\phi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{56}\Gamma_{95}/\Gamma$   
VALUE (eV)      EVTS      DOCUMENT ID      TECN      COMMENT

**1.76 ± 0.18 OUR FIT**

**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

**0.0234 ± 0.0018 OUR FIT**

$\Gamma(\rho^0 \pi^+ \pi^-)/\Gamma(2(\pi^+ \pi^-))$   $\Gamma_2/\Gamma_1$   
VALUE      DOCUMENT ID      TECN      COMMENT

**0.39 ± 0.12 OUR FIT**

**0.39 ± 0.12**      TANENBAUM 78      MRK1       $\psi(2S) \rightarrow \gamma \chi_{c0}$

$\Gamma(\rho^0 \pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_2/\Gamma$   
VALUE      DOCUMENT ID

**0.0091 ± 0.0029 OUR FIT**

$\Gamma(f_0(980)f_0(980))/\Gamma_{\text{total}}$   $\Gamma_4/\Gamma$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>6.6 \pm 2.1 \pm 0.1</math></b>	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
<b><math>3.3 \pm 0.4 \pm 0.1</math></b>	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.

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>2.9 \pm 0.4 \pm 0.1</math></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.

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

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>3.3 \pm 0.4 \pm 0.1</math></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.

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

VALUE (units $10^{-3}$ )	DOCUMENT ID
<b><math>18.1 \pm 1.4</math> OUR FIT</b>	

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

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.41 \pm 0.09</math> OUR FIT</b>			
<b><math>0.41 \pm 0.10</math></b>	TANENBAUM 78	MRK1	$\psi(2S) \rightarrow \gamma\chi_{c0}$



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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
$9.8_{-2.8}^{+3.6} \pm 0.2$	83	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$

<sup>1</sup> ABLIKIM 05Q reports  $(10.44 \pm 2.37_{-1.90}^{+3.05}) \times 10^{-4}$  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.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
$8.0_{-2.4}^{+2.0} \pm 0.2$	62	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$

<sup>1</sup> ABLIKIM 05Q reports  $(8.49 \pm 1.66_{-1.99}^{+1.32}) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow K_0^*(1430)^0 \bar{K}_2^*(1430)^0 + \text{c.c.} \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . 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
$6.3 \pm 1.9 \pm 0.1$	68	<sup>1</sup> ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$

<sup>1</sup> ABLIKIM 05Q reports  $(6.66 \pm 1.31_{-1.51}^{+1.60}) \times 10^{-3}$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow K_1(1270)^+ K^- + \text{c.c.} \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . 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
$< 2.7$	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
$16.2_{-9.0}^{+10.4} \pm 0.3$	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.

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

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<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.

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

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<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.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<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.				

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

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<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.				

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<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 $B(\psi(2S) \rightarrow \chi_{c0}\gamma) = (9.68 \pm 0.31)\%$ .				

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<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 $B(\psi(2S) \rightarrow \chi_{c0}\gamma) = (9.68 \pm 0.31)\%$ .				

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

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<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>2.49±0.33±0.05</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.

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<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.

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<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.

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

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<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  $[\Gamma(\chi_{c0}(1P) \rightarrow K_S^0K_S^0\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))] = (0.558 \pm 0.051 \pm 0.089) \times 10^{-3}$  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.

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<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.

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

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
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**12.0 ± 1.8 OUR EVALUATION** Treating systematic error as correlated.

**12.0 ± 1.7 OUR AVERAGE**

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  $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (32.6 \pm 0.5)\%$ .

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

VALUE	DOCUMENT ID
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**0.0075 ± 0.0016 OUR FIT**

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

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**1.72<sup>+0.60</sup><sub>-0.54</sub> ± 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 ± 0.40 ± 0.03 30 ± 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
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**8.51 ± 0.33 OUR FIT**

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

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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**< 1.6 × 10<sup>-3</sup>** 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
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**3.01 ± 0.19 OUR FIT**

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

VALUE	DOCUMENT ID	TECN	COMMENT
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**0.353 ± 0.025 OUR FIT**

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

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

0.24 ± 0.10 ± 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
<b><math>2.17 \pm 0.12</math></b>	<b>OUR AVERAGE</b>				

$2.23 \pm 0.13 \pm 0.05$	2.5k	<sup>1</sup> ABLIKIM	17AI BES3	$\psi(2S) \rightarrow \gamma\eta'\eta'$
$2.00 \pm 0.21 \pm 0.04$	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. • • •

$1.60 \pm 0.41 \pm 0.03$	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
<b><math>0.97 \pm 0.11</math></b>	<b>OUR AVERAGE</b>				

$0.93 \pm 0.11 \pm 0.02$	991	<sup>1</sup> ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma$ hadrons
$2.16 \pm 0.66 \pm 0.04$	$38.1 \pm 9.6$	<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
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<b>1.41±0.13±0.03</b>	486	<sup>1</sup> ABLIKIM	19J BES3	$\psi(2S) \rightarrow \gamma$ hadrons
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• • • We do not use the following data for averages, fits, limits, etc. • • •

1.18±0.22±0.02	76	<sup>2,3</sup> ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma$ hadrons
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<sup>1</sup> ABLIKIM 19J reports  $[\Gamma(\chi_{c0}(1P) \rightarrow \omega\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  =  $(13.83 \pm 0.70 \pm 1.01) \times 10^{-6}$  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 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.

