

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

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

See the Review on “ $\psi(2S)$  and  $\chi_c$  branching ratios” before the  $\chi_{c0}(1P)$  Listings.

## $\chi_{c2}(1P)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>3556.17 ± 0.07 OUR AVERAGE</b>				
3557.3 ± 1.7 ± 0.7	611	<sup>1</sup> AAIJ	17BB LHCB	$p\bar{p} \rightarrow b\bar{b}X \rightarrow 2(K^+K^-)X$
3556.10 ± 0.06 ± 0.11	4.0k	<sup>2</sup> AAIJ	17BI LHCB	$\chi_{c2} \rightarrow J/\psi\mu^+\mu^-$
3555.3 ± 0.6 ± 2.2	2.5k	UEHARA	08 BELL	$\gamma\gamma \rightarrow \text{hadrons}$
3555.70 ± 0.59 ± 0.39		ABLIKIM	05G BES2	$\psi(2S) \rightarrow \gamma\chi_{c2}$
3556.173 ± 0.123 ± 0.020		ANDREOTTI	05A E835	$p\bar{p} \rightarrow e^+e^-\gamma$
3559.9 ± 2.9		EISENSTEIN	01 CLE2	$e^+e^- \rightarrow e^+e^-\chi_{c2}$
3556.4 ± 0.7		BAI	99B BES	$\psi(2S) \rightarrow \gamma X$
3556.22 ± 0.131 ± 0.020	585	<sup>3</sup> ARMSTRONG	92 E760	$\bar{p}p \rightarrow e^+e^-\gamma$
3556.9 ± 0.4 ± 0.5	50	BAGLIN	86B SPEC	$\bar{p}p \rightarrow e^+e^-X$
3557.8 ± 0.2 ± 4		<sup>4</sup> GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X$
3553.4 ± 2.2	66	<sup>5</sup> LEMOIGNE	82 GOLI	$185\pi^-Be \rightarrow \gamma\mu^+\mu^-A$
3555.9 ± 0.7		<sup>6</sup> OREGLIA	82 CBAL	$e^+e^- \rightarrow J/\psi 2\gamma$
3557 ± 1.5	69	<sup>7</sup> HIMEL	80 MRK2	$e^+e^- \rightarrow J/\psi 2\gamma$
3551 ± 11	15	BRANDELIK	79B DASP	$e^+e^- \rightarrow J/\psi 2\gamma$
3553 ± 4		<sup>7</sup> BARTEL	78B CNTR	$e^+e^- \rightarrow J/\psi 2\gamma$
3553 ± 4 ± 4		<sup>7,8</sup> TANENBAUM	78 MRK1	$e^+e^-$
3563 ± 7	360	<sup>7</sup> BIDDICK	77 CNTR	$e^+e^- \rightarrow \gamma X$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
3555.4 ± 1.3	53	UEHARA	13 BELL	$\gamma\gamma \rightarrow K_S^0 K_S^0$
3543 ± 10	4	WHITAKER	76 MRK1	$e^+e^- \rightarrow J/\psi 2\gamma$

<sup>1</sup> From a fit of the  $\phi\phi$  invariant mass with the width of  $\chi_{c2}(1P)$  fixed to the PDG 16 value.

<sup>2</sup> AAIJ 17BI reports also  $m(\chi_{c2}) - m(\chi_{c1}) = 45.39 \pm 0.07 \pm 0.03$  MeV.

<sup>3</sup> Recalculated by ANDREOTTI 05A, using the value of  $\psi(2S)$  mass from AULCHENKO 03.

<sup>4</sup> Using mass of  $\psi(2S) = 3686.0$  MeV.

<sup>5</sup>  $J/\psi(1S)$  mass constrained to 3097 MeV.

<sup>6</sup> Assuming  $\psi(2S)$  mass = 3686 MeV and  $J/\psi(1S)$  mass = 3097 MeV.

<sup>7</sup> Mass value shifted by us by amount appropriate for  $\psi(2S)$  mass = 3686 MeV and  $J/\psi(1S)$  mass = 3097 MeV.

<sup>8</sup> From a simultaneous fit to radiative and hadronic decay channels.

## $\chi_{c2}(1P)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.97 ± 0.09 OUR FIT</b>				
<b>2.00 ± 0.11 OUR AVERAGE</b>				
2.10 ± 0.20 ± 0.02	4.0k	AAIJ	17BI LHCB	$\chi_{c2} \rightarrow J/\psi\mu^+\mu^-$
1.915 ± 0.188 ± 0.013		ANDREOTTI	05A E835	$p\bar{p} \rightarrow e^+e^-\gamma$

1.96 ±0.17 ±0.07	585	<sup>1</sup> ARMSTRONG 92	E760	$\bar{p}p \rightarrow e^+e^-\gamma$
2.6 <sup>+1.4</sup> <sub>-1.0</sub>	50	BAGLIN	86B SPEC	$\bar{p}p \rightarrow e^+e^-\chi$
2.8 <sup>+2.1</sup> <sub>-2.0</sub>		<sup>2</sup> GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X$

<sup>1</sup> Recalculated by ANDREOTTI 05A.

<sup>2</sup> Errors correspond to 90% confidence level; authors give only width range.

### $\chi_{c2}(1P)$ DECAY MODES

Mode	Fraction ( $\Gamma_i/\Gamma$ )	Confidence level
<b>Hadronic decays</b>		
$\Gamma_1$ $2(\pi^+\pi^-)$	( 1.02±0.09 ) %	
$\Gamma_2$ $\rho\rho$		
$\Gamma_3$ $\pi^+\pi^-\pi^0\pi^0$	( 1.83±0.23 ) %	
$\Gamma_4$ $\rho^+\pi^-\pi^0 + \text{c.c.}$	( 2.19±0.34 ) %	
$\Gamma_5$ $4\pi^0$	( 1.11±0.15 ) × 10 <sup>-3</sup>	
$\Gamma_6$ $K^+K^-\pi^0\pi^0$	( 2.1 ±0.4 ) × 10 <sup>-3</sup>	
$\Gamma_7$ $K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	( 1.38±0.20 ) %	
$\Gamma_8$ $\rho^-K^+\bar{K}^0 + \text{c.c.}$	( 4.1 ±1.2 ) × 10 <sup>-3</sup>	
$\Gamma_9$ $K^*(892)^0K^-\pi^+ \rightarrow$ $K^-\pi^+K^0\pi^0 + \text{c.c.}$	( 2.9 ±0.8 ) × 10 <sup>-3</sup>	
$\Gamma_{10}$ $K^*(892)^0\bar{K}^0\pi^0 \rightarrow$ $K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	( 3.8 ±0.9 ) × 10 <sup>-3</sup>	
$\Gamma_{11}$ $K^*(892)^-K^+\pi^0 \rightarrow$ $K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	( 3.7 ±0.8 ) × 10 <sup>-3</sup>	
$\Gamma_{12}$ $K^*(892)^+\bar{K}^0\pi^- \rightarrow$ $K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	( 2.9 ±0.8 ) × 10 <sup>-3</sup>	
$\Gamma_{13}$ $K^+K^-\eta\pi^0$	( 1.3 ±0.4 ) × 10 <sup>-3</sup>	
$\Gamma_{14}$ $K^+K^-\pi^+\pi^-$	( 8.4 ±0.9 ) × 10 <sup>-3</sup>	
$\Gamma_{15}$ $K^+K^-\pi^+\pi^-\pi^0$	( 1.17±0.13 ) %	
$\Gamma_{16}$ $K_S^0K^\pm\pi^\mp\pi^+\pi^-$	( 7.3 ±0.8 ) × 10 <sup>-3</sup>	
$\Gamma_{17}$ $K^+\bar{K}^*(892)^0\pi^- + \text{c.c.}$	( 2.1 ±1.1 ) × 10 <sup>-3</sup>	
$\Gamma_{18}$ $K^*(892)^0\bar{K}^*(892)^0$	( 2.3 ±0.4 ) × 10 <sup>-3</sup>	
$\Gamma_{19}$ $3(\pi^+\pi^-)$	( 8.6 ±1.8 ) × 10 <sup>-3</sup>	
$\Gamma_{20}$ $\phi\phi$	( 1.06±0.09 ) × 10 <sup>-3</sup>	
$\Gamma_{21}$ $\phi\phi\eta$	( 5.3 ±0.6 ) × 10 <sup>-4</sup>	
$\Gamma_{22}$ $\omega\omega$	( 8.4 ±1.0 ) × 10 <sup>-4</sup>	
$\Gamma_{23}$ $\omega K^+K^-$	( 7.3 ±0.9 ) × 10 <sup>-4</sup>	
$\Gamma_{24}$ $\omega\phi$	( 9.6 ±2.7 ) × 10 <sup>-6</sup>	
$\Gamma_{25}$ $\pi\pi$	( 2.23±0.09 ) × 10 <sup>-3</sup>	
$\Gamma_{26}$ $\rho^0\pi^+\pi^-$	( 3.7 ±1.6 ) × 10 <sup>-3</sup>	
$\Gamma_{27}$ $\pi^+\pi^-\pi^0$ (non-resonant)	( 2.0 ±0.4 ) × 10 <sup>-5</sup>	

$\Gamma_{28}$	$\rho(770)^\pm \pi^\mp$	$( 6 \pm 4 ) \times 10^{-6}$	
$\Gamma_{29}$	$\pi^+ \pi^- \eta$	$( 4.8 \pm 1.3 ) \times 10^{-4}$	
$\Gamma_{30}$	$\pi^+ \pi^- \eta'$	$( 5.0 \pm 1.8 ) \times 10^{-4}$	
$\Gamma_{31}$	$\eta \eta$	$( 5.4 \pm 0.4 ) \times 10^{-4}$	
$\Gamma_{32}$	$K^+ K^-$	$( 1.01 \pm 0.06 ) \times 10^{-3}$	
$\Gamma_{33}$	$K_S^0 K_S^0$	$( 5.2 \pm 0.4 ) \times 10^{-4}$	
$\Gamma_{34}$	$K^*(892)^\pm K^\mp$	$( 1.44 \pm 0.21 ) \times 10^{-4}$	
$\Gamma_{35}$	$K^*(892)^0 \bar{K}^0 + \text{c.c.}$	$( 1.24 \pm 0.27 ) \times 10^{-4}$	
$\Gamma_{36}$	$K_2^*(1430)^\pm K^\mp$	$( 1.48 \pm 0.12 ) \times 10^{-3}$	
$\Gamma_{37}$	$K_2^*(1430)^0 \bar{K}^0 + \text{c.c.}$	$( 1.24 \pm 0.17 ) \times 10^{-3}$	
$\Gamma_{38}$	$K_3^*(1780)^\pm K^\mp$	$( 5.2 \pm 0.8 ) \times 10^{-4}$	
$\Gamma_{39}$	$K_3^*(1780)^0 \bar{K}^0 + \text{c.c.}$	$( 5.6 \pm 2.1 ) \times 10^{-4}$	
$\Gamma_{40}$	$a_2(1320)^0 \pi^0$	$( 1.29 \pm 0.34 ) \times 10^{-3}$	
$\Gamma_{41}$	$a_2(1320)^\pm \pi^\mp$	$( 1.8 \pm 0.6 ) \times 10^{-3}$	
$\Gamma_{42}$	$\bar{K}^0 K^+ \pi^- + \text{c.c.}$	$( 1.28 \pm 0.18 ) \times 10^{-3}$	
$\Gamma_{43}$	$K^+ K^- \pi^0$	$( 3.0 \pm 0.8 ) \times 10^{-4}$	
$\Gamma_{44}$	$K^+ K^- \eta$	$< 3.2 \times 10^{-4}$	90%
$\Gamma_{45}$	$K^+ K^- \eta'(958)$	$( 1.94 \pm 0.34 ) \times 10^{-4}$	
$\Gamma_{46}$	$\eta \eta'$	$( 2.2 \pm 0.5 ) \times 10^{-5}$	
$\Gamma_{47}$	$\eta' \eta'$	$( 4.6 \pm 0.6 ) \times 10^{-5}$	
$\Gamma_{48}$	$\pi^+ \pi^- K_S^0 K_S^0$	$( 2.2 \pm 0.5 ) \times 10^{-3}$	
$\Gamma_{49}$	$K^+ K^- K_S^0 K_S^0$	$< 4 \times 10^{-4}$	90%
$\Gamma_{50}$	$K_S^0 K_S^0 K_S^0 K_S^0$	$( 1.13 \pm 0.18 ) \times 10^{-4}$	
$\Gamma_{51}$	$K^+ K^- K^+ K^-$	$( 1.65 \pm 0.20 ) \times 10^{-3}$	
$\Gamma_{52}$	$K^+ K^- \phi$	$( 1.42 \pm 0.29 ) \times 10^{-3}$	
$\Gamma_{53}$	$\bar{K}^0 K^+ \pi^- \phi + \text{c.c.}$	$( 4.8 \pm 0.7 ) \times 10^{-3}$	
$\Gamma_{54}$	$K^+ K^- \pi^0 \phi$	$( 2.7 \pm 0.5 ) \times 10^{-3}$	
$\Gamma_{55}$	$\phi \pi^+ \pi^- \pi^0$	$( 9.3 \pm 1.2 ) \times 10^{-4}$	
$\Gamma_{56}$	$\rho \bar{\rho}$	$( 7.33 \pm 0.33 ) \times 10^{-5}$	
$\Gamma_{57}$	$\rho \bar{\rho} \pi^0$	$( 4.7 \pm 0.4 ) \times 10^{-4}$	
$\Gamma_{58}$	$\rho \bar{\rho} \eta$	$( 1.74 \pm 0.25 ) \times 10^{-4}$	
$\Gamma_{59}$	$\rho \bar{\rho} \omega$	$( 3.6 \pm 0.4 ) \times 10^{-4}$	
$\Gamma_{60}$	$\rho \bar{\rho} \phi$	$( 2.8 \pm 0.9 ) \times 10^{-5}$	
$\Gamma_{61}$	$\rho \bar{\rho} \pi^+ \pi^-$	$( 1.32 \pm 0.34 ) \times 10^{-3}$	
$\Gamma_{62}$	$\rho \bar{\rho} \pi^0 \pi^0$	$( 7.8 \pm 2.3 ) \times 10^{-4}$	
$\Gamma_{63}$	$\rho \bar{\rho} K^+ K^- \text{ (non-resonant)}$	$( 1.91 \pm 0.32 ) \times 10^{-4}$	
$\Gamma_{64}$	$\rho \bar{\rho} K_S^0 K_S^0$	$< 7.9 \times 10^{-4}$	90%
$\Gamma_{65}$	$\rho \bar{n} \pi^-$	$( 8.5 \pm 0.9 ) \times 10^{-4}$	
$\Gamma_{66}$	$\bar{\rho} n \pi^+$	$( 8.9 \pm 0.8 ) \times 10^{-4}$	
$\Gamma_{67}$	$\rho \bar{n} \pi^- \pi^0$	$( 2.17 \pm 0.18 ) \times 10^{-3}$	
$\Gamma_{68}$	$\bar{\rho} n \pi^+ \pi^0$	$( 2.11 \pm 0.18 ) \times 10^{-3}$	

