

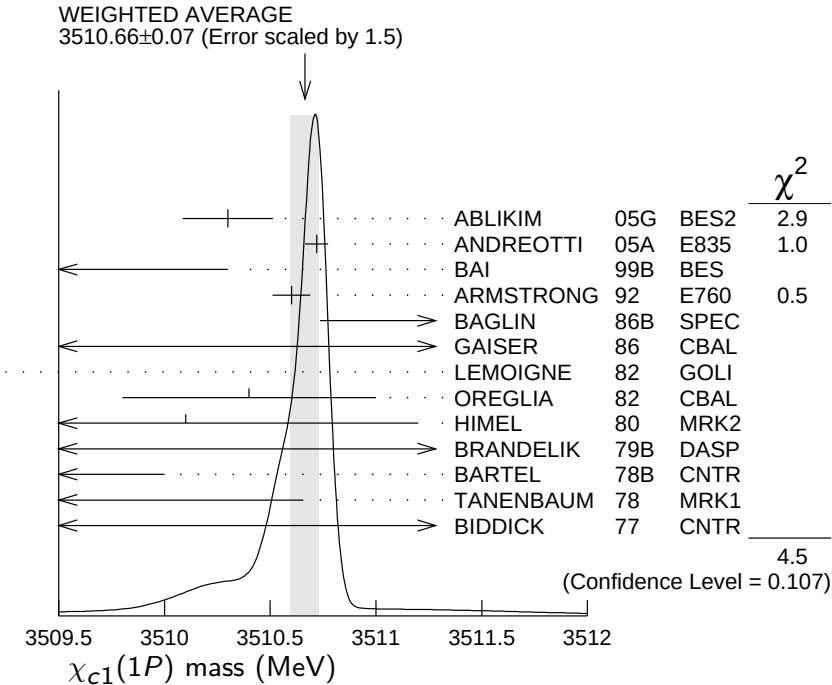
$\chi_{c1}(1P)$

$$J^{PC} = 0^{+}(1^{++})$$

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

$\chi_{c1}(1P)$ MASS						
VALUE (MeV)	EVTs		DOCUMENT ID	TECN	COMMENT	
3510.66 ± 0.07 OUR AVERAGE			Error includes scale factor	of 1.5.	See the ideogram	
below						
3510.30 ± 0.14 ± 0.16			ABLIKIM	05G BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$	
3510.719 ± 0.051 ± 0.019			ANDREOTTI	05A E835	$p\bar{p} \rightarrow e^+e^-\gamma$	
3509.4 ± 0.9			BAI	99B BES	$\psi(2S) \rightarrow \gamma X$	
3510.60 ± 0.087 ± 0.019	513	1	ARMSTRONG	92 E760	$\bar{p}p \rightarrow e^+e^-\gamma$	
3511.3 ± 0.4 ± 0.4	30		BAGLIN	86B SPEC	$\bar{p}p \rightarrow e^+e^-X$	
3512.3 ± 0.3 ± 4.0		2	GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X$	
3507.4 ± 1.7	91	3	LEMOIGNE	82 GOLI	$185 \pi^- \text{Be} \rightarrow \gamma \mu^+ \mu^- A$	
3510.4 ± 0.6			OREGLIA	82 CBAL	$e^+e^- \rightarrow J/\psi 2\gamma$	
3510.1 ± 1.1	254	4	HIMEL	80 MRK2	$e^+e^- \rightarrow J/\psi 2\gamma$	
3509 ± 11	21		BRANDELIK	79B DASP	$e^+e^- \rightarrow J/\psi 2\gamma$	
3507 ± 3		4	BARTEL	78B CNTR	$e^+e^- \rightarrow J/\psi 2\gamma$	
3505.0 ± 4 ± 4		4,5	TANENBAUM	78 MRK1	e^+e^-	
3513 ± 7	367	4	BIDDICK	77 CNTR	$\psi(2S) \rightarrow \gamma X$	
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●						
3500 ± 10	40		TANENBAUM	75 MRK1	Hadrons γ	
1 Recalculated by ANDREOTTI 05A, using the value of $\psi(2S)$ mass from AULCHENKO 03.						
2 Using mass of $\psi(2S)$ = 3686.0 MeV.						
3 $J/\psi(1S)$ mass constrained to 3097 MeV.						
4 Mass value shifted by us by amount appropriate for $\psi(2S)$ mass = 3686 MeV and $J/\psi(1S)$ mass = 3097 MeV.						
5 From a simultaneous fit to radiative and hadronic decay channels.						