<sup>3</sup> Superseded by ABLIKIM 19J.

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

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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<b>1.94±0.06±0.20</b>	1.4k	<sup>1</sup> ABLIKIM	13B BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$
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<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
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<b>6.05±0.31 OUR FIT</b>	
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### $\Gamma(K_S^0 K_S^0)/\Gamma_{\text{total}}$ $\Gamma_{43}/\Gamma$

VALUE (units $10^{-3}$ )	DOCUMENT ID
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<b>3.16±0.17 OUR FIT</b>	
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### $\Gamma(K_S^0 K_S^0)/\Gamma(\pi\pi)$ $\Gamma_{43}/\Gamma_{32}$

VALUE	DOCUMENT ID	TECN	COMMENT
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<b>0.371±0.023 OUR FIT</b>			
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• • • 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.

### $\Gamma(K_S^0 K^0)/\Gamma(K^+ K^-)$

$\Gamma_{43}/\Gamma_{42}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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**0.52 ± 0.04 OUR FIT**

• • • 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  $e^+ e^- \rightarrow e^+ e^- \chi_{c0}$

<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
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**<0.20** 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  $\psi(2S) \rightarrow \gamma \chi_{c0}$

<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
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**<0.4** 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
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**<0.09** 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  $B(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) = (32.6 \pm 0.5)\%$ .



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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

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

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

<sup>1</sup> ABLIKIM 050 reports  $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- K_S^0 K_S^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$  =  $(0.138 \pm 0.039 \pm 0.025) \times 10^{-3}$  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.

$\Gamma(K_S^0 K_S^0 K_S^0 K_S^0)/\Gamma_{\text{total}}$   $\Gamma_{50}/\Gamma$

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>5.8 \pm 0.5 \pm 0.1</math></b>	319	<sup>1</sup> ABLIKIM	19AA BES3	$\psi(2S) \rightarrow \gamma 4K_S^0$

<sup>1</sup> Using  $B(K_S^0 \rightarrow \pi^+ \pi^-) = (69.20 \pm 0.05)\%$ . ABLIKIM 19AA reports  $[\Gamma(\chi_{c0}(1P) \rightarrow K_S^0 K_S^0 K_S^0 K_S^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$  =  $(5.64 \pm 0.33 \pm 0.37) \times 10^{-5}$  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..

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

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

$\Gamma(K^+ K^- \phi)/\Gamma_{\text{total}}$   $\Gamma_{52}/\Gamma$

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.97 \pm 0.25 \pm 0.02</math></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.

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

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

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

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

$\Gamma(\phi \pi^+ \pi^- \pi^0) / \Gamma_{\text{total}}$   $\Gamma_{55} / \Gamma$

<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  $B(\psi(2S) \rightarrow \chi_{c0} \gamma) = (9.68 \pm 0.31)\%$ .

$\Gamma(\phi \phi) / \Gamma_{\text{total}}$   $\Gamma_{56} / \Gamma$

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

$\Gamma(\phi \phi \eta) / \Gamma_{\text{total}}$   $\Gamma_{57} / \Gamma$

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>8.4 ± 0.7 ± 0.6</b>	186.6	<sup>1</sup> ABLIKIM	20B BES3	$\psi(2S) \rightarrow \gamma \phi \phi \eta$

<sup>1</sup> ABLIKIM 20B reports  $(8.41 \pm 0.74 \pm 0.62) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow \phi \phi \eta) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ .

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

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

$\Gamma(\rho \bar{\rho} \pi^0) / \Gamma_{\text{total}}$   $\Gamma_{59} / \Gamma$

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.70 ± 0.07 OUR AVERAGE</b>	Error includes scale factor of 1.3.		
0.73 ± 0.06 ± 0.01	<sup>1</sup> ONYISI	10 CLE3	$\psi(2S) \rightarrow \gamma \rho \bar{\rho} X$
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  $[\Gamma(\chi_{c0}(1P) \rightarrow \rho \bar{\rho} \pi^0) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$  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  $[\Gamma(\chi_{c0}(1P) \rightarrow \rho \bar{\rho} \pi^0) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$  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.

$\Gamma(\rho \bar{\rho} \eta) / \Gamma_{\text{total}}$   $\Gamma_{60} / \Gamma$

<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	$\psi(2S) \rightarrow \gamma \rho \bar{\rho} X$
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  $[\Gamma(\chi_{c0}(1P) \rightarrow \rho \bar{\rho} \eta) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$  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.

### $\Gamma(p\bar{p}\omega)/\Gamma_{\text{total}}$ $\Gamma_{61}/\Gamma$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<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.

### $\Gamma(p\bar{p}\phi)/\Gamma_{\text{total}}$ $\Gamma_{62}/\Gamma$

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<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.

### $\Gamma(p\bar{p}\pi^+\pi^-)/\Gamma_{\text{total}}$ $\Gamma_{63}/\Gamma$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>2.1 ± 0.7 OUR EVALUATION</b>	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  $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (32.6 \pm 0.5)\%$ .