$\Gamma_{69}$	$\Lambda\bar{\Lambda}$	$(1.83 \pm 0.16) \times 10^{-4}$	
$\Gamma_{70}$	$\Lambda\bar{\Lambda}\pi^+\pi^-$	$(1.25 \pm 0.15) \times 10^{-3}$	
$\Gamma_{71}$	$\Lambda\bar{\Lambda}\pi^+\pi^-$ (non-resonant)	$(6.6 \pm 1.5) \times 10^{-4}$	
$\Gamma_{72}$	$\Lambda\bar{\Lambda}\eta$	$(1.05 \pm 0.26) \times 10^{-4}$	
$\Gamma_{73}$	$\Sigma(1385)^+\bar{\Lambda}\pi^- + \text{c.c.}$	$< 4 \times 10^{-4}$	90%
$\Gamma_{74}$	$\Sigma(1385)^-\bar{\Lambda}\pi^+ + \text{c.c.}$	$< 6 \times 10^{-4}$	90%
$\Gamma_{75}$	$K^+\bar{p}\Lambda + \text{c.c.}$	$(7.8 \pm 0.5) \times 10^{-4}$	
$\Gamma_{76}$	$nK_S^0\bar{\Lambda} + \text{c.c.}$	$(3.58 \pm 0.28) \times 10^{-4}$	
$\Gamma_{77}$	$K^*(892)^+\bar{p}\Lambda + \text{c.c.}$	$(8.2 \pm 1.1) \times 10^{-4}$	
$\Gamma_{78}$	$K^+\bar{p}\Lambda(1520) + \text{c.c.}$	$(2.8 \pm 0.7) \times 10^{-4}$	
$\Gamma_{79}$	$\Lambda(1520)\bar{\Lambda}(1520)$	$(4.6 \pm 1.5) \times 10^{-4}$	
$\Gamma_{80}$	$\Sigma^0\bar{\Sigma}^0$	$(3.7 \pm 0.6) \times 10^{-5}$	
$\Gamma_{81}$	$\Sigma^+\bar{p}K_S^0 + \text{c.c.}$	$(8.2 \pm 0.9) \times 10^{-5}$	
$\Gamma_{82}$	$\Sigma^0\bar{p}K^+ + \text{c.c.}$	$(9.1 \pm 0.8) \times 10^{-5}$	
$\Gamma_{83}$	$\Sigma^+\bar{\Sigma}^-$	$(3.4 \pm 0.7) \times 10^{-5}$	
$\Gamma_{84}$	$\Sigma^-\bar{\Sigma}^+$	$(4.4 \pm 1.8) \times 10^{-5}$	
$\Gamma_{85}$	$\Sigma(1385)^+\bar{\Sigma}(1385)^-$	$< 1.6 \times 10^{-4}$	90%
$\Gamma_{86}$	$\Sigma(1385)^-\bar{\Sigma}(1385)^+$	$< 8 \times 10^{-5}$	90%
$\Gamma_{87}$	$K^-\Lambda\bar{\Xi}^+ + \text{c.c.}$	$(1.76 \pm 0.32) \times 10^{-4}$	
$\Gamma_{88}$	$\Xi^0\bar{\Xi}^0$	$(1.83 \pm 0.22) \times 10^{-4}$	
$\Gamma_{89}$	$\Xi^-\bar{\Xi}^+$	$(1.44 \pm 0.12) \times 10^{-4}$	
$\Gamma_{90}$	$J/\psi(1S)\pi^+\pi^-\pi^0$	$< 1.5 \%$	90%
$\Gamma_{91}$	$\pi^0\eta_c$	$< 3.2 \times 10^{-3}$	90%
$\Gamma_{92}$	$\eta_c(1S)\pi^+\pi^-$	$< 5.4 \times 10^{-3}$	90%

### Radiative decays

$\Gamma_{93}$	$\gamma J/\psi(1S)$	$(19.0 \pm 0.5) \%$	
$\Gamma_{94}$	$\gamma\rho^0$	$< 1.9 \times 10^{-5}$	90%
$\Gamma_{95}$	$\gamma\omega$	$< 6 \times 10^{-6}$	90%
$\Gamma_{96}$	$\gamma\phi$	$< 7 \times 10^{-6}$	90%
$\Gamma_{97}$	$\gamma\gamma$	$(2.85 \pm 0.10) \times 10^{-4}$	
$\Gamma_{98}$	$e^+e^- J/\psi(1S)$	$(2.15 \pm 0.14) \times 10^{-3}$	
$\Gamma_{99}$	$\mu^+\mu^- J/\psi(1S)$	$(2.02 \pm 0.33) \times 10^{-4}$	

## CONSTRAINED FIT INFORMATION

A multiparticle fit to  $\chi_{c1}(1P)$ ,  $\chi_{c0}(1P)$ ,  $\chi_{c2}(1P)$ , and  $\psi(2S)$  with 4 total widths, a partial width, 25 combinations of partial widths obtained from integrated cross section, and 84 branching ratios uses 248 measurements to determine 49 parameters. The overall fit has a  $\chi^2 = 379.8$  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>14</sub>	7									
x <sub>17</sub>	2	21								
x <sub>18</sub>	4	3	1							
x <sub>20</sub>	7	5	1	3						
x <sub>25</sub>	7	6	1	4	10					
x <sub>26</sub>	18	2	0	1	1	1				
x <sub>31</sub>	3	3	1	2	5	12	1			
x <sub>32</sub>	5	4	1	3	7	15	1	8		
x <sub>33</sub>	5	4	1	2	6	13	1	7	8	
x <sub>42</sub>	2	2	0	1	3	7	0	3	4	4
x <sub>51</sub>	4	3	1	2	4	7	1	4	5	4
x <sub>56</sub>	10	9	2	5	9	11	2	5	8	7
x <sub>69</sub>	3	3	1	2	5	12	1	6	8	6
x <sub>93</sub>	12	10	2	6	15	34	2	18	22	18
x <sub>97</sub>	-6	-4	-1	-2	2	20	-2	12	12	10
Γ	-23	-19	-4	-11	-19	-25	-5	-12	-18	-15
	x <sub>1</sub>	x <sub>14</sub>	x <sub>17</sub>	x <sub>18</sub>	x <sub>20</sub>	x <sub>25</sub>	x <sub>26</sub>	x <sub>31</sub>	x <sub>32</sub>	x <sub>33</sub>

x <sub>51</sub>	2									
x <sub>56</sub>	4	5								
x <sub>69</sub>	3	4	5							
x <sub>93</sub>	10	11	4	17						
x <sub>97</sub>	5	4	18	11	34					
Γ	-8	-11	-45	-12	-46	-43				
	x <sub>42</sub>	x <sub>51</sub>	x <sub>56</sub>	x <sub>69</sub>	x <sub>93</sub>	x <sub>97</sub>				

### χ<sub>c2</sub>(1P) PARTIAL WIDTHS

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

$\Gamma(p\bar{p}) \times \Gamma(\gamma J/\psi(1S)) / \Gamma_{\text{total}}$   $\Gamma_{56} \Gamma_{93} / \Gamma$

VALUE (eV)	DOCUMENT ID	TECN	COMMENT
<b>27.5 ± 1.2 OUR FIT</b>			
<b>27.5 ± 1.5 OUR AVERAGE</b>			
27.0 ± 1.5 ± 1.1	<sup>1</sup> ANDREOTTI 05A	E835	$p\bar{p} \rightarrow e^+ e^- \gamma$
27.7 ± 1.5 ± 2.0	<sup>1,2</sup> ARMSTRONG 92	E760	$\bar{p}p \rightarrow e^+ e^- \gamma$
36 ± 8	<sup>1</sup> BAGLIN 86B	SPEC	$\bar{p}p \rightarrow e^+ e^- X$

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

<sup>2</sup> Recalculated by ANDREOTTI 05A.

$\Gamma(\gamma\gamma) \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$					$\Gamma_{97}\Gamma_{93}/\Gamma$
VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>107 ± 5 OUR FIT</b>					
<b>117 ± 10 OUR AVERAGE</b>					
111 ± 12 ± 9	147 ± 15	<sup>1</sup> DOBBS	06 CLE3	10.4 $e^+e^- \rightarrow e^+e^-\chi_{c2}$	
114 ± 11 ± 9	136 ± 13.3	<sup>1,2</sup> ABE	02T BELL	$e^+e^- \rightarrow e^+e^-\chi_{c2}$	
139 ± 55 ± 21		<sup>1,3</sup> ACCIARRI	99E L3	$e^+e^- \rightarrow e^+e^-\chi_{c2}$	
242 ± 65 ± 51		<sup>1,4</sup> ACKER...,K...	98 OPAL	$e^+e^- \rightarrow e^+e^-\chi_{c2}$	
150 ± 42 ± 36		<sup>1,5</sup> DOMINICK	94 CLE2	$e^+e^- \rightarrow e^+e^-\chi_{c2}$	
470 ± 240 ± 120		<sup>1,6</sup> BAUER	93 TPC	$e^+e^- \rightarrow e^+e^-\chi_{c2}$	

<sup>1</sup> Calculated by us using  $B(J/\psi \rightarrow \ell^+\ell^-) = 0.1187 \pm 0.0008$ .

<sup>2</sup> All systematic errors added in quadrature.

<sup>3</sup> The value for  $\Gamma(\chi_{c2} \rightarrow \gamma\gamma)$  reported in ACCIARRI 99E is derived using  $B(\chi_{c2} \rightarrow \gamma J/\psi(1S)) \times B(J/\psi(1S) \rightarrow \ell^+\ell^-) = 0.0162 \pm 0.0014$ .

<sup>4</sup> The value for  $\Gamma(\chi_{c2} \rightarrow \gamma\gamma)$  reported in ACKERSTAFF,K 98 is derived using  $B(\chi_{c2} \rightarrow \gamma J/\psi(1S)) = 0.135 \pm 0.011$  and  $B(J/\psi(1S) \rightarrow \ell^+\ell^-) = 0.1203 \pm 0.0038$ .

<sup>5</sup> The value for  $\Gamma(\chi_{c2} \rightarrow \gamma\gamma)$  reported in DOMINICK 94 is derived using  $B(\chi_{c2} \rightarrow \gamma J/\psi(1S)) = 0.135 \pm 0.011$ ,  $B(J/\psi(1S) \rightarrow e^+e^-) = 0.0627 \pm 0.0020$ , and  $B(J/\psi(1S) \rightarrow \mu^+\mu^-) = 0.0597 \pm 0.0025$ .

<sup>6</sup> The value for  $\Gamma(\chi_{c2} \rightarrow \gamma\gamma)$  reported in BAUER 93 is derived using  $B(\chi_{c2} \rightarrow \gamma J/\psi(1S)) = 0.135 \pm 0.011$ ,  $B(J/\psi(1S) \rightarrow e^+e^-) = 0.0627 \pm 0.0020$ , and  $B(J/\psi(1S) \rightarrow \mu^+\mu^-) = 0.0597 \pm 0.0025$ .

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

$\Gamma(2(\pi^+\pi^-)) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$					$\Gamma_1\Gamma_{97}/\Gamma$
VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>5.7 ± 0.5 OUR FIT</b>					
<b>5.2 ± 0.7 OUR AVERAGE</b>					
5.01 ± 0.44 ± 0.55	1597 ± 138	UEHARA	08 BELL	$\gamma\gamma \rightarrow \chi_{c2} \rightarrow 2(\pi^+\pi^-)$	
6.4 ± 1.8 ± 0.8		EISENSTEIN	01 CLE2	$e^+e^- \rightarrow e^+e^-\chi_{c2}$	

$\Gamma(\rho\rho) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$					$\Gamma_2\Gamma_{97}/\Gamma$
VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
<7.8	90	<598	UEHARA	08 BELL	$\gamma\gamma \rightarrow \chi_{c2} \rightarrow 2(\pi^+\pi^-)$

$\Gamma(K^+K^-\pi^+\pi^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$					$\Gamma_{14}\Gamma_{97}/\Gamma$
VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>4.7 ± 0.5 OUR FIT</b>					
<b>4.42 ± 0.42 ± 0.53</b>	780 ± 74	UEHARA	08 BELL	$\gamma\gamma \rightarrow \chi_{c2} \rightarrow K^+K^-\pi^+\pi^-$	

$\Gamma(K^+K^-\pi^+\pi^-\pi^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$					$\Gamma_{15}\Gamma_{97}/\Gamma$
VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>6.5 ± 0.9 ± 1.5</b>	1250	DEL-AMO-SA..11M	BABR	$\gamma\gamma \rightarrow K^+K^-\pi^+\pi^-\pi^0$	

$\Gamma(K^*(892)^0 \bar{K}^*(892)^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{18}\Gamma_{97}/\Gamma$

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

$\Gamma(\phi\phi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{20}\Gamma_{97}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.60±0.05 OUR FIT</b>				
<b>0.62±0.07±0.05</b>	89 ± 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. • • •				
0.58±0.18±0.16	26.5 ± 8.1	UEHARA 08	BELL	$\gamma\gamma \rightarrow \chi_{c2} \rightarrow 2(K^+ K^-)$
<sup>1</sup> Supersedes UEHARA 08. Using $B(\phi \rightarrow K^+ K^-) = (48.9 \pm 0.5)\%$ .				

$\Gamma(\omega\omega) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{22}\Gamma_{97}/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.64	90	<sup>1</sup> LIU 12B	BELL	$\gamma\gamma \rightarrow 2(\pi^+ \pi^- \pi^0)$
<sup>1</sup> Using $B(\omega \rightarrow \pi^+ \pi^- \pi^0) = (89.2 \pm 0.7)\%$ .				

$\Gamma(\omega\phi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{24}\Gamma_{97}/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.04	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 $B(\omega \rightarrow \pi^+ \pi^- \pi^0) = (89.2 \pm 0.7)\%$ .				

$\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{25}\Gamma_{97}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.25±0.07 OUR FIT</b>				
<b>1.18±0.25 OUR AVERAGE</b>				
1.44±0.54±0.47	34 ± 13	<sup>1</sup> UEHARA 09	BELL	10.6 $e^+ e^- \rightarrow e^+ e^- \pi^0 \pi^0$
1.14±0.21±0.17	54 ± 10	<sup>2</sup> NAKAZAWA 05	BELL	10.6 $e^+ e^- \rightarrow e^+ e^- \pi^+ \pi^-$
<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 $\pi\pi$ .				

$\Gamma(\rho^0 \pi^+ \pi^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{26}\Gamma_{97}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>2.1±0.9 OUR FIT</b>				
<b>3.2±1.9±0.5</b>	986 ± 578	UEHARA 08	BELL	$\gamma\gamma \rightarrow \chi_{c2} \rightarrow 2(\pi^+ \pi^-)$

$\Gamma(\eta\eta) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{31}\Gamma_{97}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.53±0.22±0.09</b>	8	<sup>1</sup> UEHARA 10A	BELL	10.6 $e^+ e^- \rightarrow e^+ e^- \eta\eta$
<sup>1</sup> Interference with the continuum not included.				

$\Gamma(K^+ K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$   $\Gamma_{32}\Gamma_{97}/\Gamma$

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

$$\Gamma(K_S^0 K_S^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}} \qquad \Gamma_{33}\Gamma_{97}/\Gamma$$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.294 ± 0.025 OUR FIT**

**0.27<sup>+0.07</sup><sub>-0.06</sub> ± 0.03**      53      <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. • • •

0.31 ± 0.05 ± 0.03      38 ± 7      CHEN      07B BELL       $e^+ e^- \rightarrow e^+ e^- \chi_{c2}$

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

$$\Gamma(\bar{K}^0 K^+ \pi^- + \text{c.c.}) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}} \qquad \Gamma_{42}\Gamma_{97}/\Gamma$$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.72 ± 0.11 OUR FIT**

**1.20 ± 0.33 ± 0.13**      126      <sup>1</sup> DEL-AMO-SA..11M BABR       $\gamma\gamma \rightarrow K_S^0 K^\pm \pi^\mp$

<sup>1</sup> We have multiplied  $\bar{K}^0 K \pi$  by 2/3 to obtain  $\bar{K}^0 K^+ \pi^- + \text{c.c.}$

$$\Gamma(K^+ K^- K^+ K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}} \qquad \Gamma_{51}\Gamma_{97}/\Gamma$$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.93 ± 0.11 OUR FIT**

**1.10 ± 0.21 ± 0.15**      126 ± 24      UEHARA      08 BELL       $\gamma\gamma \rightarrow \chi_{c2} \rightarrow 2(K^+ K^-)$

$$\Gamma(\eta_c(1S) \pi^+ \pi^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}} \qquad \Gamma_{92}\Gamma_{97}/\Gamma$$

VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
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**<15.7**

## χ<sub>c2</sub>(1P) BRANCHING RATIOS

### HADRONIC DECAYS

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

VALUE	DOCUMENT ID
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**0.0102 ± 0.0009 OUR FIT**

$$\Gamma(\rho^0 \pi^+ \pi^-)/\Gamma(2(\pi^+ \pi^-)) \qquad \Gamma_{26}/\Gamma_1$$

VALUE	DOCUMENT ID	TECN	COMMENT
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**0.36 ± 0.15 OUR FIT**

**0.31 ± 0.17**      TANENBAUM 78      MRK1       $\psi(2S) \rightarrow \gamma \chi_{c2}$

$$\Gamma(\pi^+ \pi^- \pi^0 \pi^0)/\Gamma_{\text{total}} \qquad \Gamma_3/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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**1.83 ± 0.23 ± 0.04**      903.5      <sup>1</sup> HE      08B CLEO       $e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> HE 08B reports  $1.87 \pm 0.07 \pm 0.22 \pm 0.13$  % from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \pi^+ \pi^- \pi^0 \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.