- ¹ Recalculated by ANDREOTTI 05A, using the value of $\psi(2S)$ mass from AULCHENKO 03.
- ² Using mass of $\psi(2S) = 3686.0$ MeV.
- ³ $J/\psi(1S)$ mass constrained to 3097 MeV.
- ⁴ Mass value shifted by us by amount appropriate for $\psi(2S)$ mass = 3686 MeV and $J/\psi(1S)$ mass = 3097 MeV.
- ⁵ From a simultaneous fit to radiative and hadronic decay channels.



$\chi_{c1}(1P)$ WIDTH

VALUE (MeV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
0.84 $\pm$ 0.04 OUR FIT					
0.88 $\pm$ 0.05 OUR AVERAGE					
1.39 $^{+0.40}_{-0.38}$ $^{+0.26}_{-0.77}$			ABLIKIM	05G BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$
0.876 $\pm$ 0.045 $\pm$ 0.026			ANDREOTTI	05A E835	$p\bar{p} \rightarrow e^+ e^- \gamma$
0.87 $\pm$ 0.11 $\pm$ 0.08		513	¹ ARMSTRONG	92 E760	$\bar{p}p \rightarrow e^+ e^- \gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.3	95		BAGLIN	86B SPEC	$\bar{p}p \rightarrow e^+ e^- X$
<3.8	90		GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X$
¹ Recalculated by ANDREOTTI 05A.					

 $\chi_{c1}(1P)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Hadronic decays		
Γ_1 $3(\pi^+ \pi^-)$	(5.8 $\pm$ 1.4) $\times 10^{-3}$	S=1.2
Γ_2 $2(\pi^+ \pi^-)$	(7.6 $\pm$ 2.6) $\times 10^{-3}$	
Γ_3 $\pi^+ \pi^- \pi^0 \pi^0$	(1.22 $\pm$ 0.16) %	
Γ_4 $\rho^+ \pi^- \pi^0 + \text{c.c.}$	(1.48 $\pm$ 0.25) %	
Γ_5 $\rho^0 \pi^+ \pi^-$	(3.9 $\pm$ 3.5) $\times 10^{-3}$	
Γ_6 $4\pi^0$	(5.5 $\pm$ 0.8) $\times 10^{-4}$	
Γ_7 $\pi^+ \pi^- K^+ K^-$	(4.5 $\pm$ 1.0) $\times 10^{-3}$	
Γ_8 $K^+ K^- \pi^0 \pi^0$	(1.14 $\pm$ 0.28) $\times 10^{-3}$	
Γ_9 $K^+ K^- \pi^+ \pi^- \pi^0$	(1.15 $\pm$ 0.13) %	
Γ_{10} $K_S^0 K^\pm \pi^\mp \pi^+ \pi^-$	(7.5 $\pm$ 0.8) $\times 10^{-3}$	
Γ_{11} $K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.}$	(8.7 $\pm$ 1.4) $\times 10^{-3}$	
Γ_{12} $\rho^- K^+ \bar{K}^0 + \text{c.c.}$	(5.1 $\pm$ 1.2) $\times 10^{-3}$	
Γ_{13} $K^*(892)^0 \bar{K}^0 \pi^0 \rightarrow K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.}$	(2.4 $\pm$ 0.7) $\times 10^{-3}$	
Γ_{14} $K^+ K^- \eta \pi^0$	(1.14 $\pm$ 0.35) $\times 10^{-3}$	
Γ_{15} $\pi^+ \pi^- K_S^0 K_S^0$	(7.0 $\pm$ 3.0) $\times 10^{-4}$	
Γ_{16} $K^+ K^- \eta$	(3.2 $\pm$ 1.0) $\times 10^{-4}$	
Γ_{17} $\bar{K}^0 K^+ \pi^- + \text{c.c.}$	(7.1 $\pm$ 0.6) $\times 10^{-3}$	
Γ_{18} $K^*(892)^0 \bar{K}^0 + \text{c.c.}$	(1.0 $\pm$ 0.4) $\times 10^{-3}$	
Γ_{19} $K^*(892)^+ K^- + \text{c.c.}$	(1.5 $\pm$ 0.7) $\times 10^{-3}$	
Γ_{20} $K_J^*(1430)^0 \bar{K}^0 + \text{c.c.} \rightarrow K_S^0 K^+ \pi^- + \text{c.c.}$	< 8 $\times 10^{-4}$	CL=90%
Γ_{21} $K_J^*(1430)^+ K^- + \text{c.c.} \rightarrow K_S^0 K^+ \pi^- + \text{c.c.}$	< 2.2 $\times 10^{-3}$	CL=90%
Γ_{22} $K^+ K^- \pi^0$	(1.85 $\pm$ 0.25) $\times 10^{-3}$	