### $\Gamma(p\bar{p}\pi^0\pi^0)/\Gamma_{\text{total}}$ $\Gamma_{64}/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.104 ± 0.028 ± 0.002</b>	39.5	<sup>1</sup> HE 08B	CLEO	$e^+e^- \rightarrow \gamma h^+h^-h^0h^0$

<sup>1</sup>HE 08B reports  $0.11 \pm 0.02 \pm 0.02 \pm 0.01\%$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p}\pi^0\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

### $\Gamma(p\bar{p}K^+K^- \text{ (non-resonant)})/\Gamma_{\text{total}}$ $\Gamma_{65}/\Gamma$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.22 ± 0.26 ± 0.02</b>	48 ± 8	<sup>1</sup> ABLIKIM 11F	BES3	$\psi(2S) \rightarrow \gamma p\bar{p}K^+K^-$

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

### $\Gamma(p\bar{p}K_S^0 K_S^0)/\Gamma_{\text{total}}$ $\Gamma_{66}/\Gamma$

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

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

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>12.7 ± 1.1 OUR AVERAGE</b>				
12.9 ± 1.1 ± 0.3	5150	<sup>1</sup> ABLIKIM 12J	BES3	$\psi(2S) \rightarrow \gamma p\bar{n}\pi^-$
11.2 ± 3.1 ± 0.2		<sup>2</sup> ABLIKIM 06i	BES2	$\psi(2S) \rightarrow \gamma p\pi^- X$

<sup>1</sup> ABLIKIM 12J reports  $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{n}\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  =  $(1.26 \pm 0.02 \pm 0.11) \times 10^{-4}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . 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  $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{n}\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$  =  $(1.10 \pm 0.24 \pm 0.18) \times 10^{-4}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

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.

### $\Gamma(p\bar{n}\pi^-\pi^0)/\Gamma_{\text{total}}$ $\Gamma_{69}/\Gamma$

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

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

### $\Gamma(\bar{p}n\pi^+\pi^0)/\Gamma_{\text{total}}$ $\Gamma_{70}/\Gamma$

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.

$\Gamma(\Lambda\bar{\Lambda})/\Gamma_{\text{total}}$	$\Gamma_{71}/\Gamma$
<u>VALUE (units <math>10^{-4}</math>)</u>	<u>DOCUMENT ID</u>
<b><math>3.27 \pm 0.24</math> OUR FIT</b>	

$\Gamma(\Lambda\bar{\Lambda}\pi^+\pi^-)/\Gamma_{\text{total}}$	$\Gamma_{72}/\Gamma$
<u>VALUE (units <math>10^{-5}</math>)</u>	<u>CL%</u>

<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>118 \pm 12 \pm 2</math></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  $B(\psi(2S) \rightarrow \chi_{c0}\gamma) = (9.2 \pm 0.5)\%$

$\Gamma(\Lambda\bar{\Lambda}\pi^+\pi^- \text{ (non-resonant)})/\Gamma_{\text{total}}$	$\Gamma_{73}/\Gamma$
<u>VALUE (units <math>10^{-5}</math>)</u>	<u>CL%</u>

<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;50</b>	90	<sup>1</sup> ABLIKIM 12I

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

$\Gamma(\Sigma(1385)^+\bar{\Lambda}\pi^- + \text{c.c.})/\Gamma_{\text{total}}$	$\Gamma_{74}/\Gamma$
<u>VALUE (units <math>10^{-5}</math>)</u>	<u>CL%</u>

<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;50</b>	90	<sup>1</sup> ABLIKIM 12I

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

$\Gamma(\Sigma(1385)^-\bar{\Lambda}\pi^+ + \text{c.c.})/\Gamma_{\text{total}}$	$\Gamma_{75}/\Gamma$
<u>VALUE (units <math>10^{-5}</math>)</u>	<u>CL%</u>

<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;50</b>	90	<sup>1</sup> ABLIKIM 12I

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

$\Gamma(K^+\bar{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}$	$\Gamma_{76}/\Gamma$
<u>VALUE (units <math>10^{-3}</math>)</u>	<u>EVTS</u>

<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<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
$1.01 \pm 0.19 \pm 0.02$		<sup>3</sup> ATHAR 07

BES3  $\psi(2S) \rightarrow \gamma\Lambda\bar{p}K^+$   
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.

### $\Gamma(K^*(892)^+ \bar{p} \Lambda + \text{c.c.})/\Gamma_{\text{total}}$ $\Gamma_{77}/\Gamma$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>4.8±0.9±0.1</b>	254	<sup>1</sup> ABLIKIM	19AU BES3	$\psi(2S) \rightarrow \gamma K^{*+} \bar{p} \Lambda$

<sup>1</sup> ABLIKIM 19AU reports  $[\Gamma(\chi_{c0}(1P) \rightarrow K^*(892)^+ \bar{p} \Lambda + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$   $= (4.7 \pm 0.7 \pm 0.5) \times 10^{-5}$  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.

### $\Gamma(K^+ \bar{p} \Lambda(1520) + \text{c.c.})/\Gamma_{\text{total}}$ $\Gamma_{78}/\Gamma$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>2.9±0.7±0.1</b>	62 ± 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.

### $\Gamma(\Lambda(1520) \bar{\Lambda}(1520))/\Gamma_{\text{total}}$ $\Gamma_{79}/\Gamma$

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

<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.