**$\Gamma(\rho^+ \pi^- \pi^0 + \text{c.c.})/\Gamma_{\text{total}}$**   **$\Gamma_4/\Gamma$**

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>2.19±0.34±0.05</b>	1031.9	<sup>1,2</sup> HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> HE 08B reports  $2.23 \pm 0.11 \pm 0.32 \pm 0.16$  % from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \rho^+ \pi^- \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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.

**$\Gamma(4\pi^0)/\Gamma_{\text{total}}$**   **$\Gamma_5/\Gamma$**

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.11±0.15±0.02</b>	1164	<sup>1</sup> ABLIKIM	11A BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c2}$

<sup>1</sup> ABLIKIM 11A reports  $(1.21 \pm 0.05 \pm 0.16) \times 10^{-3}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow 4\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

**$\Gamma(K^+ K^- \pi^0 \pi^0)/\Gamma_{\text{total}}$**   **$\Gamma_6/\Gamma$**

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.206±0.040±0.004</b>	76.9	<sup>1</sup> HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> HE 08B reports  $0.21 \pm 0.03 \pm 0.03 \pm 0.01$  % from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^+ K^- \pi^0 \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

**$\Gamma(K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}$**   **$\Gamma_7/\Gamma$**

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.38±0.19±0.03</b>	211.6	<sup>1</sup> HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> HE 08B reports  $1.41 \pm 0.11 \pm 0.16 \pm 0.10$  % from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.41±0.12±0.01</b>	62.9	<sup>1</sup> HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> HE 08B reports  $0.42 \pm 0.11 \pm 0.06 \pm 0.03$  % from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \rho^- K^+ \bar{K}^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

**$\Gamma(K^*(892)^0 K^- \pi^+ \rightarrow K^- \pi^+ K^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}$**   **$\Gamma_9/\Gamma$**

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.29±0.08±0.01</b>	38.7	<sup>1</sup> HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> HE 08B reports  $0.30 \pm 0.07 \pm 0.04 \pm 0.02$  % from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^*(892)^0 K^- \pi^+ \rightarrow K^- \pi^+ K^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.38±0.09±0.01</b>	63.0	<sup>1</sup> HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> HE 08B reports  $0.39 \pm 0.07 \pm 0.05 \pm 0.03$  % from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^*(892)^0 \bar{K}^0 \pi^0 \rightarrow K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.37±0.08±0.01</b>	51.1	<sup>1</sup> HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> HE 08B reports  $0.38 \pm 0.07 \pm 0.04 \pm 0.03$  % from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^*(892)^- K^+ \pi^0 \rightarrow K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.29±0.08±0.01</b>	39.3	<sup>1</sup> HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> HE 08B reports  $0.30 \pm 0.07 \pm 0.04 \pm 0.02$  % from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^*(892)^+ \bar{K}^0 \pi^- \rightarrow K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

**$\Gamma(K^+ K^- \eta \pi^0)/\Gamma_{\text{total}}$**   **$\Gamma_{13}/\Gamma$**

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.127±0.044±0.003</b>	22.9	<sup>1</sup> HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

<sup>1</sup> HE 08B reports  $0.13 \pm 0.04 \pm 0.02 \pm 0.01$  % from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^+ K^- \eta \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

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

**8.4 ± 0.9 OUR FIT**

$\Gamma(K^+ K^- \pi^+ \pi^- \pi^0) / \Gamma_{\text{total}}$   $\Gamma_{15} / \Gamma$

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

**11.69 ± 0.13 ± 1.31** 11k <sup>1</sup> ABLIKIM 13B BES3  $e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c2}$

<sup>1</sup> Using  $1.06 \times 10^8$   $\psi(2S)$  mesons and  $B(\psi(2S) \rightarrow \chi_{c2} \gamma) = (8.72 \pm 0.34)\%$ .

$\Gamma(K_S^0 K^\pm \pi^\mp \pi^+ \pi^-) / \Gamma_{\text{total}}$   $\Gamma_{16} / \Gamma$

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

**7.30 ± 0.11 ± 0.75** 4.5k <sup>1</sup> ABLIKIM 13B BES3  $e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c2}$

<sup>1</sup> Using  $1.06 \times 10^8$   $\psi(2S)$  mesons and  $B(\psi(2S) \rightarrow \chi_{c2} \gamma) = (8.72 \pm 0.34)\%$ .

$\Gamma(K^+ \bar{K}^*(892)^0 \pi^- + \text{c.c.}) / \Gamma(K^+ K^- \pi^+ \pi^-)$   $\Gamma_{17} / \Gamma_{14}$

VALUE DOCUMENT ID TECN COMMENT

**0.25 ± 0.13 OUR FIT**

**0.25 ± 0.13**

TANENBAUM 78 MRK1  $\psi(2S) \rightarrow \gamma \chi_{c2}$

$\Gamma(K^+ \bar{K}^*(892)^0 \pi^- + \text{c.c.}) / \Gamma_{\text{total}}$   $\Gamma_{17} / \Gamma$

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

**21 ± 11 OUR FIT**

$\Gamma(K^*(892)^0 \bar{K}^*(892)^0) / \Gamma_{\text{total}}$   $\Gamma_{18} / \Gamma$

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

**2.3 ± 0.4 OUR FIT**

$\Gamma(3(\pi^+ \pi^-)) / \Gamma_{\text{total}}$   $\Gamma_{19} / \Gamma$

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

**8.6 ± 1.8 OUR EVALUATION** Treating systematic error as correlated.

**15.2 ± 1.7 OUR AVERAGE** Error includes scale factor of 3.7.

15.7 ± 0.1 ± 0.5 112K <sup>1</sup> ABLIKIM 22Q BES3  $\psi(2S) \rightarrow \gamma 3(\pi^+ \pi^-)$

8.6 ± 0.9 ± 1.6 <sup>2</sup> BAI 99B BES  $\psi(2S) \rightarrow \gamma \chi_{c2}$

8.7 ± 5.9 ± 0.4 <sup>2</sup> TANENBAUM 78 MRK1  $\psi(2S) \rightarrow \gamma \chi_{c2}$

<sup>1</sup> ABLIKIM 22Q reports  $(1.565 \pm 0.005 \pm 0.048) \times 10^{-2}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow 3(\pi^+ \pi^-)) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ .

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

$\Gamma(\phi\phi) / \Gamma_{\text{total}}$   $\Gamma_{20} / \Gamma$

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

**1.06 ± 0.09 OUR FIT**

**$\Gamma(\phi\phi\eta)/\Gamma_{\text{total}}$**   **$\Gamma_{21}/\Gamma$**

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>5.3±0.5±0.4</b>	143.6	<sup>1</sup> ABLIKIM	20B BES3	$\psi(2S) \rightarrow \gamma\phi\phi\eta$

<sup>1</sup> ABLIKIM 20B reports  $(5.33 \pm 0.52 \pm 0.39) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \phi\phi\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ .

**$\Gamma(\omega\omega)/\Gamma_{\text{total}}$**   **$\Gamma_{22}/\Gamma$**

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.84±0.10 OUR AVERAGE</b>				
0.82±0.10±0.02	762	<sup>1</sup> ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma$ hadrons
1.73±0.57±0.04	27.7 ± 7.4	<sup>2</sup> ABLIKIM	05N BES2	$\psi(2S) \rightarrow \gamma\chi_{c2} \rightarrow \gamma 6\pi$

<sup>1</sup> ABLIKIM 11K reports  $(8.9 \pm 0.3 \pm 1.1) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \omega\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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  $[(\chi_{c2}(1P) \rightarrow \omega\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))] = (0.165 \pm 0.044 \pm 0.032) \times 10^{-3}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.73±0.04±0.08</b>	512	<sup>1</sup> ABLIKIM	13B BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c2}$

<sup>1</sup> Using  $1.06 \times 10^8$   $\psi(2S)$  mesons and  $B(\psi(2S) \rightarrow \chi_{c2}\gamma) = (8.72 \pm 0.34)\%$ .

**$\Gamma(\omega\phi)/\Gamma_{\text{total}}$**   **$\Gamma_{24}/\Gamma$**

<u>VALUE (units <math>10^{-6}</math>)</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>9.6±2.7±0.2</b>		33	<sup>1</sup> ABLIKIM	19J BES3	$\psi(2S) \rightarrow \gamma$ hadrons

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

<18	90	<sup>2,3</sup> ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma$ hadrons
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<sup>1</sup> ABLIKIM 19J reports  $[\Gamma(\chi_{c2}(1P) \rightarrow \omega\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))] = (0.91 \pm 0.23 \pm 0.12) \times 10^{-6}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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  $< 2 \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \omega\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))] = (8.74 \pm 0.35) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

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

**$\Gamma(\pi\pi)/\Gamma_{\text{total}}$**   **$\Gamma_{25}/\Gamma$**

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>
<b>2.23±0.09 OUR FIT</b>	

**$\Gamma(\rho^0\pi^+\pi^-)/\Gamma_{\text{total}}$**   **$\Gamma_{26}/\Gamma$**

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>DOCUMENT ID</u>
<b>37±16 OUR FIT</b>	

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

<u>VALUE (units <math>10^{-5}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>2.01±0.42±0.04</b>	64	<sup>1</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma\pi^+\pi^-\pi^0$

<sup>1</sup> ABLIKIM 17AG reports  $(2.1 \pm 0.4 \pm 0.2) \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \pi^+\pi^-\pi^0(\text{non-resonant}))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\rho(770)^\pm\pi^\mp)/\Gamma_{\text{total}}$   $\Gamma_{28}/\Gamma$

<u>VALUE (units <math>10^{-5}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.61±0.38±0.01</b>	15	<sup>1</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma\pi^+\pi^-\pi^0$

<sup>1</sup> ABLIKIM 17AG reports  $(0.64 \pm 0.39 \pm 0.07) \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \rho(770)^\pm\pi^\mp)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.48±0.13±0.01</b>		<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. • • •

<1.4 90 <sup>2</sup> ABLIKIM 06R BES2  $\psi(2S) \rightarrow \gamma\chi_{c2}$

<sup>1</sup> ATHAR 07 reports  $(0.49 \pm 0.12 \pm 0.06) \times 10^{-3}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \pi^+\pi^-\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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 06R reports  $< 1.7 \times 10^{-3}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \pi^+\pi^-\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.1 \pm 0.4) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

$\Gamma(\pi^+\pi^-\eta')/\Gamma_{\text{total}}$   $\Gamma_{30}/\Gamma$

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.50±0.18±0.01</b>	<sup>1</sup> ATHAR	07 CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

<sup>1</sup> ATHAR 07 reports  $(0.51 \pm 0.18 \pm 0.06) \times 10^{-3}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \pi^+\pi^-\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\eta\eta)/\Gamma_{\text{total}}$   $\Gamma_{31}/\Gamma$

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>DOCUMENT ID</u>
<b>5.4±0.4 OUR FIT</b>	

$$\frac{\Gamma(K^+ K^-)}{\Gamma_{\text{total}}} \qquad \Gamma_{32}/\Gamma$$

<i>VALUE</i> (units $10^{-3}$ )	<i>DOCUMENT ID</i>	
<b>1.01 ± 0.06 OUR FIT</b>		

$$\frac{\Gamma(K_S^0 K_S^0)}{\Gamma_{\text{total}}} \qquad \Gamma_{33}/\Gamma$$

<i>VALUE</i> (units $10^{-3}$ )	<i>DOCUMENT ID</i>	
<b>0.52 ± 0.04 OUR FIT</b>		

$$\frac{\Gamma(K_S^0 K_S^0)}{\Gamma(\pi\pi)} \qquad \Gamma_{33}/\Gamma_{25}$$

<i>VALUE</i>	<i>DOCUMENT ID</i>	<i>TECN</i>	<i>COMMENT</i>
<b>0.235 ± 0.019 OUR FIT</b>			

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

0.27 ± 0.07 ± 0.04	<sup>1,2</sup> CHEN	07B BELL	$e^+ e^- \rightarrow e^+ e^- \chi_{c2}$
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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.

$$\frac{\Gamma(K_S^0 K_S^0)}{\Gamma(K^+ K^-)} \qquad \Gamma_{33}/\Gamma_{32}$$

<i>VALUE</i>	<i>DOCUMENT ID</i>	<i>TECN</i>	<i>COMMENT</i>
<b>0.52 ± 0.05 OUR FIT</b>			

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

0.70 ± 0.21 ± 0.12	<sup>1,2</sup> CHEN	07B BELL	$e^+ e^- \rightarrow e^+ e^- \chi_{c2}$
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<sup>1</sup> Using  $\Gamma(K^+ K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$  from NAKAZAWA 05.

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

$$\frac{\Gamma(K^*(892)^\pm K^\mp)}{\Gamma_{\text{total}}} \qquad \Gamma_{34}/\Gamma$$

<i>VALUE</i> (units $10^{-4}$ )	<i>DOCUMENT ID</i>	<i>TECN</i>	<i>COMMENT</i>
<b>1.44 ± 0.21 ± 0.03</b>	<sup>1</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K \bar{K} \pi$

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

1.72 ± 0.26 ± 0.04	<sup>2</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K^+ K^- \pi^0$
1.34 ± 0.27 ± 0.03	<sup>3</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K_S^0 K^\pm \pi^\mp$

<sup>1</sup> ABLIKIM 17AG reports  $(1.5 \pm 0.1 \pm 0.2) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^*(892)^\pm K^\mp)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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 17AG reports  $(1.8 \pm 0.2 \pm 0.2) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^*(892)^\pm K^\mp)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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 17AG reports  $(1.4 \pm 0.2 \pm 0.2) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^*(892)^\pm K^\mp)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^*(892)^0 \bar{K}^0 + \text{c.c.})/\Gamma_{\text{total}}$   $\Gamma_{35}/\Gamma$ 

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>1.24 ± 0.27 ± 0.03</b>	<sup>1</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K_S^0 K^\pm \pi^\mp$

<sup>1</sup> ABLIKIM 17AG reports  $(1.3 \pm 0.2 \pm 0.2) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^*(892)^0 \bar{K}^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(K_2^*(1430)^\pm K^\mp)/\Gamma_{\text{total}}$   $\Gamma_{36}/\Gamma$ 

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>14.8 ± 1.2 ± 0.3</b>	<sup>1</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K \bar{K} \pi$

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

17.4 ± 1.6 ± 0.4	<sup>2</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K^+ K^- \pi^0$
13.0 ± 1.5 ± 0.3	<sup>3</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K_S^0 K^\pm \pi^\mp$

<sup>1</sup> ABLIKIM 17AG reports  $(15.5 \pm 0.6 \pm 1.2) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K_2^*(1430)^\pm K^\mp)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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 17AG reports  $(18.2 \pm 0.8 \pm 1.6) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K_2^*(1430)^\pm K^\mp)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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 17AG reports  $(13.6 \pm 0.8 \pm 1.4) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K_2^*(1430)^\pm K^\mp)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(K_2^*(1430)^0 \bar{K}^0 + \text{c.c.})/\Gamma_{\text{total}}$   $\Gamma_{37}/\Gamma$ 