Γ_{23}	$\eta\pi^+\pi^-$	$(4.9 \pm 0.5) \times 10^{-3}$	
Γ_{24}	$a_0(980)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-$	$(1.8 \pm 0.6) \times 10^{-3}$	
Γ_{25}	$f_2(1270)\eta$	$(2.7 \pm 0.8) \times 10^{-3}$	
Γ_{26}	$\pi^+\pi^-\eta'$	$(2.3 \pm 0.5) \times 10^{-3}$	
Γ_{27}	$K^+K^-\eta'(958)$	$(8.8 \pm 0.9) \times 10^{-4}$	
Γ_{28}	$K_0^*(1430)^+K^- + \text{c.c.}$	$(6.4^{+2.2}_{-2.8}) \times 10^{-4}$	
Γ_{29}	$f_0(980)\eta'(958)$	$(1.6^{+1.4}_{-0.7}) \times 10^{-4}$	
Γ_{30}	$f_0(1710)\eta'(958)$	$(7^{+7}_{-5}) \times 10^{-5}$	
Γ_{31}	$f'_2(1525)\eta'(958)$	$(9 \pm 6) \times 10^{-5}$	
Γ_{32}	$\pi^0 f_0(980) \rightarrow \pi^0\pi^+\pi^-$	$< 6 \times 10^{-6}$	CL=90%
Γ_{33}	$K^+\bar{K}^*(892)^0\pi^- + \text{c.c.}$	$(3.2 \pm 2.1) \times 10^{-3}$	
Γ_{34}	$K^*(892)^0\bar{K}^*(892)^0$	$(1.5 \pm 0.4) \times 10^{-3}$	
Γ_{35}	$K^+K^-K_S^0K_S^0$	$< 4 \times 10^{-4}$	CL=90%
Γ_{36}	$K^+K^-K^+K^-$	$(5.5 \pm 1.1) \times 10^{-4}$	
Γ_{37}	$K^+K^-\phi$	$(4.2 \pm 1.6) \times 10^{-4}$	
Γ_{38}	$\bar{K}^0K^+\pi^-\phi + \text{c.c.}$	$(3.3 \pm 0.5) \times 10^{-3}$	
Γ_{39}	$K^+K^-\pi^0\phi$	$(1.62 \pm 0.30) \times 10^{-3}$	
Γ_{40}	$\phi\pi^+\pi^-\pi^0$	$(7.5 \pm 1.0) \times 10^{-4}$	
Γ_{41}	$\omega\omega$	$(5.8 \pm 0.7) \times 10^{-4}$	
Γ_{42}	ωK^+K^-	$(7.8 \pm 0.9) \times 10^{-4}$	
Γ_{43}	$\omega\phi$	$(2.1 \pm 0.6) \times 10^{-5}$	
Γ_{44}	$\phi\phi$	$(4.2 \pm 0.5) \times 10^{-4}$	
Γ_{45}	$p\bar{p}$	$(7.72 \pm 0.35) \times 10^{-5}$	
Γ_{46}	$p\bar{p}\pi^0$	$(1.59 \pm 0.19) \times 10^{-4}$	
Γ_{47}	$p\bar{p}\eta$	$(1.48 \pm 0.25) \times 10^{-4}$	
Γ_{48}	$p\bar{p}\omega$	$(2.16 \pm 0.31) \times 10^{-4}$	
Γ_{49}	$p\bar{p}\phi$	$< 1.8 \times 10^{-5}$	CL=90%
Γ_{50}	$p\bar{p}\pi^+\pi^-$	$(5.0 \pm 1.9) \times 10^{-4}$	
Γ_{51}	$p\bar{p}\pi^0\pi^0$		
Γ_{52}	$p\bar{p}K^+K^- (\text{non-resonant})$	$(1.30 \pm 0.23) \times 10^{-4}$	
Γ_{53}	$p\bar{p}K_S^0K_S^0$	$< 4.5 \times 10^{-4}$	CL=90%
Γ_{54}	$p\bar{n}\pi^-$	$(3.9 \pm 0.5) \times 10^{-4}$	
Γ_{55}	$\bar{p}n\pi^+$	$(4.0 \pm 0.5) \times 10^{-4}$	
Γ_{56}	$p\bar{n}\pi^-\pi^0$	$(1.05 \pm 0.12) \times 10^{-3}$	
Γ_{57}	$\bar{p}n\pi^+\pi^0$	$(1.03 \pm 0.12) \times 10^{-3}$	
Γ_{58}	$\Lambda\bar{\Lambda}$	$(1.16 \pm 0.12) \times 10^{-4}$	
Γ_{59}	$\Lambda\bar{\Lambda}\pi^+\pi^-$	$(3.0 \pm 0.5) \times 10^{-4}$	
Γ_{60}	$\Lambda\bar{\Lambda}\pi^+\pi^- (\text{non-resonant})$	$(2.5 \pm 0.6) \times 10^{-4}$	
Γ_{61}	$\Sigma(1385)^+\bar{\Lambda}\pi^- + \text{c.c.}$	$< 1.3 \times 10^{-4}$	CL=90%
Γ_{62}	$\Sigma(1385)^-\bar{\Lambda}\pi^+ + \text{c.c.}$	$< 1.3 \times 10^{-4}$	CL=90%
Γ_{63}	$K^+\bar{p}\Lambda$	$(4.2 \pm 0.4) \times 10^{-4}$	S=1.1
Γ_{64}	$K^+\bar{p}\Lambda(1520) + \text{c.c.}$	$(1.7 \pm 0.5) \times 10^{-4}$	