### $\Gamma(\Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}$ $\Gamma_{80}/\Gamma$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>4.68±0.32 OUR AVERAGE</b>				

4.82±0.34±0.10      1046      <sup>1</sup> ABLIKIM      18V BES3       $\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$

4.2 ±0.7 ±0.1      78 ± 10      <sup>2</sup> NAIK      08 CLEO       $\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$

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

4.7 ±0.5 ±0.1      243      <sup>3,4</sup> ABLIKIM      13H BES3       $\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$

<sup>1</sup> ABLIKIM 18V reports  $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$   $= (4.72 \pm 0.18 \pm 0.28) \times 10^{-5}$  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.

<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.

<sup>3</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>4</sup> Superseded by ABLIKIM 18V

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

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**4.6 ± 0.8 OUR AVERAGE** Error includes scale factor of 2.6.

5.10 ± 0.35 ± 0.10	747	<sup>1</sup> ABLIKIM	18V BES3	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$
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3.1 ± 0.7 ± 0.1	39 ± 7	<sup>2</sup> NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

4.5 ± 0.5 ± 0.1	148	<sup>3,4</sup> ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$
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<sup>1</sup> ABLIKIM 18V reports  $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$  =  $(4.99 \pm 0.24 \pm 0.24) \times 10^{-5}$  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.

<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.

<sup>3</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>4</sup> Superseded by ABLIKIM 18V

**$\Gamma(\Sigma^- \bar{\Sigma}^+)/\Gamma_{\text{total}}$   $\Gamma_{84}/\Gamma$**

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>5.1 ± 0.2 ± 0.4</b>	2143	<sup>1</sup> ABLIKIM	20i BES3	$\psi(2S) \rightarrow \gamma \Sigma^- \bar{\Sigma}^+$
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<sup>1</sup> ABLIKIM 20i reports  $(5.13 \pm 0.24 \pm 0.41) \times 10^{-4}$  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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$ .

**$\Gamma(\Sigma(1385)^+ \bar{\Sigma}(1385)^-)/\Gamma_{\text{total}}$   $\Gamma_{85}/\Gamma$**

<u>VALUE (units <math>10^{-5}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>16.2 ± 5.8 ± 0.3</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 12l 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.

**$\Gamma(\Sigma(1385)^- \bar{\Sigma}(1385)^+)/\Gamma_{\text{total}}$   $\Gamma_{86}/\Gamma$**

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

<sup>1</sup> ABLIKIM 12l 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.

**$\Gamma(K^- \Lambda \bar{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}$   $\Gamma_{87}/\Gamma$**

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

<sup>1</sup> ABLIKIM 15l 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.

**$\Gamma(\Xi^0 \bar{\Xi}^0)/\Gamma_{\text{total}}$   $\Gamma_{88}/\Gamma$**

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	$\psi(2S) \rightarrow \gamma \Xi^0 \bar{\Xi}^0$

<sup>1</sup> NAIK 08 reports  $(3.34 \pm 0.70 \pm 0.48) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c0}(1P) \rightarrow \Xi^0 \bar{\Xi}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$  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.

**$\Gamma(\Xi^- \bar{\Xi}^+)/\Gamma_{\text{total}}$   $\Gamma_{89}/\Gamma$**

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

**$\Gamma(\eta_c \pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{90}/\Gamma$**

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. • • •



$<41 \times 10^{-4}$       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.

$\Gamma(\rho\bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\pi\pi)/\Gamma_{\text{total}}$   $\Gamma_{58}/\Gamma \times \Gamma_{32}/\Gamma$

VALUE (units  $10^{-7}$ )      DOCUMENT ID      TECN      COMMENT

**18.8±1.0 OUR FIT**

**15.3±2.4±0.8**      <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  $B(\rho\bar{\rho}) \cdot B(\pi\pi)$ .

$\Gamma(\rho\bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\pi^0\eta)/\Gamma_{\text{total}}$   $\Gamma_{58}/\Gamma \times \Gamma_{33}/\Gamma$

VALUE (units  $10^{-7}$ )      DOCUMENT ID      TECN      COMMENT

**<0.4**      ANDREOTTI 05C E835  $\bar{p}p \rightarrow \pi^0\eta$

$\Gamma(\rho\bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\pi^0\eta')/\Gamma_{\text{total}}$   $\Gamma_{58}/\Gamma \times \Gamma_{34}/\Gamma$

VALUE (units  $10^{-7}$ )      DOCUMENT ID      TECN      COMMENT

**<2.5**      ANDREOTTI 05C E835  $\bar{p}p \rightarrow \pi^0\eta'$

$\Gamma(\rho\bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\eta\eta)/\Gamma_{\text{total}}$   $\Gamma_{58}/\Gamma \times \Gamma_{36}/\Gamma$

VALUE (units  $10^{-7}$ )      DOCUMENT ID      TECN      COMMENT

**6.7±0.5 OUR FIT**

**4.0±1.2<sup>+0.5</sup><sub>-0.3</sub>**      ANDREOTTI 05C E835  $\bar{p}p \rightarrow \eta\eta$

$\Gamma(\rho\bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\eta\eta')/\Gamma_{\text{total}}$   $\Gamma_{58}/\Gamma \times \Gamma_{37}/\Gamma$

VALUE (units  $10^{-6}$ )      DOCUMENT ID      TECN      COMMENT

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

2.1<sup>+2.3</sup><sub>-1.5</sub>      ANDREOTTI 05C E835  $\bar{p}p \rightarrow \pi^0\eta$

## ————— RADIATIVE DECAYS —————

$\Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$   $\Gamma_{91}/\Gamma$

VALUE (units  $10^{-2}$ )      EVTS      DOCUMENT ID      TECN      COMMENT

**1.40±0.05 OUR FIT**

• • • 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.