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>12.4 ± 1.7 ± 0.3</b>	<sup>1</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K_S^0 K^\pm \pi^\mp$

<sup>1</sup> ABLIKIM 17AG reports  $(13.0 \pm 1.0 \pm 1.5) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K_2^*(1430)^0 \bar{K}^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(K_3^*(1780)^\pm K^\mp)/\Gamma_{\text{total}}$   $\Gamma_{38}/\Gamma$ 

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>5.2 ± 0.8 ± 0.1</b>	<sup>1</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K \bar{K} \pi$

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

$5.1 \pm 1.0 \pm 0.1$	<sup>2</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K^+ K^- \pi^0$
$5.6 \pm 1.8 \pm 0.1$	<sup>3</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K_S^0 K^\pm \pi^\mp$

<sup>1</sup> ABLIKIM 17AG reports  $(5.4 \pm 0.5 \pm 0.7) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K_3^*(1780)^\pm K^\mp)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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 17AG reports  $(5.3 \pm 0.5 \pm 0.9) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K_3^*(1780)^\pm K^\mp)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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 17AG reports  $(5.9 \pm 1.1 \pm 1.5) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K_3^*(1780)^\pm K^\mp)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

**$\Gamma(K_3^*(1780)^0 \bar{K}^0 + \text{c.c.})/\Gamma_{\text{total}}$**   **$\Gamma_{39}/\Gamma$**

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>5.6 \pm 2.1 \pm 0.1</math></b>	<sup>1</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K_S^0 K^\pm \pi^\mp$

<sup>1</sup> ABLIKIM 17AG reports  $(5.9 \pm 1.6 \pm 1.5) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K_3^*(1780)^0 \bar{K}^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

**$\Gamma(a_2(1320)^0 \pi^0)/\Gamma_{\text{total}}$**   **$\Gamma_{40}/\Gamma$**

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>12.9 \pm 3.4 \pm 0.3</math></b>	<sup>1</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K^+ K^- \pi^0$

<sup>1</sup> ABLIKIM 17AG reports  $(13.5 \pm 1.6 \pm 3.2) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow a_2(1320)^0 \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

**$\Gamma(a_2(1320)^\pm \pi^\mp)/\Gamma_{\text{total}}$**   **$\Gamma_{41}/\Gamma$**

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>17.6 \pm 6.1 \pm 0.4</math></b>	<sup>1</sup> ABLIKIM	17AG BES3	$\psi(2S) \rightarrow \gamma K_S^0 K^\pm \pi^\mp$

<sup>1</sup> ABLIKIM 17AG reports  $(18.4 \pm 3.3 \pm 5.5) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow a_2(1320)^\pm \pi^\mp)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.



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

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>0.30±0.08±0.01</b>		<sup>1</sup> ATHAR	07	CLEO $\psi(2S) \rightarrow \gamma h^+ h^- h^0$

<sup>1</sup> ATHAR 07 reports  $(0.31 \pm 0.07 \pm 0.04) \times 10^{-3}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^+ K^- \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-3}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.32</b>	90	<sup>1</sup> ATHAR	07	CLEO $\psi(2S) \rightarrow \gamma h^+ h^- h^0$

<sup>1</sup> ATHAR 07 reports  $< 0.33 \times 10^{-3}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^+ K^- \eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

$\Gamma(K^+ K^- \eta'(958))/\Gamma_{\text{total}}$   $\Gamma_{45}/\Gamma$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.94±0.34</b>	107	<sup>1</sup> ABLIKIM	14J	BES3 $\psi(2S) \rightarrow \gamma K^+ K^- \eta'(958)$

<sup>1</sup> Derived using  $B(\psi(2S) \rightarrow \gamma \chi_{c2}) = (8.72 \pm 0.34)\%$ . Uncertainty includes both statistical and systematic contributions combined in quadrature.

$\Gamma(\eta\eta')/\Gamma_{\text{total}}$   $\Gamma_{46}/\Gamma$

VALUE (units $10^{-5}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>2.17±0.47±0.05</b>		20	<sup>1</sup> ABLIKIM	17AI	BES3 $\psi(2S) \rightarrow \gamma \eta' \eta$

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

< 6	90	3.3 ± 8.0	<sup>2</sup> ASNER	09	CLEO $\psi(2S) \rightarrow \gamma \eta \eta'$
< 23	90		<sup>3</sup> ADAMS	07	CLEO $\psi(2S) \rightarrow \gamma \chi_{c2}$

<sup>1</sup> ABLIKIM 17AI reports  $(2.27 \pm 0.43 \pm 0.25) \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \eta\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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  $< 0.6 \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \eta\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

<sup>3</sup> Superseded by ASNER 09. ADAMS 07 reports  $< 2.3 \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \eta\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 0.0933 \pm 0.0014 \pm 0.0061$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

$\Gamma(\eta' \eta')/\Gamma_{\text{total}}$   $\Gamma_{47}/\Gamma$

VALUE (units $10^{-5}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>4.6±0.6±0.1</b>		60	<sup>1</sup> ABLIKIM	17AI	BES3 $\psi(2S) \rightarrow \gamma \eta' \eta'$

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

<10	90	12 ± 7	<sup>2</sup> ASNER	09	CLEO	$\psi(2S) \rightarrow \gamma \eta' \eta'$
<30	90		<sup>3</sup> ADAMS	07	CLEO	$\psi(2S) \rightarrow \gamma \chi_{c2}$

<sup>1</sup> ABLIKIM 17A1 reports  $(4.76 \pm 0.56 \pm 0.38) \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \eta' \eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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  $< 1.0 \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \eta' \eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

<sup>3</sup> Superseded by ASNER 09. ADAMS 07 reports  $< 3.1 \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \eta' \eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 0.0933 \pm 0.0014 \pm 0.0061$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

### $\Gamma(\pi^+ \pi^- K_S^0 K_S^0)/\Gamma_{\text{total}}$ $\Gamma_{48}/\Gamma$

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>2.17±0.54±0.05</b>	57 ± 11	<sup>1</sup> ABLIKIM	050 BES2	$\psi(2S) \rightarrow \gamma \chi_{c2}$

<sup>1</sup> ABLIKIM 050 reports  $[\Gamma(\chi_{c2}(1P) \rightarrow \pi^+ \pi^- K_S^0 K_S^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  =  $(0.207 \pm 0.039 \pm 0.033) \times 10^{-3}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;4</b>	90	2.3 ± 2.2	<sup>1</sup> ABLIKIM	050 BES2	$e^+ e^- \rightarrow \chi_{c2} \gamma$

<sup>1</sup> ABLIKIM 050 reports  $[\Gamma(\chi_{c2}(1P) \rightarrow K^+ K^- K_S^0 K_S^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  <  $3.5 \times 10^{-5}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

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

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.13±0.18±0.02</b>	68	<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  $[\Gamma(\chi_{c2}(1P) \rightarrow K_S^0 K_S^0 K_S^0 K_S^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  =  $(10.8 \pm 1.5 \pm 0.8) \times 10^{-6}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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>1.65±0.20 OUR FIT</b>	

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

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**1.42±0.29±0.03** 52 <sup>1</sup> ABLIKIM 06T BES2  $\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

<sup>1</sup> ABLIKIM 06T reports  $(1.67 \pm 0.26 \pm 0.24) \times 10^{-3}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^+ K^- \phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.1 \pm 0.4) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
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**4.83±0.32±0.66** ABLIKIM 15M BES3  $\psi(2S) \rightarrow \gamma \chi_{c2}$

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

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
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**2.74±0.16±0.44** ABLIKIM 15M BES3  $\psi(2S) \rightarrow \gamma \chi_{c2}$

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

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.93±0.06±0.10** 408 <sup>1</sup> ABLIKIM 13B BES3  $e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c2}$

<sup>1</sup> Using  $1.06 \times 10^8$   $\psi(2S)$  mesons and  $B(\psi(2S) \rightarrow \chi_{c2} \gamma) = (8.72 \pm 0.34)\%$ .

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

VALUE (units $10^{-4}$ )	DOCUMENT ID
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**0.733±0.033 OUR FIT**

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

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
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**0.47±0.04 OUR AVERAGE**

0.47±0.04±0.01 <sup>1</sup> ONYISI 10 CLE3  $\psi(2S) \rightarrow \gamma p\overline{p}X$

0.43±0.09±0.01 <sup>2</sup> ATHAR 07 CLEO  $\psi(2S) \rightarrow \gamma h^+ h^- h^0$

<sup>1</sup> ONYISI 10 reports  $(4.83 \pm 0.25 \pm 0.35 \pm 0.31) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow p\overline{p}\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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  $(0.44 \pm 0.08 \pm 0.05) \times 10^{-3}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow p\overline{p}\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
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**0.174±0.025 OUR AVERAGE**

0.172±0.026±0.004 <sup>1</sup> ONYISI 10 CLE3  $\psi(2S) \rightarrow \gamma p\overline{p}X$

0.186±0.070±0.004 <sup>2</sup> ATHAR 07 CLEO  $\psi(2S) \rightarrow \gamma h^+ h^- h^0$

<sup>1</sup> ONYISI 10 reports  $(1.76 \pm 0.23 \pm 0.14 \pm 0.11) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow p\overline{p}\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow$

$\gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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  $(0.19 \pm 0.07 \pm 0.02) \times 10^{-3}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow p\bar{p}\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.36±0.04±0.01</b>	<sup>1</sup> ONYISI 10	CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$

<sup>1</sup>ONYISI 10 reports  $(3.68 \pm 0.35 \pm 0.26 \pm 0.24) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow p\bar{p}\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (units <math>10^{-5}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>2.8±0.9±0.1</b>	24 ± 7	<sup>1</sup> ABLIKIM 11F	BES3	$\psi(2S) \rightarrow \gamma p\bar{p}K^+K^-$

<sup>1</sup>ABLIKIM 11F reports  $(3.04 \pm 0.85 \pm 0.43) \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow p\bar{p}\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.32±0.34 OUR EVALUATION</b>	Treating systematic error as correlated.		
<b>1.3 ± 0.4 OUR AVERAGE</b>	Error includes scale factor of 1.3.		
1.17±0.19±0.30	<sup>1</sup> BAI 99B	BES	$\psi(2S) \rightarrow \gamma\chi_{c2}$
2.64±1.03±0.14	<sup>1</sup> TANENBAUM 78	MRK1	$\psi(2S) \rightarrow \gamma\chi_{c2}$

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

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

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.078±0.023±0.002</b>	29.2	<sup>1</sup> HE 08B	CLEO	$e^+e^- \rightarrow \gamma h^+h^-h^0h^0$

<sup>1</sup>HE 08B reports  $0.08 \pm 0.02 \pm 0.01 \pm 0.01 \%$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow p\bar{p}\pi^0\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.91±0.32±0.04</b>	131 ± 12	<sup>1</sup> ABLIKIM	11F BES3	$\psi(2S) \rightarrow \gamma p\bar{p}K^+K^-$

<sup>1</sup> ABLIKIM 11F reports  $(2.08 \pm 0.19 \pm 0.30) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow p\bar{p}K^+K^- \text{ (non-resonant)})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;7.9</b>	90	<sup>1</sup> ABLIKIM	06D BES2	$\psi(2S) \rightarrow \chi_{c2}\gamma$

<sup>1</sup> Using  $B(\psi(2S) \rightarrow \chi_{c2}\gamma) = (9.3 \pm 0.6)\%$ .

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>8.5±0.9 OUR AVERAGE</b>				

8.4±1.0±0.2	3309	<sup>1</sup> ABLIKIM	12J BES3	$\psi(2S) \rightarrow \gamma p\bar{n}\pi^-$
10.2±3.4±0.2		<sup>2</sup> ABLIKIM	06i BES2	$\psi(2S) \rightarrow \gamma p\pi^-X$

<sup>1</sup> ABLIKIM 12J reports  $[\Gamma(\chi_{c2}(1P) \rightarrow p\bar{n}\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  =  $(0.80 \pm 0.02 \pm 0.09) \times 10^{-4}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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  $[\Gamma(\chi_{c2}(1P) \rightarrow p\bar{n}\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  =  $(0.97 \pm 0.20 \pm 0.26) \times 10^{-4}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>8.9±0.8±0.2</b>	3732	<sup>1</sup> ABLIKIM	12J BES3	$\psi(2S) \rightarrow \gamma\bar{p}n\pi^+$

<sup>1</sup> ABLIKIM 12J reports  $[\Gamma(\chi_{c2}(1P) \rightarrow \bar{p}n\pi^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  =  $(0.85 \pm 0.02 \pm 0.07) \times 10^{-4}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>21.7±1.7±0.5</b>	2128	<sup>1</sup> ABLIKIM	12J BES3	$\psi(2S) \rightarrow \gamma p\bar{n}\pi^-\pi^0$

<sup>1</sup> ABLIKIM 12J reports  $[\Gamma(\chi_{c2}(1P) \rightarrow p\bar{n}\pi^-\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  =  $(2.07 \pm 0.06 \pm 0.15) \times 10^{-4}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>21.1±1.8±0.4</b>	2352	<sup>1</sup> ABLIKIM	12J BES3	$\psi(2S) \rightarrow \gamma\bar{p}n\pi^+\pi^0$

<sup>1</sup> ABLIKIM 12J reports  $[\Gamma(\chi_{c2}(1P) \rightarrow \bar{p}n\pi^+\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))] = (2.01 \pm 0.06 \pm 0.16) \times 10^{-4}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	DOCUMENT ID
<b>1.83±0.16 OUR FIT</b>	

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

VALUE (units $10^{-5}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>125±15±3</b>		371	<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. • • •

<350	90	<sup>2</sup> ABLIKIM	06D BES2	$\psi(2S) \rightarrow \chi_{c2}\gamma$
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<sup>1</sup> ABLIKIM 12i reports  $(137.0 \pm 7.6 \pm 15.7) \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Lambda\bar{\Lambda}\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.72 \pm 0.34) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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  $B(\psi(2S) \rightarrow \chi_{c2}\gamma) = (9.3 \pm 0.6)\%$ .

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

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>66±15±1</b>	36	<sup>1</sup> ABLIKIM	12i BES3	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}\pi^+\pi^-$

<sup>1</sup> ABLIKIM 12i reports  $(71.8 \pm 14.5 \pm 8.2) \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Lambda\bar{\Lambda}\pi^+\pi^- \text{ (non-resonant)})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.72 \pm 0.34) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;40</b>	90	<sup>1</sup> ABLIKIM	12i BES3	$\psi(2S) \rightarrow \gamma\Sigma(1385)^+\bar{\Lambda}\pi^-$

<sup>1</sup> ABLIKIM 12i reports  $< 42 \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Sigma(1385)^+\bar{\Lambda}\pi^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.72 \pm 0.34) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

$\Gamma(\Sigma(1385)^-\bar{\Lambda}\pi^+ + \text{c.c.})/\Gamma_{\text{total}}$   $\Gamma_{74}/\Gamma$

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;60</b>	90	<sup>1</sup> ABLIKIM	12i BES3	$\psi(2S) \rightarrow \gamma\Sigma(1385)^-\bar{\Lambda}\pi^+$

<sup>1</sup> ABLIKIM 12i reports  $< 61 \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Sigma(1385)^-\bar{\Lambda}\pi^+ + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

$\gamma\chi_{c2}(1P)) = (8.72 \pm 0.34) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

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

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>7.8±0.5 OUR AVERAGE</b>				
7.7±0.5±0.2	5k	<sup>1,2</sup> ABLIKIM 13D	BES3	$\psi(2S) \rightarrow \gamma\Lambda\bar{p}K^+$
8.3±1.6±0.2		<sup>3</sup> ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

<sup>1</sup> ABLIKIM 13D reports  $(8.4 \pm 0.3 \pm 0.6) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^+\bar{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.72 \pm 0.34) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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  $(8.5 \pm 1.4 \pm 1.0) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^+\bar{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

**$\Gamma(nK_S^0\bar{\Lambda} + \text{c.c.})/\Gamma_{\text{total}}$**   **$\Gamma_{76}/\Gamma$**

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>3.58±0.16±0.23</b>	879	<sup>1</sup> ABLIKIM 21AV	BES3	$\psi(2S) \rightarrow \gamma nK_S^0\bar{\Lambda} + \text{c.c.}$

<sup>1</sup> ABLIKIM 21AV reports  $(3.58 \pm 0.16 \pm 0.23) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow nK_S^0\bar{\Lambda} + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = 0.0952 \pm 0.0020$ . Also uses  $B(\bar{\Lambda} \rightarrow \bar{p}\pi^+) = (63.9 \pm 0.5)\%$  and  $B(K_S^0 \rightarrow \pi^+\pi^-) = (69.20 \pm 0.05)\%$ .