Γ_{65}	$\Lambda(1520)\bar{\Lambda}(1520)$	< 1.0	$\times 10^{-4}$	CL=90%
Γ_{66}	$\Sigma^0\bar{\Sigma}^0$	< 4	$\times 10^{-5}$	CL=90%
Γ_{67}	$\Sigma^+\bar{\Sigma}^-$	< 6	$\times 10^{-5}$	CL=90%
Γ_{68}	$\Sigma(1385)^+\bar{\Sigma}(1385)^-$	< 1.0	$\times 10^{-4}$	CL=90%
Γ_{69}	$\Sigma(1385)^-\bar{\Sigma}(1385)^+$	< 5	$\times 10^{-5}$	CL=90%
Γ_{70}	$K^-\Lambda\bar{\Xi}^+ + \text{c.c.}$	$(1.38 \pm 0.25) \times 10^{-4}$		
Γ_{71}	$\Xi^0\bar{\Xi}^0$	< 6	$\times 10^{-5}$	CL=90%
Γ_{72}	$\Xi^-\bar{\Xi}^+$	$(8.2 \pm 2.2) \times 10^{-5}$		
Γ_{73}	$\pi^+\pi^- + K^+K^-$	< 2.1	$\times 10^{-3}$	
Γ_{74}	$K_S^0 K_S^0$	< 6	$\times 10^{-5}$	CL=90%
Γ_{75}	$\eta_c \pi^+\pi^-$	< 3.2	$\times 10^{-3}$	CL=90%