$\Gamma(\gamma\rho^0)/\Gamma_{\text{total}}$   $\Gamma_{92}/\Gamma$

VALUE (units  $10^{-6}$ )      CL%      EVTS      DOCUMENT ID      TECN      COMMENT

**< 9**      90      1.2 ± 4.5      <sup>1</sup> BENNETT      08A CLEO       $\psi(2S) \rightarrow \gamma\gamma\rho^0$

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

<10      90      6 ± 12      <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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .

**$\Gamma(\gamma\omega)/\Gamma_{\text{total}}$**   **$\Gamma_{93}/\Gamma$**

VALUE (units $10^{-6}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>&lt; 8</b>	90	$0.0 \pm 2.8$	<sup>1</sup> BENNETT 08A	CLEO	$\psi(2S) \rightarrow \gamma\gamma\omega$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
<13	90	$5 \pm 11$	<sup>2</sup> ABLIKIM 11E	BES3	$\psi(2S) \rightarrow \gamma\gamma\omega$
<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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .					

**$\Gamma(\gamma\phi)/\Gamma_{\text{total}}$**   **$\Gamma_{94}/\Gamma$**

VALUE (units $10^{-6}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>&lt; 6</b>	90	$0.1 \pm 1.6$	<sup>1</sup> BENNETT 08A	CLEO	$\psi(2S) \rightarrow \gamma\gamma\phi$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
<16	90	$15 \pm 7$	<sup>2</sup> ABLIKIM 11E	BES3	$\psi(2S) \rightarrow \gamma\gamma\phi$
<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 $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$ .					

**$\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$**   **$\Gamma_{95}/\Gamma$**

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>2.04 \pm 0.09</math> OUR FIT</b>				
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<7	90	<sup>1</sup> WICHT 08	BELL	$B^\pm \rightarrow K^\pm \gamma\gamma$
<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 $B(B^\pm \rightarrow \chi_{c0} K^\pm) = 1.51 \times 10^{-4}$ .				

**$\Gamma(e^+ e^- J/\psi(1S))/\Gamma_{\text{total}}$**   **$\Gamma_{96}/\Gamma$**

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
$1.54 \pm 0.33 \pm 0.03$	56	<sup>1,2</sup> ABLIKIM 171	BES3	$\psi(2S) \rightarrow \gamma e^+ e^- J/\psi$
<sup>1</sup> ABLIKIM 171 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.				
<sup>2</sup> Not independent from other measurements reported by ABLIKIM 171				

$\Gamma(e^+ e^- J/\psi(1S))/\Gamma(\gamma J/\psi(1S))$   $\Gamma_{96}/\Gamma_{91}$

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>9.5 \pm 1.9 \pm 0.7</math></b>	56	<sup>1</sup> ABLIKIM 17I	BES3	$\psi(2S) \rightarrow e^+ e^- \gamma J/\psi$

<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.

$\Gamma(\mu^+ \mu^- J/\psi(1S))/\Gamma(e^+ e^- J/\psi(1S))$   $\Gamma_{97}/\Gamma_{96}$

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.14</b>	90	<9.5	ABLIKIM 19Z	BES3	$\psi(2S) \rightarrow \gamma \chi_c \rightarrow \gamma(\mu^+ \mu^- J/\psi)$

$\Gamma(\gamma\gamma)/\Gamma(\gamma J/\psi(1S))$   $\Gamma_{95}/\Gamma_{91}$

VALUE (units $10^{-2}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>1.45 \pm 0.08</math> OUR FIT</b>			
<b><math>2.0 \pm 0.4</math> OUR AVERAGE</b>			
$2.2 \pm 0.4$ <sup>+0.1</sup> / <sub>-0.2</sub>	<sup>1</sup> ANDREOTTI 04	E835	$p\bar{p} \rightarrow \chi_{c0} \rightarrow \gamma\gamma$
$1.45 \pm 0.74$	<sup>2</sup> AMBROGIANI 00B	E835	$\bar{p}p \rightarrow \chi_{c2} \rightarrow \gamma\gamma, \gamma J/\psi$

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

$\Gamma(p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$   $\Gamma_{58}/\Gamma \times \Gamma_{91}/\Gamma$

VALUE (units $10^{-7}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>31.1 \pm 1.5</math> OUR FIT</b>				
<b><math>28.2 \pm 2.1</math> OUR AVERAGE</b>				
$28.0 \pm 1.9 \pm 1.3$	392	<sup>1,2,3</sup> BAGNASCO 02	E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$
$29.3$ <sup>+5.7</sup> / <sub>-4.7</sub> $\pm 1.5$	89	<sup>1,2</sup> AMBROGIANI 99B		$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$

<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.