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

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>8.2±1.1±0.2</b>	476	<sup>1</sup> ABLIKIM 19AU	BES3	$\psi(2S) \rightarrow \gamma K^{*+}\bar{p}\Lambda$

<sup>1</sup> ABLIKIM 19AU reports  $[\Gamma(\chi_{c2}(1P) \rightarrow K^*(892)^+\bar{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))] = (7.8 \pm 0.9 \pm 0.6) \times 10^{-5}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

<u>VALUE (units <math>10^{-4}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>2.8±0.7±0.1</b>	79 ± 13	<sup>1</sup> ABLIKIM 11F	BES3	$\psi(2S) \rightarrow \gamma p\bar{p}K^+K^-$

<sup>1</sup> ABLIKIM 11F reports  $(3.06 \pm 0.50 \pm 0.54) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow K^+\bar{p}\Lambda(1520) + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma\chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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><math>4.6 \pm 1.4 \pm 0.1</math></b>	$29 \pm 7$	<sup>1</sup> ABLIKIM	11F BES3	$\psi(2S) \rightarrow \gamma p \bar{p} K^+ K^-$

<sup>1</sup> ABLIKIM 11F reports  $(5.05 \pm 1.29 \pm 0.93) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Lambda(1520)\bar{\Lambda}(1520))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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 $10^{-5}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>3.7 \pm 0.6 \pm 0.1</math></b>		91	<sup>1</sup> ABLIKIM	18V BES3	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$

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

<6	90		<sup>2</sup> ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$
<7	90	$7.5 \pm 3.4$	<sup>3</sup> NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$

<sup>1</sup> ABLIKIM 18V reports  $[\Gamma(\chi_{c2}(1P) \rightarrow \Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))] = (0.35 \pm 0.05 \pm 0.02) \times 10^{-5}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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 13H reports  $< 0.65 \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

<sup>3</sup> NAIK 08 reports  $< 0.75 \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

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

VALUE (units $10^{-5}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>3.4 \pm 0.7 \pm 0.1</math></b>		55	<sup>1</sup> ABLIKIM	18V BES3	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$

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

<8	90		<sup>2</sup> ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$
<7	90	$4.0 \pm 3.5$	<sup>3</sup> NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$

<sup>1</sup> ABLIKIM 18V reports  $[\Gamma(\chi_{c2}(1P) \rightarrow \Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))] = (0.32 \pm 0.06 \pm 0.03) \times 10^{-5}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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 13H reports  $< 0.88 \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

<sup>3</sup> NAIK 08 reports  $< 0.67 \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .



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

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>4.4 \pm 1.7 \pm 0.5</math></b>	131	<sup>1</sup> ABLIKIM	20i	BES3 $\psi(2S) \rightarrow \gamma \Sigma^- \bar{\Sigma}^+$

<sup>1</sup> ABLIKIM 20i reports  $(4.4 \pm 1.7 \pm 0.5) \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Sigma^- \bar{\Sigma}^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ .

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

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;16</math></b>	90	<sup>1</sup> ABLIKIM	12i	BES3 $\psi(2S) \rightarrow \gamma \Sigma(1385)^+ \bar{\Sigma}(1385)^-$

<sup>1</sup> ABLIKIM 12i reports  $< 17 \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Sigma(1385)^+ \bar{\Sigma}(1385)^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.72 \pm 0.34) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

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

VALUE (units $10^{-5}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>&lt;8</math></b>	90	<sup>1</sup> ABLIKIM	12i	BES3 $\psi(2S) \rightarrow \gamma \Sigma(1385)^- \bar{\Sigma}(1385)^+$

<sup>1</sup> ABLIKIM 12i reports  $< 8.5 \times 10^{-5}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Sigma(1385)^- \bar{\Sigma}(1385)^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.72 \pm 0.34) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

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

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>1.76 \pm 0.32 \pm 0.04</math></b>	51	<sup>1</sup> ABLIKIM	15i	BES3 $\psi(2S) \rightarrow \gamma K^- \Lambda \bar{\Xi}^+ + \text{c.c.}$

<sup>1</sup> ABLIKIM 15i reports  $[\Gamma(\chi_{c2}(1P) \rightarrow K^- \Lambda \bar{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$   $= (1.68 \pm 0.26 \pm 0.15) \times 10^{-5}$  which we divide by our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units $10^{-4}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>1.83 \pm 0.15 \pm 0.16</math></b>		804	<sup>1</sup> ABLIKIM	220	BES3 $\psi(2S) \rightarrow \gamma \Xi^0 \Xi^0$

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

$<1.0$	90	3	<sup>2</sup> NAIK	08	CLEO $\psi(2S) \rightarrow \gamma \Xi^0 \Xi^0$
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<sup>1</sup> ABLIKIM 220 reports  $(1.83 \pm 0.15 \pm 0.16) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Xi^0 \Xi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ .

<sup>2</sup> NAIK 08 reports  $< 1.06 \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Xi^0 \Xi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

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

VALUE (units $10^{-4}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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**1.44 ± 0.12 OUR AVERAGE**

1.44 ± 0.06 ± 0.11		1691	<sup>1</sup> ABLIKIM	220 BES3	$\psi(2S) \rightarrow \gamma \Xi^- \Xi^+$
1.42 ± 0.31 ± 0.03		29 ± 5	<sup>2</sup> NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Xi^+ \Xi^-$

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

< 3.7		90	<sup>3</sup> ABLIKIM	06D BES2	$\psi(2S) \rightarrow \chi_{c2} \gamma$
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<sup>1</sup> ABLIKIM 220 reports  $(1.44 \pm 0.06 \pm 0.11) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Xi^- \Xi^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ .

<sup>2</sup> NAIK 08 reports  $(1.45 \pm 0.30 \pm 0.15) \times 10^{-4}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \Xi^- \Xi^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.33 \pm 0.14 \pm 0.61) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . Our first error is their experiment's error and our second error is the systematic error from using our best value.

<sup>3</sup> Using  $B(\psi(2S) \rightarrow \chi_{c2} \gamma) = (9.3 \pm 0.6)\%$ .

$\Gamma(J/\psi(1S) \pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{90}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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< 0.015		90	BARATE	81 SPEC 190 GeV $\pi^- \text{Be} \rightarrow 2\pi 2\mu$
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$\Gamma(\pi^0 \eta_c)/\Gamma_{\text{total}}$   $\Gamma_{91}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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< 3.2 × 10 <sup>-3</sup>		90	<sup>1</sup> ABLIKIM	15N BES3 $\psi(2S) e^+ e^- \rightarrow \gamma \pi^0 \eta_c$
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<sup>1</sup> Using  $B(\eta_c \rightarrow K_S^0 K^\pm \pi^\mp) \times B(K_S^0 \rightarrow \pi^+ \pi^-) \times B(\pi^0 \rightarrow \gamma \gamma) = (1.66 \pm 0.11) \times 10^{-2}$ .

$\Gamma(\eta_c(1S) \pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{92}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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< 0.54 × 10 <sup>-2</sup>		90	<sup>1,2</sup> ABLIKIM	13B BES3 $e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c2}$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 1.2 × 10 <sup>-2</sup>		90	<sup>1,3</sup> ABLIKIM	13B BES3 $e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c2}$
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<sup>1</sup> Using  $1.06 \times 10^8$   $\psi(2S)$  mesons and  $B(\psi(2S) \rightarrow \chi_{c2} \gamma) = (8.72 \pm 0.34)\%$ .

<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.

$\Gamma(\eta_c(1S) \pi^+ \pi^-)/\Gamma(K^0 K^+ \pi^- + \text{c.c.})$   $\Gamma_{92}/\Gamma_{42}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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< 16.4		90	<sup>1</sup> LEES	12AE BABR $e^+ e^- \rightarrow e^+ e^- \pi^+ \pi^- \eta_c$
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<sup>1</sup> We divided the reported limit by 2 to take into account the  $K_L^0 K^+ \pi^-$  mode.

————— RADIATIVE DECAYS —————

$\Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$   $\Gamma_{93}/\Gamma$

VALUE (units $10^{-2}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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**19.0 ± 0.5 OUR FIT**

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

18.64 ± 0.08 ± 1.69 1.0M <sup>1</sup> ABLIKIM 17U BES3  $e^+e^- \rightarrow \gamma X$   
 19.9 ± 0.5 ± 1.2 <sup>2</sup> ADAM 05A CLEO  $e^+e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c2}$

<sup>1</sup> Not independent from  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))$  and the product  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) \times B(\chi_{c2}(1P) \rightarrow \gamma J/\psi(1S))$  also measured in ABLIKIM 17U.

<sup>2</sup> Uses  $B(\psi(2S) \rightarrow \gamma \chi_{c2} \rightarrow \gamma \gamma J/\psi)$  from ADAM 05A and  $B(\psi(2S) \rightarrow \gamma \chi_{c2})$  from ATHAR 04.

**$\Gamma(\gamma\rho^0)/\Gamma_{\text{total}}$**   **$\Gamma_{94}/\Gamma$**

VALUE (units $10^{-6}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>&lt;19</b>	90	13 ± 11	<sup>1</sup> ABLIKIM	11E BES3	$\psi(2S) \rightarrow \gamma \rho^0$

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

<40 90 17.2 ± 6.8 <sup>2</sup> BENNETT 08A CLEO  $\psi(2S) \rightarrow \gamma \rho^0$

<sup>1</sup> ABLIKIM 11E reports  $< 20.8 \times 10^{-6}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \gamma \rho^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

<sup>2</sup> BENNETT 08A reports  $< 50 \times 10^{-6}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \gamma \rho^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.1 \pm 0.4) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

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

VALUE (units $10^{-6}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>&lt;6</b>	90	1 ± 6	<sup>1</sup> ABLIKIM	11E BES3	$\psi(2S) \rightarrow \gamma \omega$

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

<6 90 0.0 ± 1.8 <sup>2</sup> BENNETT 08A CLEO  $\psi(2S) \rightarrow \gamma \omega$

<sup>1</sup> ABLIKIM 11E reports  $< 6.1 \times 10^{-6}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \gamma \omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

<sup>2</sup> BENNETT 08A reports  $< 7.0 \times 10^{-6}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \gamma \omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.1 \pm 0.4) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

**$\Gamma(\gamma\phi)/\Gamma_{\text{total}}$**   **$\Gamma_{96}/\Gamma$**

VALUE (units $10^{-6}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>&lt; 7</b>	90	5 ± 5	<sup>1</sup> ABLIKIM	11E BES3	$\psi(2S) \rightarrow \gamma \phi$

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

<11 90 1.3 ± 2.5 <sup>2</sup> BENNETT 08A CLEO  $\psi(2S) \rightarrow \gamma \phi$

<sup>1</sup> ABLIKIM 11E reports  $< 8.1 \times 10^{-6}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \gamma \phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.74 \pm 0.35) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

<sup>2</sup> BENNETT 08A reports  $< 13 \times 10^{-6}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow \gamma \phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.1 \pm 0.4) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = 9.52 \times 10^{-2}$ .

**$\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$**   **$\Gamma_{97}/\Gamma$**

VALUE (units $10^{-4}$ )	DOCUMENT ID
<b>2.85 ± 0.10 OUR FIT</b>	

$\Gamma(e^+e^- J/\psi(1S))/\Gamma_{\text{total}}$   $\Gamma_{98}/\Gamma$

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$2.37 \pm 0.15 \pm 0.05$	1.3k	<sup>1,2</sup> ABLIKIM	17I BES3	$\psi(2S) \rightarrow \gamma e^+ e^- J/\psi$
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<sup>1</sup> ABLIKIM 17I reports  $(2.48 \pm 0.08 \pm 0.16) \times 10^{-3}$  from a measurement of  $[\Gamma(\chi_{c2}(1P) \rightarrow e^+ e^- J/\psi(1S))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))]$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.11 \pm 0.31) \times 10^{-2}$ , which we rescale to our best value  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (9.52 \pm 0.20) \times 10^{-2}$ . 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 17I

$\Gamma(e^+e^- J/\psi(1S))/\Gamma(\gamma J/\psi(1S))$   $\Gamma_{98}/\Gamma_{93}$

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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<b><math>11.3 \pm 0.4 \pm 0.5</math></b>	1.3k	<sup>1</sup> ABLIKIM	17I BES3	$\psi(2S) \rightarrow e^+ e^- \gamma J/\psi$
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<sup>1</sup> Uses  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) \times B(\chi_{c2}(1P) \rightarrow \gamma J/\psi(1S)) = (199.6 \pm 0.8 \pm 7.0) \times 10^{-4}$  from ABLIKIM 17N and accounts for common systematic errors.

$\Gamma(\mu^+ \mu^- J/\psi(1S))/\Gamma(e^+ e^- J/\psi(1S))$   $\Gamma_{99}/\Gamma_{98}$

VALUE (units $10^{-2}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
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<b><math>9.40 \pm 0.79 \pm 1.15</math></b>	219	ABLIKIM	19Z BES3	$\psi(2S) \rightarrow \gamma \chi_c \rightarrow \gamma(\mu^+ \mu^- J/\psi)$
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$\Gamma(\gamma\gamma)/\Gamma(\gamma J/\psi(1S))$   $\Gamma_{97}/\Gamma_{93}$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
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**$1.50 \pm 0.05$  OUR FIT**

**$0.99 \pm 0.18$**

<sup>1</sup> AMBROGIANI	00B E835	$\bar{p}p \rightarrow \chi_{c2} \rightarrow \gamma\gamma, \gamma J/\psi$
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<sup>1</sup> Calculated by us using  $B(J/\psi(1S) \rightarrow e^+ e^-) = 0.0593 \pm 0.0010$ .

$\Gamma(\gamma\gamma)/\Gamma_{\text{total}} \times \Gamma(\rho\bar{\rho})/\Gamma_{\text{total}}$   $\Gamma_{97}/\Gamma \times \Gamma_{56}/\Gamma$

VALUE (units $10^{-8}$ )	DOCUMENT ID	TECN	COMMENT
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**$2.09 \pm 0.13$  OUR FIT**

**$1.7 \pm 0.4$  OUR AVERAGE**

$1.60 \pm 0.42$

ARMSTRONG	93 E760	$\bar{p}p \rightarrow \gamma\gamma X$
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$9.9 \pm 4.5$

BAGLIN	87B SPEC	$\bar{p}p \rightarrow \gamma\gamma X$
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$\chi_{c2}(1P)$  CROSS-PARTICLE BRANCHING RATIOS

$\Gamma(\chi_{c2}(1P) \rightarrow K^+ K^- \pi^+ \pi^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)$   $\Gamma_{14}/\Gamma \times \Gamma_{168}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
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**$2.31 \pm 0.26$  OUR FIT**

**$2.5 \pm 0.9$  OUR AVERAGE** Error includes scale factor of 2.3.

$1.90 \pm 0.14 \pm 0.44$

BAI	99B BES	$\psi(2S) \rightarrow \gamma \chi_{c2}$
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$3.8 \pm 0.67$

<sup>1</sup> TANENBAUM	78 MRK1	$\psi(2S) \rightarrow \gamma \chi_{c2}$
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<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  $B(J/\psi \rightarrow \ell^+ \ell^-) = 0.1181 \pm 0.0020$ .