Radiative decays

Γ_{76}	$\gamma J/\psi(1S)$	$(33.9 \pm 1.2) \%$
Γ_{77}	$\gamma \rho^0$	$(2.20 \pm 0.18) \times 10^{-4}$
Γ_{78}	$\gamma \omega$	$(6.9 \pm 0.8) \times 10^{-5}$
Γ_{79}	$\gamma \phi$	$(2.5 \pm 0.5) \times 10^{-5}$
Γ_{80}	$\gamma \gamma$	

CONSTRAINED FIT INFORMATION

A multiparticle fit to $\chi_{c1}(1P)$, $\chi_{c0}(1P)$, $\chi_{c2}(1P)$, and $\psi(2S)$ with 4 total widths, a partial width, 25 combinations of partial widths obtained from integrated cross section, and 84 branching ratios uses 240 measurements to determine 49 parameters. The overall fit has a $\chi^2 = 342.4$ for 191 degrees of freedom.

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

x_{36}	6				
x_{45}	8	3			
x_{58}	13	5	7		
x_{76}	31	13	6	26	
Γ	-19	-8	-62	-16	-51
	x_{17}	x_{36}	x_{45}	x_{58}	x_{76}

$\chi_{c1}(1P)$ PARTIAL WIDTHS

———— $\chi_{c1}(1P) \Gamma(i) \Gamma(\gamma J/\psi(1S)) / \Gamma(\text{total})$ ————

$\Gamma(p\bar{p}) \times \Gamma(\gamma J/\psi(1S)) / \Gamma_{\text{total}}$ $\Gamma_{45} \Gamma_{76} / \Gamma$

VALUE (eV)	DOCUMENT ID	TECN	COMMENT
21.9±0.8 OUR FIT			
21.4±0.9 OUR AVERAGE			
21.5±0.5±0.8	¹ ANDREOTTI	05A E835	$p\bar{p} \rightarrow e^+ e^- \gamma$

$21.4 \pm 1.5 \pm 2.2$	^{1,2} ARMSTRONG 92	E760	$\bar{p}p \rightarrow e^+e^- \gamma$
$19.9^{+4.4}_{-4.0}$	¹ BAGLIN	86B SPEC	$\bar{p}p \rightarrow e^+e^- X$

¹ Calculated by us using $B(J/\psi(1S) \rightarrow e^+e^-) = 0.0593 \pm 0.0010$.² Recalculated by ANDREOTTI 05A. **$\chi_{c1}(1P)$ BRANCHING RATIOS****HADRONIC DECAYS** **$\Gamma(3(\pi^+\pi^-))/\Gamma_{\text{total}}$** **$\Gamma_1/\Gamma$**

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
5.8 ± 1.4 OUR EVALUATION	Error includes scale factor of 1.2. Treating systematic error as correlated.		
5.8 ± 1.1 OUR AVERAGE			
$5.4 \pm 0.7 \pm 0.9$	¹ BAI	99B BES	$\psi(2S) \rightarrow \gamma \chi_{c1}$
$16.0 \pm 5.9 \pm 0.8$	¹ TANENBAUM	78 MRK1	$\psi(2S) \rightarrow \gamma \chi_{c1}$
¹ Rescaled by us using $B(\psi(2S) \rightarrow \gamma \chi_{c1}) = (8.8 \pm 0.4)\%$ and $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (32.6 \pm 0.5)\%$.			