$\Gamma(p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{58}/\Gamma \times \Gamma_{95}/\Gamma$

VALUE (units $10^{-8}$ )	DOCUMENT ID	TECN	COMMENT
<b><math>4.52 \pm 0.27</math> OUR FIT</b>			
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$6.52 \pm 1.18$ <sup>+0.48</sup> / <sub>-0.72</sub>	<sup>1</sup> ANDREOTTI 04	E835	$p\bar{p} \rightarrow \chi_{c0} \rightarrow \gamma\gamma$

<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

$$\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}} \quad \Gamma_{58}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_{\psi(2S)}$$

VALUE (units $10^{-6}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>21.7±0.9 OUR FIT</b>				
<b>23.7±1.0 OUR AVERAGE</b>				
23.7±0.8±0.9	1222	ABLIKIM	13V BES3	$\psi(2S) \rightarrow \gamma p\bar{p}$
23.7±1.4±1.4	383 ± 22	<sup>1</sup> NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma p\bar{p}$
23.6 <sup>+3.7</sup> <sub>-3.4</sub> ±3.4	89.5 <sup>+14</sup> <sub>-13</sub>	BAI	04F BES	$\psi(2S) \rightarrow \gamma\chi_{c0}(1P) \rightarrow \gamma p\bar{p}$

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

$$\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \quad \Gamma_{58}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$$

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

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

$$\Gamma(\chi_{c0}(1P) \rightarrow \Lambda\bar{\Lambda})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}} \quad \Gamma_{71}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_{\psi(2S)}$$

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

$$\Gamma(\chi_{c0}(1P) \rightarrow \Lambda\bar{\Lambda})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \quad \Gamma_{71}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$$

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

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S))}{\Gamma_{\text{total}}} \times \frac{\Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))}{\Gamma_{\text{total}}} \times \frac{\Gamma_{91}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_{\psi(2S)}}{\Gamma_{91}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_{\psi(2S)}}$$

<u>VALUE (units 10<sup>-2</sup>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**0.138 ± 0.005 OUR FIT**

**0.147 ± 0.029 OUR AVERAGE**

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	12O	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.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S))}{\Gamma_{\text{total}}} \times \frac{\Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))}{\Gamma(\psi(2S) \rightarrow J/\psi(1S) \text{ anything})} \times \frac{\Gamma_{91}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_9^{\psi(2S)}}{\Gamma_{91}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_9^{\psi(2S)}}$$

$$\frac{\Gamma_{91}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_9^{\psi(2S)}}{\Gamma_{91}/\Gamma \times \Gamma_{151}^{\psi(2S)}/(\Gamma_{11}^{\psi(2S)} + \Gamma_{12}^{\psi(2S)} + \Gamma_{13}^{\psi(2S)} + 0.343\Gamma_{152}^{\psi(2S)} + 0.190\Gamma_{153}^{\psi(2S)})}$$

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

• • • 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.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S))}{\Gamma_{\text{total}}} \times \frac{\Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))}{\Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)} \times \frac{\Gamma_{91}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}{\Gamma_{91}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

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

**0.358 ± 0.020 ± 0.037**

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

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

0.55 ± 0.04 ± 0.06	172	<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.

$$\Gamma(\chi_{c0}(1P) \rightarrow \gamma\gamma)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}} \quad \Gamma_{95}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_{\psi(2S)}$$

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>2.00±0.08 OUR FIT</b>				
<b>1.95±0.09 OUR AVERAGE</b>				
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	$\psi(2S) \rightarrow \gamma\chi_{c0} \rightarrow 3\gamma$
<sup>1</sup> Superseded by ABLIKIM 17AE.				

$$\Gamma(\chi_{c0}(1P) \rightarrow \pi\pi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}} \quad \Gamma_{32}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_{\psi(2S)}$$

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  $\pi\pi$ .

$$\Gamma(\chi_{c0}(1P) \rightarrow \pi\pi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \quad \Gamma_{32}/\Gamma \times \Gamma_{151}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$$

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  $\pi\pi$ .

$$\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) / \Gamma_{\text{total}} \quad \Gamma_{36} / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{\psi(2S)}$$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**2.95 ± 0.18 OUR FIT**

**3.12 ± 0.19 OUR AVERAGE**

3.23 ± 0.09 ± 0.23	2132	<sup>1</sup> ABLIKIM	10A	BES3 $e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$
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2.93 ± 0.12 ± 0.29	0.9k	<sup>2</sup> ASNER	09	CLEO $\psi(2S) \rightarrow \gamma\eta\eta$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

2.86 ± 0.46 ± 0.37	48	<sup>3</sup> ADAMS	07	CLEO $\psi(2S) \rightarrow \gamma\chi_{c0}$
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<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).

$$\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \quad \Gamma_{36} / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}$$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
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**0.85 ± 0.05 OUR FIT**

**0.578 ± 0.241 ± 0.158**

BAI	03C	BES	$\psi(2S) \rightarrow \gamma\eta\eta$
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$$\Gamma(\chi_{c0}(1P) \rightarrow K^+K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) / \Gamma_{\text{total}} \quad \Gamma_{42} / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{\psi(2S)}$$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**5.92 ± 0.28 OUR FIT**

**5.97 ± 0.07 ± 0.32**

8.1k	<sup>1</sup> ASNER	09	CLEO	$\psi(2S) \rightarrow \gamma K^+K^-$
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<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  $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$ .

$$\Gamma(\chi_{c0}(1P) \rightarrow K^+K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \quad \Gamma_{42} / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}$$

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**1.71 ± 0.08 OUR FIT**

**1.63 ± 0.10 ± 0.15**

774 ± 38	<sup>1</sup> BAI	98I	BES	$\psi(2S) \rightarrow \gamma K^+K^-$
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<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].

$$\Gamma(\chi_{c0}(1P) \rightarrow K_S^0 K_S^0) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) / \Gamma_{\text{total}} \quad \Gamma_{43} / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{\psi(2S)}$$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**3.10 ± 0.16 OUR FIT**

**3.18 ± 0.17 OUR AVERAGE**

3.22 ± 0.07 ± 0.17	2.1k	<sup>1</sup> ASNER	09	CLEO $\psi(2S) \rightarrow \gamma K_S^0 K_S^0$
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3.02 ± 0.19 ± 0.33	322	ABLIKIM	05O	BES2 $\psi(2S) \rightarrow \gamma K_S^0 K_S^0$
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<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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$ .