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow K^*(892)^0 \bar{K}^*(892)^0) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) / \Gamma_{\text{total}}}{\Gamma_{\text{total}}} \times \frac{\Gamma_{18} / \Gamma \times \Gamma_{168}^{\psi(2S)} / \Gamma_{\psi(2S)}}{\Gamma_{168}^{\psi(2S)} / \Gamma_{\psi(2S)}}$$

VALUE (units 10 <sup>-4</sup> )	DOCUMENT ID	TECN	COMMENT
<b>2.1 ± 0.4 OUR FIT</b>			
<b>3.11 ± 0.36 ± 0.48</b>	ABLIKIM	04H BES2	$\psi(2S) \rightarrow \gamma \chi_{c2}$

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \rho \bar{\rho}) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) / \Gamma_{\text{total}}}{J/\psi(1S) \pi^+ \pi^-} \times \frac{\Gamma_{56} / \Gamma \times \Gamma_{168}^{\psi(2S)} / \Gamma_{\psi(2S)}}{\Gamma_{168}^{\psi(2S)} / \Gamma_{\psi(2S)}}$$

VALUE (units 10 <sup>-5</sup> )	DOCUMENT ID	TECN	COMMENT
<b>2.01 ± 0.09 OUR FIT</b>			
<b>1.4 ± 1.1</b>	<sup>1</sup> BAI	98I BES	$\psi(2S) \rightarrow \gamma \chi_{c2} \rightarrow \gamma \bar{\rho} \rho$

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

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \rho \bar{\rho}) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) / \Gamma_{\text{total}}}{\Gamma_{\text{total}}} \times \frac{\Gamma_{56} / \Gamma \times \Gamma_{168}^{\psi(2S)} / \Gamma_{\psi(2S)}}{\Gamma_{168}^{\psi(2S)} / \Gamma_{\psi(2S)}}$$

VALUE (units 10 <sup>-6</sup> )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>6.98 ± 0.32 OUR FIT</b>				
<b>7.1 ± 0.5 OUR AVERAGE</b>				Error includes scale factor of 1.2.

7.3 ± 0.4 ± 0.3	405	ABLIKIM	13V BES3	$\psi(2S) \rightarrow \gamma \rho \bar{\rho}$
7.2 ± 0.7 ± 0.4	121 ± 12	<sup>1</sup> NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \rho \bar{\rho}$
4.4 <sup>+1.6</sup> / <sub>-1.4</sub> ± 0.6	14.3 <sup>+5.2</sup> / <sub>-4.7</sub>	BAI	04F BES	$\psi(2S) \rightarrow \gamma \chi_{c2}(1P) \rightarrow \gamma \bar{\rho} \rho$

<sup>1</sup> Calculated by us. NAIK 08 reports  $B(\chi_{c2} \rightarrow \rho \bar{\rho}) = (7.7 \pm 0.8 \pm 0.4 \pm 0.5) \times 10^{-5}$  using  $B(\psi(2S) \rightarrow \gamma \chi_{c2}) = (9.33 \pm 0.14 \pm 0.61)\%$ .

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \Lambda \bar{\Lambda}) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) / \Gamma_{\text{total}}}{\Gamma_{\text{total}}} \times \frac{\Gamma_{69} / \Gamma \times \Gamma_{168}^{\psi(2S)} / \Gamma_{\psi(2S)}}{\Gamma_{168}^{\psi(2S)} / \Gamma_{\psi(2S)}}$$

VALUE (units 10 <sup>-6</sup> )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>17.4 ± 1.4 OUR FIT</b>				
<b>17.3 ± 1.5 OUR AVERAGE</b>				

18.2 ± 0.8 ± 1.7	670	ABLIKIM	21L BES3	$\psi(2S) \rightarrow \gamma \rho \pi^- \bar{\rho} \pi^+$
15.9 ± 2.1 ± 1.0	71	<sup>1</sup> NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Lambda \bar{\Lambda}$

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

18.2 ± 1.4 ± 0.9	207	<sup>2,3</sup> ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Lambda \bar{\Lambda}$
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<sup>1</sup> Calculated by us. NAIK 08 reports  $B(\chi_{c2} \rightarrow \Lambda \bar{\Lambda}) = (17.0 \pm 2.2 \pm 1.1 \pm 1.1) \times 10^{-5}$  using  $B(\psi(2S) \rightarrow \gamma \chi_{c2}) = (9.33 \pm 0.14 \pm 0.61)\%$ .

<sup>2</sup> Superseded by ABLIKIM 21L

<sup>3</sup> Calculated by us. ABLIKIM 13H reports  $B(\chi_{c2} \rightarrow \Lambda \bar{\Lambda}) = (20.8 \pm 1.6 \pm 2.3) \times 10^{-5}$  from a measurement of  $B(\chi_{c2} \rightarrow \Lambda \bar{\Lambda}) \times B(\psi(2S) \rightarrow \gamma \chi_{c2})$  assuming  $B(\psi(2S) \rightarrow \gamma \chi_{c2}) = (8.74 \pm 0.35)\%$ .

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \Lambda\bar{\Lambda})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_{69}/\Gamma \times \Gamma_{168}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}}$$

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>5.0 ± 0.4 OUR FIT</b>				
<b>7.1<sup>+3.1</sup><sub>-2.9</sub> ± 1.3</b>	8.3 <sup>+3.7</sup> <sub>-3.4</sub>	<sup>1</sup> BAI	03E BES	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}$

<sup>1</sup> BAI 03E reports [  $B(\chi_{c2} \rightarrow \Lambda\bar{\Lambda}) B(\psi(2S) \rightarrow \gamma\chi_{c2}) / B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) ] \times [B^2(\Lambda \rightarrow \pi^-p) / B(J/\psi \rightarrow p\bar{p})] = (1.33_{-0.55}^{+0.59} \pm 0.25)\%$ . We calculate from this measurement the presented value using  $B(\Lambda \rightarrow \pi^-p) = (63.9 \pm 0.5)\%$  and  $B(J/\psi \rightarrow p\bar{p}) = (2.17 \pm 0.07) \times 10^{-3}$ .

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \Lambda\bar{\Lambda}\eta)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))/\Gamma_{\text{total}}}{\Gamma_{72}/\Gamma \times \Gamma_{168}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}}$$

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.00 ± 0.20 ± 0.14</b>	32	ABLIKIM	22AO BES3	$\psi(2S) \rightarrow \gamma p\pi^- \bar{p}\pi^+ \gamma\gamma$

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \pi\pi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))/\Gamma_{\text{total}}}{\Gamma_{25}/\Gamma \times \Gamma_{168}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}}$$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>2.12 ± 0.08 OUR FIT</b>				
<b>2.17 ± 0.09 OUR AVERAGE</b>				

2.19 ± 0.05 ± 0.15	4.5k	<sup>1</sup> ABLIKIM	10A BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c2}$
2.23 ± 0.06 ± 0.10	2.5k	<sup>2</sup> ASNER	09 CLEO	$\psi(2S) \rightarrow \gamma\pi^+\pi^-$
1.90 ± 0.08 ± 0.20	0.8k	<sup>3</sup> ASNER	09 CLEO	$\psi(2S) \rightarrow \gamma\pi^0\pi^0$

<sup>1</sup> Calculated by us. ABLIKIM 10A reports  $B(\chi_{c2} \rightarrow \pi^0\pi^0) = (0.88 \pm 0.02 \pm 0.06 \pm 0.04) \times 10^{-3}$  using  $B(\psi(2S) \rightarrow \gamma\chi_{c2}) = (8.3 \pm 0.4)\%$ . We have multiplied the  $\pi^0\pi^0$  measurement by 3 to obtain  $\pi\pi$ .

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

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

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \pi\pi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_{25}/\Gamma \times \Gamma_{168}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}}$$

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.612 ± 0.023 OUR FIT</b>				
<b>0.54 ± 0.06 OUR AVERAGE</b>				

0.66 ± 0.18 ± 0.37	21 ± 6	<sup>1</sup> BAI	03C BES	$\psi(2S) \rightarrow \gamma\pi^0\pi^0$
0.54 ± 0.05 ± 0.04	185 ± 16	<sup>2</sup> BAI	98I BES	$\psi(2S) \rightarrow \gamma\pi^+\pi^-$

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

$$\Gamma(\chi_{c2}(1P) \rightarrow \eta\eta)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))/\Gamma_{\text{total}} \quad \Gamma_{31}/\Gamma \times \Gamma_{168}^{\psi(2S)}/\Gamma_{\psi(2S)}$$

VALUE (units $10^{-4}$ )	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.52±0.04 OUR FIT</b>					
<b>0.52±0.04 OUR AVERAGE</b>					
0.54±0.03±0.04		386	<sup>1</sup> ABLIKIM	10A	BES3 $e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c2}$
0.47±0.05±0.05		156	ASNER	09	CLEO $\psi(2S) \rightarrow \gamma\eta\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 0.44	90		<sup>2</sup> ADAMS	07	CLEO $\psi(2S) \rightarrow \gamma\chi_{c2}$
< 3	90		BAI	03C	BES $\psi(2S) \rightarrow \gamma\eta\eta \rightarrow 5\gamma$
0.62±0.31±0.19			LEE	85	CBAL $\psi(2S) \rightarrow \text{photons}$

<sup>1</sup> Calculated by us. ABLIKIM 10A reports  $B(\chi_{c2} \rightarrow \eta\eta) = (0.65 \pm 0.04 \pm 0.05 \pm 0.03) \times 10^{-3}$  using  $B(\psi(2S) \rightarrow \gamma\chi_{c2}) = (8.3 \pm 0.4)\%$ .

<sup>2</sup> Superseded by ASNER 09.

$$\Gamma(\chi_{c2}(1P) \rightarrow K^+K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))/\Gamma_{\text{total}} \quad \Gamma_{32}/\Gamma \times \Gamma_{168}^{\psi(2S)}/\Gamma_{\psi(2S)}$$

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>9.6±0.6 OUR FIT</b>				
<b>10.5±0.3±0.6</b>	1.6k	<sup>1</sup> ASNER	09	CLEO $\psi(2S) \rightarrow \gamma K^+K^-$

<sup>1</sup> Calculated by us. ASNER 09 reports  $B(\chi_{c2} \rightarrow K^+K^-) = (1.13 \pm 0.03 \pm 0.06 \pm 0.07) \times 10^{-3}$  using  $B(\psi(2S) \rightarrow \gamma\chi_{c2}) = (9.33 \pm 0.14 \pm 0.61)\%$ .

$$\Gamma(\chi_{c2}(1P) \rightarrow K^+K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \quad \Gamma_{32}/\Gamma \times \Gamma_{168}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}$$

VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.276±0.017 OUR FIT</b>				
<b>0.190±0.034±0.019</b>	115 ± 13	<sup>1</sup> BAI	98I	BES $\psi(2S) \rightarrow \gamma K^+K^-$

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

$$\Gamma(\chi_{c2}(1P) \rightarrow K_S^0 K_S^0)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c2}(1P))/\Gamma_{\text{total}} \quad \Gamma_{33}/\Gamma \times \Gamma_{168}^{\psi(2S)}/\Gamma_{\psi(2S)}$$

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>5.0 ±0.4 OUR FIT</b>				
<b>5.0 ±0.4 OUR AVERAGE</b>				
4.9 ±0.3 ±0.3	373 ± 20	<sup>1</sup> ASNER	09	CLEO $\psi(2S) \rightarrow \gamma K_S^0 K_S^0$
5.72±0.76±0.63	65	ABLIKIM	050	BES2 $\psi(2S) \rightarrow \gamma K_S^0 K_S^0$

<sup>1</sup> Calculated by us. ASNER 09 reports  $B(\chi_{c2} \rightarrow K_S^0 K_S^0) = (0.53 \pm 0.03 \pm 0.03 \pm 0.03) \times 10^{-3}$  using  $B(\psi(2S) \rightarrow \gamma\chi_{c2}) = (9.33 \pm 0.14 \pm 0.61)\%$ .

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow K_S^0 K_S^0) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)}{\Gamma_{33} / \Gamma \times \Gamma_{168}^{\psi(2S)} / \Gamma_{12}^{\psi(2S)}}$$

VALUE (units $10^{-5}$ )	DOCUMENT ID	TECN	COMMENT
<b>14.4 ± 1.1 OUR FIT</b>			
<b>14.7 ± 4.1 ± 3.3</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  $B(\chi_{c2} \rightarrow K_S^0 K_S^0)$  reported by BAI 99B was derived using  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (7.8 \pm 0.8)\%$  and  $B(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) = (32.4 \pm 2.6)\%$  [BAI 98D].

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.}) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) / \Gamma_{\text{total}}}{\Gamma_{42} / \Gamma \times \Gamma_{168}^{\psi(2S)} / \Gamma_{12}^{\psi(2S)}}$$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.22 ± 0.17 OUR FIT</b>				
<b>1.15 ± 0.18 OUR AVERAGE</b>				

1.21 ± 0.19 ± 0.09	37	<sup>1</sup> ATHAR	07	CLEO $\psi(2S) \rightarrow \gamma K_S^0 K^\pm \pi^\mp$
0.97 ± 0.32 ± 0.13	28	<sup>2</sup> ABLIKIM	06R	BES2 $\psi(2S) \rightarrow \gamma K_S^0 K^\pm \pi^\mp$

<sup>1</sup> Calculated by us. ATHAR 07 reports  $B(\chi_{c2} \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.}) = (1.3 \pm 0.2 \pm 0.1 \pm 0.1) \times 10^{-3}$  using  $B(\psi(2S) \rightarrow \gamma \chi_{c2}) = (9.33 \pm 0.14 \pm 0.61)\%$ .

<sup>2</sup> Calculated by us. ABLIKIM 06R reports  $B(\chi_{c2} \rightarrow K_S^0 K^\pm \pi^\mp) = (0.6 \pm 0.2 \pm 0.1) \times 10^{-3}$  using  $B(\psi(2S) \rightarrow \gamma \chi_{c2}) = (8.1 \pm 0.6)\%$ . We have multiplied by 2 to obtain  $\bar{K}^0 K^+ \pi^- + \text{c.c.}$  from  $K_S^0 K^\pm \pi^\mp$ .

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow 2(\pi^+ \pi^-)) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)}{\Gamma_1 / \Gamma \times \Gamma_{168}^{\psi(2S)} / \Gamma_{12}^{\psi(2S)}}$$

VALUE (units $10^{-3}$ )	DOCUMENT ID	TECN	COMMENT
<b>2.79 ± 0.26 OUR FIT</b>			

**3.1 ± 1.0 OUR AVERAGE** Error includes scale factor of 2.5.

2.3 ± 0.1 ± 0.5	<sup>1</sup> BAI	99B	BES $\psi(2S) \rightarrow \gamma \chi_{c2}$
4.3 ± 0.6	<sup>2</sup> TANENBAUM	78	MRK1 $\psi(2S) \rightarrow \gamma \chi_{c2}$

<sup>1</sup> Calculated by us. The value for  $B(\chi_{c2} \rightarrow 2\pi^+ 2\pi^-)$  reported in BAI 99B is derived using  $B(\psi(2S) \rightarrow \gamma \chi_{c2}) = (7.8 \pm 0.8)\%$  and  $B(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) = (32.4 \pm 2.6)\%$  [BAI 98D].

<sup>2</sup> The value for  $B(\psi(2S) \rightarrow \gamma \chi_{c2}) \times B(\chi_{c2} \rightarrow 2\pi^+ \pi^-)$  reported in TANENBAUM 78 is derived using  $B(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) \times B(J/\psi(1S) \ell^+ \ell^-) = (4.6 \pm 0.7)\%$ . Calculated by us using  $B(J/\psi(1S) \rightarrow \ell^+ \ell^-) = 0.1181 \pm 0.0020$ .