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K_S^0 K_S^0) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)}{\Gamma_{43} / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

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].

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow 2(\pi^+ \pi^-)) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)}{\Gamma_1 / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>6.6 ± 0.5 OUR FIT</b>			
<b>6.9 ± 2.4 OUR AVERAGE</b>	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  $B(J/\psi(1S) \rightarrow \ell^+ \ell^-) = 0.1181 \pm 0.0020$ .

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma_{\text{total}}}{\Gamma_8 / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.78 ± 0.14 OUR FIT</b>			
<b>1.64 ± 0.05 ± 0.2</b>	ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \chi_{c0}$

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)}{\Gamma_8 / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>5.1 ± 0.4 OUR FIT</b>			
<b>5.8 ± 1.6 OUR AVERAGE</b>	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  $B(J/\psi \rightarrow \ell^+ \ell^-) = 0.1181 \pm 0.0020$ .

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- K^+ K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma_{\text{total}}}{\Gamma_{51} / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>2.76 ± 0.28 OUR FIT</b>				
<b>3.20 ± 0.11 ± 0.41</b>	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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.2 \pm 0.4)\%$ .

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- K^+ K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma_{\text{total}}}{\Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)} \times \frac{\Gamma_{51} / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}{\Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

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

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

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \phi\phi) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma_{\text{total}}}{\Gamma_{56} / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

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  $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.2 \pm 0.4)\%$ .

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \phi\phi) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma_{\text{total}}}{\Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)} \times \frac{\Gamma_{56} / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}{\Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

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].

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^+ \bar{p} K_S^0 + \text{c.c.}) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma_{\text{total}}}{\Gamma_{81} / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>3.45 ± 0.17 ± 0.19</b>	493	<sup>1</sup> ABLIKIM	19BB	BES3 $\psi(2S) \rightarrow \gamma \Sigma^+ \bar{p} K_S^0 + \text{c.c.}$

<sup>1</sup> Calculated by us. ABLIKIM 19BB reports  $B(\chi_c^0 \rightarrow \Sigma^+ \bar{p} K_S^0 + \text{c.c.}) = (3.52 \pm 0.19 \pm 0.21) \times 10^{-4}$  using  $B(\psi(2S) \rightarrow \gamma \chi_c^0) = (9.79 \pm 0.20)\%$  and other branching fractions from PDG 18.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^0 \bar{p} K^+ + \text{c.c.}) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma_{\text{total}}}{\Gamma_{82} / \Gamma \times \Gamma_{151}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}}$$

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>2.97 ± 0.12 ± 0.14</b>	871	<sup>1</sup> ABLIKIM	20AE	BES3 $\psi(2S) \rightarrow \gamma \Sigma^0 \bar{p} K^+ + \text{c.c.}$

<sup>1</sup> Calculated by us. ABLIKIM 20AE reports  $B(\chi_c^0 \rightarrow \Sigma^0 \bar{p} K^+ + \text{c.c.}) = (3.03 \pm 0.12 \pm 0.15) \times 10^{-4}$  using  $B(\psi(2S) \rightarrow \gamma \chi_c^0) = (9.79 \pm 0.20)\%$  and other branching fractions from PDG 20.

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

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ABLIKIM	20B	PR D101 012012	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	20I	PR D101 092002	M. Ablikim <i>et al.</i>	(BESIII Collab.)
PDG	20	PTEP 2020 083C01	P.A. Zyla <i>et al.</i>	(PDG Collab.)
ABLIKIM	19AA	PR D99 052008	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	19AU	PR D100 052010	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	19BB	PR D100 092006	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	19J	PR D99 012015	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	19Z	PR D99 051101	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	18V	PR D97 052011	M. Ablikim <i>et al.</i>	(BESIII Collab.)
PDG	18	PR D98 030001	M. Tanabashi <i>et al.</i>	(PDG Collab.)
AAIJ	17BB	EPJ C77 609	R. Aaij <i>et al.</i>	(LHCb Collab.)
ABLIKIM	17AE	PR D96 092007	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	17AI	PR D96 112006	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	17I	PRL 118 221802	M. Ablikim <i>et al.</i>	(BESIII Collab.)
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ABLIKIM	15M	PR D91 112008	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	15N	PR D91 112018	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	13B	PR D87 012002	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	13D	PR D87 012007	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	13H	PR D87 032007	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	13V	PR D88 112001	M. Ablikim <i>et al.</i>	(BESIII Collab.)
UEHARA	13	PTEP 2013 123C01	S. Uehara <i>et al.</i>	(BELLE Collab.)
ABLIKIM	12A	PR D85 112008	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	12I	PR D86 052004	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	12J	PR D86 052011	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	12O	PRL 109 172002	M. Ablikim <i>et al.</i>	(BESIII Collab.)
LIU	12B	PRL 108 232001	Z.Q. Liu <i>et al.</i>	(BELLE Collab.)
ABLIKIM	11A	PR D83 012006	M. Ablikim <i>et al.</i>	(BESIII Collab.)
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ABLIKIM	11K	PRL 107 092001	M. Ablikim <i>et al.</i>	(BESIII Collab.)
DEL-AMO-SA...	11M	PR D84 012004	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
ABLIKIM	10A	PR D81 052005	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ONYISI	10	PR D82 011103	P.U.E. Onyisi <i>et al.</i>	(CLEO Collab.)
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ASNER	09	PR D79 072007	D.M. Asner <i>et al.</i>	(CLEO Collab.)
UEHARA	09	PR D79 052009	S. Uehara <i>et al.</i>	(BELLE Collab.)
BENNETT	08A	PRL 101 151801	J.V. Bennett <i>et al.</i>	(CLEO Collab.)
ECKLUND	08A	PR D78 091501	K.M. Ecklund <i>et al.</i>	(CLEO Collab.)
HE	08B	PR D78 092004	Q. He <i>et al.</i>	(CLEO Collab.)
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NAIK	08	PR D78 031101	P. Naik <i>et al.</i>	(CLEO Collab.)
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ATHAR	07	PR D75 032002	S.B. Athar <i>et al.</i>	(CLEO Collab.)
CHEN	07B	PL B651 15	W.T. Chen <i>et al.</i>	(BELLE Collab.)
ABLIKIM	06D	PR D73 052006	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06I	PR D74 012004	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06R	PR D74 072001	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06T	PL B642 197	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	05G	PR D71 092002	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	05N	PL B630 7	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	05O	PL B630 21	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	05Q	PR D72 092002	M. Ablikim <i>et al.</i>	(BES Collab.)
ADAM	05A	PRL 94 232002	N.E. Adam <i>et al.</i>	(CLEO Collab.)
ANDREOTTI	05A	NP B717 34	M. Andreotti <i>et al.</i>	(FNAL E835 Collab.)

ANDREOTTI	05C	PR D72 112002	M. Andreotti <i>et al.</i>	(FNAL E835 Collab.)
NAKAZAWA	05	PL B615 39	H. Nakazawa <i>et al.</i>	(BELLE Collab.)
ABE	04G	PR D70 071102	K. Abe <i>et al.</i>	(BELLE Collab.)
ABLIKIM	04G	PR D70 092002	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	04H	PR D70 092003	M. Ablikim <i>et al.</i>	(BES Collab.)
ANDREOTTI	04	PL B584 16	M. Andreotti <i>et al.</i>	(E835 Collab.)
ATHAR	04	PR D70 112002	S.B. Athar <i>et al.</i>	(CLEO Collab.)
BAI	04F	PR D69 092001	J.Z. Bai <i>et al.</i>	(BES Collab.)
ANDREOTTI	03	PRL 91 091801	M. Andreotti <i>et al.</i>	(FNAL E835 Collab.)
AULCHENKO	03	PL B573 63	V.M. Aulchenko <i>et al.</i>	(KEDR Collab.)
BAI	03C	PR D67 032004	J.Z. Bai <i>et al.</i>	(BES Collab.)
BAI	03E	PR D67 112001	J.Z. Bai <i>et al.</i>	(BES Collab.)
ABE,K	02	PRL 89 142001	K. Abe <i>et al.</i>	(BELLE Collab.)
BAGNASCO	02	PL B533 237	S. Bagnasco <i>et al.</i>	(FNAL E835 Collab.)
EISENSTEIN	01	PRL 87 061801	B.I. Eisenstein <i>et al.</i>	(CLEO Collab.)
AMBROGIANI	00B	PR D62 052002	M. Ambrogiani <i>et al.</i>	(FNAL E835 Collab.)
AMBROGIANI	99B	PRL 83 2902	M. Ambrogiani <i>et al.</i>	(FNAL E835 Collab.)
BAI	99B	PR D60 072001	J.Z. Bai <i>et al.</i>	(BES Collab.)
BAI	98D	PR D58 092006	J.Z. Bai <i>et al.</i>	(BES Collab.)
BAI	98I	PRL 81 3091	J.Z. Bai <i>et al.</i>	(BES Collab.)
GAISER	86	PR D34 711	J. Gaiser <i>et al.</i>	(Crystal Ball Collab.)
LEE	85	SLAC 282	R.A. Lee	(SLAC)
OREGLIA	82	PR D25 2259	M.J. Oreglia <i>et al.</i>	(SLAC, CIT, HARV+)
BRANDELIK	79B	NP B160 426	R. Brandelik <i>et al.</i>	(DASP Collab.)
BARTEL	78B	PL 79B 492	W. Bartel <i>et al.</i>	(DESY, HEIDP)
TANENBAUM	78	PR D17 1731	W.M. Tanenbaum <i>et al.</i>	(SLAC, LBL)
Also		Private Comm.	G. Trilling	(LBL, UCB)
BIDDICK	77	PRL 38 1324	C.J. Biddick <i>et al.</i>	(UCSD, UMD, PAVI+)

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