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow K^+ K^- K^+ K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) / \Gamma_{\text{total}}}{\Gamma_{51} / \Gamma \times \Gamma_{168}^{\psi(2S)} / \Gamma_{12}^{\psi(2S)}}$$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.57 ± 0.19 OUR FIT</b>				
<b>1.76 ± 0.16 ± 0.24</b>	160	<sup>1</sup> ABLIKIM	06T	BES2 $\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

<sup>1</sup> Calculated by us. The value of  $B(\chi_{c2} \rightarrow 2K^+ 2K^-)$  reported by ABLIKIM 06T was derived using  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.1 \pm 0.4)\%$ .



$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow K^+ K^- K^+ K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) / \Gamma_{\text{total}}}{\Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)} \times \frac{\Gamma_{51} / \Gamma \times \Gamma_{168}^{\psi(2S)} / \Gamma_{12}^{\psi(2S)}}{\Gamma_{12}^{\psi(2S)}}$$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>4.5 ± 0.5 OUR FIT</b>			
<b>3.6 ± 0.6 ± 0.6</b>	<sup>1</sup> BAI	99B BES	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

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

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \phi \phi) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) / \Gamma_{\text{total}}}{\Gamma_{20} / \Gamma \times \Gamma_{168}^{\psi(2S)} / \Gamma_{12}^{\psi(2S)}}$$

VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.01 ± 0.08 OUR FIT</b>				
<b>0.98 ± 0.13 OUR AVERAGE</b>				Error includes scale factor of 1.3.

0.94 ± 0.03 ± 0.10	849	<sup>1</sup> ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma$ hadrons
1.38 ± 0.24 ± 0.23	41	<sup>2</sup> ABLIKIM	06T BES2	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

<sup>1</sup> Calculated by us. The value of  $B(\chi_{c2} \rightarrow \phi \phi)$  reported by ABLIKIM 11K was derived using  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.74 \pm 0.35)\%$ .

<sup>2</sup> Calculated by us. The value of  $B(\chi_{c2} \rightarrow \phi \phi)$  reported by ABLIKIM 06T was derived using  $B(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) = (8.1 \pm 0.4)\%$ .

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \phi \phi) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) / \Gamma_{\text{total}}}{\Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)} \times \frac{\Gamma_{20} / \Gamma \times \Gamma_{168}^{\psi(2S)} / \Gamma_{12}^{\psi(2S)}}{\Gamma_{12}^{\psi(2S)}}$$

VALUE (units $10^{-4}$ )	DOCUMENT ID	TECN	COMMENT
<b>2.92 ± 0.24 OUR FIT</b>			
<b>4.8 ± 1.3 ± 1.3</b>	<sup>1</sup> BAI	99B BES	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

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

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \Sigma^+ \bar{p} K_S^0 + \text{c.c.}) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) / \Gamma_{\text{total}}}{\Gamma_{81} / \Gamma \times \Gamma_{168}^{\psi(2S)} / \Gamma_{12}^{\psi(2S)}}$$

VALUE (units $10^{-6}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>7.85 ± 0.77 ± 0.44</b>	129	<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  $B(\chi_{c2} \rightarrow \Sigma^+ \bar{p} K_S^0 + \text{c.c.}) = (8.25 \pm 0.83 \pm 0.49) \times 10^{-5}$  using  $B(\psi(2S) \rightarrow \gamma \chi_{c2}) = (9.52 \pm 0.20)\%$  and other branching fractions from PDG 18.

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \Sigma^0 \bar{p} K^+ + \text{c.c.}) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P)) / \Gamma_{\text{total}}}{\Gamma_{82} / \Gamma \times \Gamma_{168}^{\psi(2S)} / \Gamma_{12}^{\psi(2S)}}$$

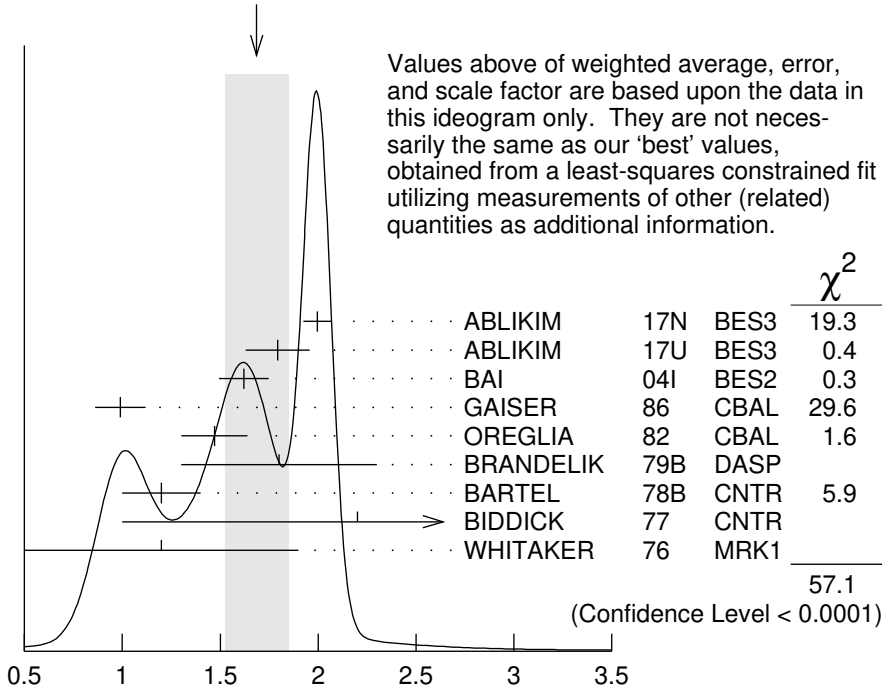
VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.87 ± 0.06 ± 0.04</b>	271	<sup>1</sup> ABLIKIM	20AE BES3	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{p} K^+ + \text{c.c.}$

<sup>1</sup> Calculated by us. ABLIKIM 20AE reports  $B(\chi_{c2} \rightarrow \Sigma^0 \bar{p} K^+ + \text{c.c.}) = (0.91 \pm 0.06 \pm 0.05) \times 10^{-4}$  using  $B(\psi(2S) \rightarrow \gamma \chi_{c2}) = (9.52 \pm 0.20)\%$  and other branching fractions from PDG 20.

$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \gamma J/\psi(1S))}{\Gamma_{\text{total}}} \times \frac{\Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))}{\Gamma_{\text{total}}} \times \frac{\Gamma_{93}/\Gamma \times \Gamma_{168}^{\psi(2S)}}{\Gamma_{\psi(2S)}}$$

VALUE (units $10^{-2}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.81 ± 0.04</b>				<b>OUR FIT</b>
<b>1.69 ± 0.16</b>				<b>OUR AVERAGE</b> Error includes scale factor of 3.4. See the ideogram below.
1.996 ± 0.008 ± 0.070	81k	<sup>1</sup> ABLIKIM	17N BES3	$\psi(2S) \rightarrow \gamma \gamma J/\psi$
1.793 ± 0.008 ± 0.163	1.0M	ABLIKIM	17U BES3	$e^+ e^- \rightarrow \gamma X$
1.62 ± 0.04 ± 0.12	5.8k	BAI	04I BES2	$\psi(2S) \rightarrow J/\psi \gamma \gamma$
0.99 ± 0.10 ± 0.08		GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X$
1.47 ± 0.17		<sup>2</sup> OREGLIA	82 CBAL	$\psi(2S) \rightarrow \gamma \chi_{c2}$
1.8 ± 0.5		<sup>3</sup> BRANDELIK	79B DASP	$\psi(2S) \rightarrow \gamma \chi_{c2}$
1.2 ± 0.2		<sup>3</sup> BARTEL	78B CNTR	$\psi(2S) \rightarrow \gamma \chi_{c2}$
2.2 ± 1.2		<sup>4</sup> BIDDICK	77 CNTR	$e^+ e^- \rightarrow \gamma X$
1.2 ± 0.7		<sup>2</sup> WHITAKER	76 MRK1	$e^+ e^-$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1.874 ± 0.007 ± 0.102	76k	<sup>5</sup> ABLIKIM	12O BES3	$\psi(2S) \rightarrow \gamma \chi_{c2}$
1.95 ± 0.02 ± 0.07	12.4k	<sup>6</sup> MENDEZ	08 CLEO	$\psi(2S) \rightarrow \gamma \chi_{c2}$
1.85 ± 0.04 ± 0.07	1.9k	<sup>7</sup> ADAM	05A CLEO	Repl. by MENDEZ 08

WEIGHTED AVERAGE  
1.69 ± 0.16 (Error scaled by 3.4)



$$\frac{\Gamma(\chi_{c2}(1P) \rightarrow \gamma J/\psi(1S))}{\Gamma_{\text{total}}} \times \frac{\Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))}{\Gamma_{\text{total}}}$$

(units  $10^{-2}$ )

- <sup>1</sup> Uses  $B(J/\psi \rightarrow e^+ e^-) = (5.971 \pm 0.032)\%$  and  $B(J/\psi \rightarrow \mu^+ \mu^-) = (5.961 \pm 0.033)\%$ .
- <sup>2</sup> Recalculated by us using  $B(J/\psi(1S) \rightarrow \ell^+ \ell^-) = 0.1181 \pm 0.0020$ .
- <sup>3</sup> Recalculated by us using  $B(J/\psi(1S) \rightarrow \mu^+ \mu^-) = 0.0588 \pm 0.0010$ .
- <sup>4</sup> Assumes isotropic gamma distribution.

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

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

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

$$\Gamma(\chi_{c2}(1P) \rightarrow \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c2}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S) \text{ anything})$$

$$\frac{\Gamma_{93}/\Gamma \times \Gamma_{168}^{\psi(2S)}/\Gamma_{10}^{\psi(2S)}}{0.343\Gamma_{167}^{\psi(2S)} + 0.190\Gamma_{168}^{\psi(2S)}} = \frac{\Gamma_{93}/\Gamma \times \Gamma_{168}^{\psi(2S)}/\Gamma_{10}^{\psi(2S)}}{(\Gamma_{12}^{\psi(2S)} + \Gamma_{13}^{\psi(2S)} + \Gamma_{14}^{\psi(2S)})}$$

VALUE (units 10 <sup>-2</sup> )	EVTS	DOCUMENT ID	TECN	COMMENT
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**2.95±0.06 OUR FIT**

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

3.12±0.03±0.09	12.4k	<sup>1</sup> MENDEZ	08	CLEO	$\psi(2S) \rightarrow \gamma \chi_{c2}$
3.11±0.07±0.07	1.9k	ADAM	05A	CLEO	Repl. by MENDEZ 08

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

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

$$\frac{\Gamma_{93}/\Gamma \times \Gamma_{168}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}}{0.343\Gamma_{167}^{\psi(2S)} + 0.190\Gamma_{168}^{\psi(2S)}}$$

VALUE (units 10 <sup>-2</sup> )	EVTS	DOCUMENT ID	TECN	COMMENT
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**5.22±0.11 OUR FIT**

**5.53±0.17 OUR AVERAGE**

5.56±0.05±0.16	12.4k	MENDEZ	08	CLEO	$\psi(2S) \rightarrow \gamma \chi_{c2}$
6.0 ±2.8	1.3k	<sup>1</sup> ABLIKIM	04B	BES	$\psi(2S) \rightarrow J/\psi X$
3.9 ±1.2		<sup>2</sup> HIMEL	80	MRK2	$\psi(2S) \rightarrow \gamma \chi_{c2}$

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

5.52±0.13±0.13	1.9k	<sup>3</sup> ADAM	05A	CLEO	Repl. by MENDEZ 08
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<sup>1</sup> From a fit to the  $J/\psi$  recoil mass spectra.

<sup>2</sup> The value for  $B(\psi(2S) \rightarrow \gamma \chi_{c2}) \times B(\chi_{c2} \rightarrow \gamma J/\psi(1S))$  reported in HIMEL 80 is derived using  $B(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) = (33 \pm 3)\%$  and  $B(J/\psi(1S) \rightarrow \ell^+ \ell^-) = 0.138 \pm 0.018$ . Calculated by us using  $B(J/\psi(1S) \rightarrow \ell^+ \ell^-) = (0.1181 \pm 0.0020)$ .

<sup>3</sup> Not independent from other values reported by ADAM 05A.

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

$$\frac{\Gamma_{97}/\Gamma \times \Gamma_{168}^{\psi(2S)}/\Gamma_{\psi(2S)}}{0.343\Gamma_{167}^{\psi(2S)} + 0.190\Gamma_{168}^{\psi(2S)}}$$

VALUE (units 10 <sup>-5</sup> )	EVTS	DOCUMENT ID	TECN	COMMENT
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**2.71±0.08 OUR FIT**

**2.82±0.10 OUR AVERAGE**

2.83±0.08±0.06	5k	<sup>1</sup> ABLIKIM	17AE	BES3	$\psi(2S) \rightarrow \gamma \chi_{c2} \rightarrow 3\gamma$
2.68±0.28±0.15	0.3k	ECKLUND	08A	CLEO	$\psi(2S) \rightarrow \gamma \chi_{c2} \rightarrow 3\gamma$
7.0 ±2.1 ±2.0		LEE	85	CBAL	$\psi(2S) \rightarrow \gamma \chi_{c2}$

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

2.81±0.17±0.15	1.1k	<sup>2</sup> ABLIKIM	12A	BES3	$\psi(2S) \rightarrow \gamma \chi_{c2} \rightarrow 3\gamma$
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<sup>1</sup> ABLIKIM 17AE measures the ratio of two-photon partial widths for the helicity  $\lambda = 0$  and helicity  $\lambda = 2$  components to be  $f_{0/2} = \Gamma_{\gamma\gamma}^{\lambda=0} / \Gamma_{\gamma\gamma}^{\lambda=2} = 0.000 \pm 0.006 \pm 0.012$ .

<sup>2</sup> ABLIKIM 12A measures the ratio of two-photon partial widths for the helicity  $\lambda = 0$  and helicity  $\lambda = 2$  components to be  $f_{0/2} = \Gamma_{\gamma\gamma}^{\lambda=0} / \Gamma_{\gamma\gamma}^{\lambda=2} = 0.00 \pm 0.02 \pm 0.02$ . Superseded by ABLIKIM 17AE.

$\Gamma(\chi_{c2}(1P) \rightarrow \gamma\gamma)/\Gamma(\chi_{c0}(1P) \rightarrow \gamma\gamma)$					$\Gamma_{97}/\Gamma_{97}^{\chi_{c0}(1P)}$
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>0.292±0.028 OUR AVERAGE</b>					
0.295±0.014±0.028	8k	<sup>1</sup> ABLIKIM	17AE BES3	$\psi(2S) \rightarrow \gamma\chi_{cJ} \rightarrow 3\gamma$	
0.278±0.050±0.036	0.5k	<sup>1</sup> ECKLUND	08A CLEO	$\psi(2S) \rightarrow \gamma\chi_{cJ} \rightarrow 3\gamma$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.271±0.029±0.030	1.9k	<sup>1,2</sup> ABLIKIM	12A BES3	$\psi(2S) \rightarrow \gamma\chi_{cJ} \rightarrow 3\gamma$	
<sup>1</sup> Not independent from the values of $\Gamma(\chi_{c0}, \chi_{c2})$ and $B(\psi(2S) \rightarrow \chi_{c0}, \chi_{c2})$ .					
<sup>2</sup> Superseded by ABLIKIM 17AE.					

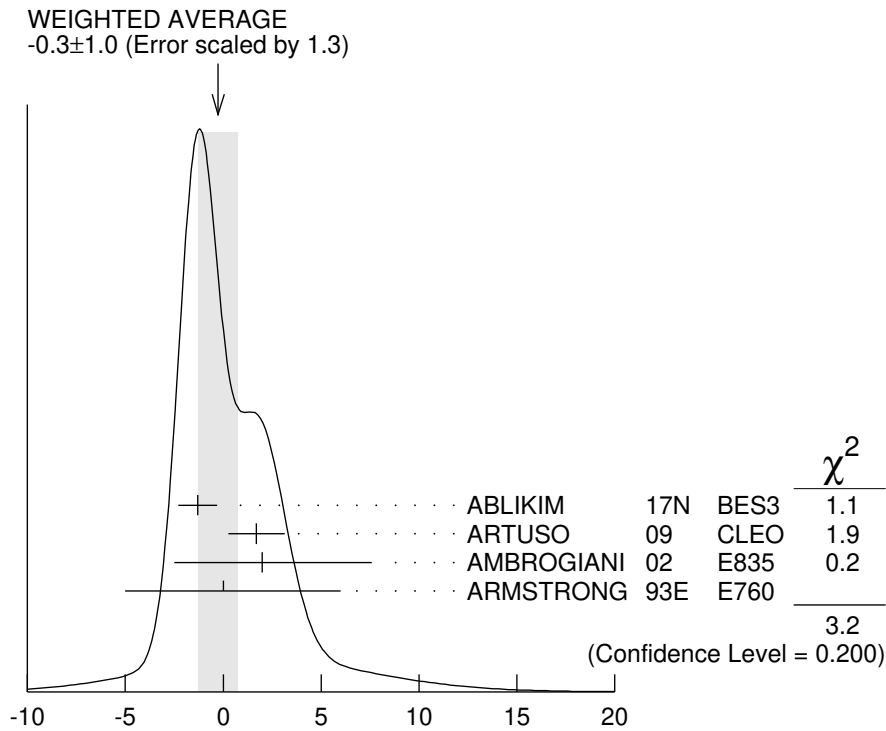
### MULTIPOLE AMPLITUDES IN $\chi_{c2}(1P) \rightarrow \gamma J/\psi(1S)$ RADIATIVE DECAY

**$a_2 = M2/\sqrt{E1^2 + M2^2 + E3^2}$  Magnetic quadrupole fractional transition amplitude**

VALUE (units $10^{-2}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>-11.0± 1.0 OUR AVERAGE</b>				
-12.0± 1.3±0.4	89k	<sup>1</sup> ABLIKIM	17N BES3	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$
- 9.3± 1.6±0.3	19.8k	<sup>2</sup> ARTUSO	09 CLEO	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$
- 9.3 <sup>+</sup> <sub>-</sub> 3.9 <sup>+</sup> <sub>4.1</sub> ±0.6	5.9k	<sup>3</sup> AMBROGIANI	02 E835	$p\bar{p} \rightarrow \chi_{c2} \rightarrow J/\psi\gamma$
-14 ± 6	1.9k	<sup>3</sup> ARMSTRONG	93E E760	$p\bar{p} \rightarrow \chi_{c2} \rightarrow J/\psi\gamma$
-33.3 <sup>+</sup> <sub>-</sub> 11.6 <sub>29.2</sub>	441	<sup>3</sup> OREGLIA	82 CBAL	$\psi(2S) \rightarrow \chi_{c1}\gamma \rightarrow J/\psi\gamma\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
- 7.9± 1.9±0.3	19.8k	<sup>4</sup> ARTUSO	09 CLEO	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$
<sup>1</sup> Correlated with $a_3$ , $b_2$ , and $b_3$ with correlation coefficients $\rho_{a_2 a_3} = 0.733$ , $\rho_{a_2 b_2} = -0.605$ , and $\rho_{a_2 b_3} = -0.095$ .				
<sup>2</sup> From a fit with floating $M2$ amplitudes $a_2$ and $b_2$ , and fixed $E3$ amplitudes $a_3=b_3=0$ .				
<sup>3</sup> Assuming $a_3=0$ .				
<sup>4</sup> From a fit with floating $M2$ and $E3$ amplitudes $a_2$ , $b_2$ , and $a_3$ , and $b_3$ .				

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

VALUE (units $10^{-2}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>-0.3±1.0 OUR AVERAGE</b> Error includes scale factor of 1.3. See the ideogram below.				
-1.3±0.9±0.4	89k	<sup>1</sup> ABLIKIM	17N BES3	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$
1.7±1.4±0.3	19.8k	<sup>2</sup> ARTUSO	09 CLEO	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$
2.0 <sup>+</sup> <sub>-</sub> 5.5 <sup>+</sup> <sub>4.4</sub> ±0.9	5908	AMBROGIANI	02 E835	$p\bar{p} \rightarrow \chi_{c2} \rightarrow J/\psi\gamma$
0 <sup>+</sup> <sub>-</sub> 6 <sub>5</sub>	1904	ARMSTRONG	93E E760	$p\bar{p} \rightarrow \chi_{c2} \rightarrow J/\psi\gamma$
<sup>1</sup> Correlated with $a_2$ , $b_2$ , and $b_3$ with correlation coefficients $\rho_{a_2 a_3} = 0.733$ , $\rho_{a_3 b_2} = -0.422$ , and $\rho_{a_3 b_3} = -0.024$ .				
<sup>2</sup> From a fit with floating $M2$ and $E3$ amplitudes $a_2$ , $b_2$ , and $a_3$ , and $b_3$ .				



$a_3 = E3 / \sqrt{E1^2 + M2^2 + E3^2}$  Electric octupole fractional transition amplitude (units  $10^{-2}$ )

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

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

VALUE (units $10^{-2}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>1.9 \pm 0.9</math> OUR AVERAGE</b>		Error includes scale factor of 1.4. See the ideogram below.		
$1.7 \pm 0.8 \pm 0.2$	89k	<sup>1</sup> ABLIKIM	17N BES3	$\psi(2S) \rightarrow \gamma \gamma \ell^+ \ell^-$
$4.6 \pm 1.0 \pm 1.3$	13.8k	<sup>2</sup> ABLIKIM	11I BES3	$\psi(2S) \rightarrow \gamma \pi^+ \pi^-, \gamma K^+ K^-$
$0.2 \pm 1.5 \pm 0.4$	19.8k	<sup>3</sup> ARTUSO	09 CLEO	$\psi(2S) \rightarrow \gamma \gamma \ell^+ \ell^-$
$-5.1^{+5.4}_{-3.6}$	721	<sup>2</sup> ABLIKIM	04I BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^-, \gamma K^+ K^-$
$13.2^{+9.8}_{-7.5}$	441	<sup>4</sup> OREGLIA	82 CBAL	$\psi(2S) \rightarrow \gamma \gamma \ell^+ \ell^-$

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

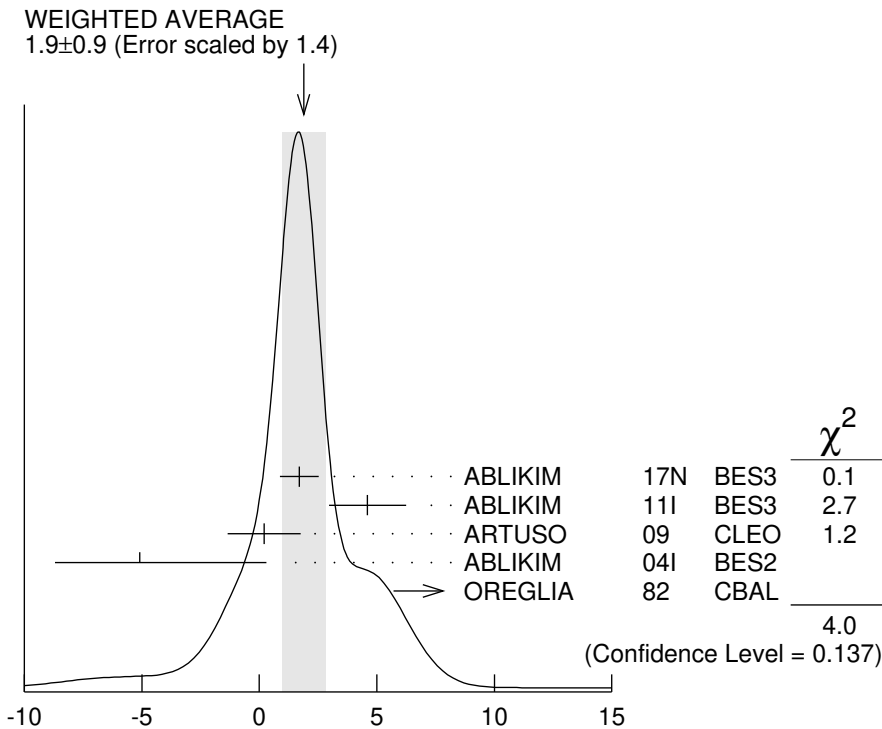
$1.0 \pm 1.3 \pm 0.3$  19.8k <sup>4</sup> ARTUSO 09 CLEO  $\psi(2S) \rightarrow \gamma \gamma \ell^+ \ell^-$

<sup>1</sup> Correlated with  $a_2$ ,  $a_3$ , and  $b_3$  with correlation coefficients  $\rho_{a_2 b_2} = -0.605$ ,  $\rho_{a_3 b_2} = -0.422$ , and  $\rho_{b_2 b_3} = 0.384$ .

<sup>2</sup> From a fit with floating  $M2$  and  $E3$  amplitudes  $b_2$  and  $b_3$ .

<sup>3</sup> From a fit with floating  $M2$  and  $E3$  amplitudes  $a_2$ ,  $b_2$ , and  $a_3$ , and  $b_3$ .

<sup>4</sup> From a fit with floating  $M2$  amplitudes  $a_2$  and  $b_2$ , and fixed  $E3$  amplitudes  $a_3 = b_3 = 0$ .



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

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

VALUE (units $10^{-2}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>-1.0 \pm 0.6</math> OUR AVERAGE</b>				
$-1.4 \pm 0.7 \pm 0.4$	89k	<sup>1</sup> ABLIKIM	17N BES3	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$
$1.5 \pm 0.8 \pm 1.8$	13.8k	<sup>2</sup> ABLIKIM	11I BES3	$\psi(2S) \rightarrow \gamma\pi^+\pi^-, \gamma K^+K^-$
$-0.8 \pm 1.2 \pm 0.2$	19.8k	ARTUSO	09 CLEO	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$
$-2.7^{+4.3}_{-2.9}$	721	<sup>2</sup> ABLIKIM	04I BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-, \gamma K^+K^-$

<sup>1</sup> Correlated with  $a_2$ ,  $a_3$ , and  $b_2$  with correlation coefficients  $\rho_{a_2 b_3} = -0.095$ ,  $\rho_{a_3 b_3} = -0.024$ , and  $\rho_{b_2 b_3} = 0.384$ .

<sup>2</sup> From a fit with floating  $M2$  and  $E3$  amplitudes  $b_2$  and  $b_3$ .

## MULTIPOLE AMPLITUDE RATIOS IN RADIATIVE DECAYS

### $\psi(2S) \rightarrow \gamma\chi_{c2}(1P)$ and $\chi_{c2} \rightarrow \gamma J/\psi(1S)$

$b_2/a_2$  Magnetic quadrupole transition amplitude ratio

VALUE (units $10^{-2}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>-11^{+14}_{-15}</math></b>	19.8k	<sup>1</sup> ARTUSO	09 CLEO	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$

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

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

ABLIKIM	22AO	PR D106 072004	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	22O	JHEP 2206 074	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	22Q	PR D106 032014	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	21AV	JHEP 2111 217	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	21L	PR D103 112004	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	20AE	PR D102 092006	M. Ablikim <i>et al.</i>	(BESIII Collab.)
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.)
AAIJ	17BI	PRL 119 221801	R. Aaij <i>et al.</i>	(LHCb Collab.)
ABLIKIM	17AE	PR D96 092007	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	17AG	PR D96 111102	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.)
ABLIKIM	17N	PR D95 072004	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	17U	PR D96 032001	M. Ablikim <i>et al.</i>	(BESIII Collab.)
PDG	16	CP C40 100001	C. Patrignani <i>et al.</i>	(PDG Collab.)
ABLIKIM	15I	PR D91 092006	M. Ablikim <i>et al.</i>	(BESIII Collab.)
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	14J	PR D89 074030	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.)
LEES	12AE	PR D86 092005	J.P. Lees <i>et al.</i>	(BABAR 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.)
ABLIKIM	11E	PR D83 112005	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	11F	PR D83 112009	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	11I	PR D84 092006	M. Ablikim <i>et al.</i>	(BESIII Collab.)
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.)
UEHARA	10A	PR D82 114031	S. Uehara <i>et al.</i>	(BELLE Collab.)
ARTUSO	09	PR D80 112003	M. Artuso <i>et al.</i>	(CLEO Collab.)
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.)
MENDEZ	08	PR D78 011102	H. Mendez <i>et al.</i>	(CLEO Collab.)
NAIK	08	PR D78 031101	P. Naik <i>et al.</i>	(CLEO Collab.)
UEHARA	08	EPJ C53 1	S. Uehara <i>et al.</i>	(BELLE Collab.)
ADAMS	07	PR D75 071101	G.S. Adams <i>et al.</i>	(CLEO Collab.)
ATHAR	07	PR D75 032002	S.B. Athar <i>et al.</i>	(CLEO Collab.)
CHEN	07B	PL B651 15	W.T. Chen <i>et al.</i>	(BELLE Collab.)
ABLIKIM	06D	PR D73 052006	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06I	PR D74 012004	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06R	PR D74 072001	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06T	PL B642 197	M. Ablikim <i>et al.</i>	(BES Collab.)
DOBBS	06	PR D73 071101	S. Dobbs <i>et al.</i>	(CLEO 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.)
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.)
NAKAZAWA	05	PL B615 39	H. Nakazawa <i>et al.</i>	(BELLE Collab.)
ABLIKIM	04B	PR D70 012003	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	04H	PR D70 092003	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	04I	PR D70 092004	M. Ablikim <i>et al.</i>	(BES 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.)
BAI	04I	PR D70 012006	J.Z. Bai <i>et al.</i>	(BES 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	02T	PL B540 33	K. Abe <i>et al.</i>	(BELLE Collab.)
AMBROGIANI	02	PR D65 052002	M. Ambrogiani <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.)
ACCIARRI	99E	PL B453 73	M. Acciarri <i>et al.</i>	(L3 Collab.)
BAI	99B	PR D60 072001	J.Z. Bai <i>et al.</i>	(BES Collab.)
ACKER...,K...	98	PL B439 197	K. Akerstaff <i>et al.</i>	(OPAL 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.)
DOMINICK	94	PR D50 4265	J. Dominick <i>et al.</i>	(CLEO Collab.)
ARMSTRONG	93	PRL 70 2988	T.A. Armstrong <i>et al.</i>	(FNAL E760 Collab.)
ARMSTRONG	93E	PR D48 3037	T.A. Armstrong <i>et al.</i>	(FNAL-E760 Collab.)
BAUER	93	PL B302 345	D.A. Bauer <i>et al.</i>	(TPC Collab.)
ARMSTRONG	92	NP B373 35	T.A. Armstrong <i>et al.</i>	(FNAL, FERR, GENO+)
Also		PRL 68 1468	T.A. Armstrong <i>et al.</i>	(FNAL, FERR, GENO+)
BAGLIN	87B	PL B187 191	C. Baglin <i>et al.</i>	(R704 Collab.)
BAGLIN	86B	PL B172 455	C. Baglin	(LAPP, CERN, GENO, LYON, OSLO+)
GAISER	86	PR D34 711	J. Gaiser <i>et al.</i>	(Crystal Ball Collab.)
LEE	85	SLAC 282	R.A. Lee	(SLAC)
LEMOIGNE	82	PL 113B 509	Y. Lemoigne <i>et al.</i>	(SACL, LOIC, SHMP+)
OREGLIA	82	PR D25 2259	M.J. Oreglia <i>et al.</i>	(SLAC, CIT, HARV+)
Also		Private Comm.	M.J. Oreglia	(EFI)
BARATE	81	PR D24 2994	R. Barate <i>et al.</i>	(SACL, LOIC, SHMP, CERN+)
HIMEL	80	PRL 44 920	T. Himel <i>et al.</i>	(LBL, SLAC)
Also		Private Comm.	G. Trilling	(LBL, UCB)
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+)
WHITAKER	76	PRL 37 1596	J.S. Whitaker <i>et al.</i>	(SLAC, LBL)