 $\Gamma(2(\pi^+\pi^-))/\Gamma_{\text{total}}$ **Γ_2/Γ**

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
7.6 ± 2.6 OUR EVALUATION	Treating systematic error as correlated.		
8 ± 4 OUR AVERAGE	Error includes scale factor of 1.5.		
$4.6 \pm 2.1 \pm 2.6$	¹ BAI	99B BES	$\psi(2S) \rightarrow \gamma \chi_{c1}$
$12.5 \pm 4.2 \pm 0.6$	¹ TANENBAUM	78 MRK1	$\psi(2S) \rightarrow \gamma \chi_{c1}$
¹ Rescaled by us using $B(\psi(2S) \rightarrow \gamma \chi_{c1}) = (8.8 \pm 0.4)\%$ and $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (32.6 \pm 0.5)\%$.			

 $\Gamma(\pi^+\pi^-\pi^0\pi^0)/\Gamma_{\text{total}}$ **Γ_3/Γ**

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
$1.22 \pm 0.15 \pm 0.04$	604.7	¹ HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$
¹ HE 08B reports $1.28 \pm 0.06 \pm 0.15 \pm 0.08\%$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \pi^+\pi^-\pi^0\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.				

 $\Gamma(\rho^+\pi^-\pi^0 + \text{c.c.})/\Gamma_{\text{total}}$ **Γ_4/Γ**

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
$1.48 \pm 0.24 \pm 0.05$	712.3	^{1,2} HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$
¹ HE 08B reports $1.56 \pm 0.13 \pm 0.22 \pm 0.10\%$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \rho^+\pi^-\pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.				
² Calculated by us. We have added the values from HE 08B for $\rho^+\pi^-\pi^0$ and $\rho^-\pi^+\pi^0$ decays assuming uncorrelated statistical and fully correlated systematic uncertainties.				

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

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
39 ± 35	¹ TANENBAUM 78	MRK1	$\psi(2S) \rightarrow \gamma \chi_{c1}$

¹ Estimated using $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 0.087$. The errors do not contain the uncertainty in the $\psi(2S)$ decay.

 $\Gamma(4\pi^0)/\Gamma_{\text{total}}$ Γ_6/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
0.55 ± 0.08 ± 0.02	608	¹ ABLIKIM 11A	BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c1}$

¹ ABLIKIM 11A reports $(0.57 \pm 0.03 \pm 0.08) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow 4\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
4.5 ± 1.0 OUR EVALUATION	Treating systematic error as correlated.		

4.5 ± 0.9 OUR AVERAGE

4.2 ± 0.4 ± 0.9	¹ BAI 99B	BES	$\psi(2S) \rightarrow \gamma \chi_{c1}$
7.3 ± 3.0 ± 0.4	¹ TANENBAUM 78	MRK1	$\psi(2S) \rightarrow \gamma \chi_{c1}$

¹ Rescaled by us using $B(\psi(2S) \rightarrow \gamma \chi_{c1}) = (8.8 \pm 0.4)\%$ and $B(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) = (32.6 \pm 0.5)\%$.

 $\Gamma(K^+ K^- \pi^0 \pi^0)/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.114 ± 0.028 ± 0.004	45.1	¹ HE 08B	CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $0.12 \pm 0.02 \pm 0.02 \pm 0.01\%$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^+ K^- \pi^0 \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(K^+ K^- \pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}$ Γ_9/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
11.46 ± 0.12 ± 1.29	12k	¹ ABLIKIM 13B	BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c1}$

¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c1} \gamma) = (9.2 \pm 0.4)\%$.

 $\Gamma(K_S^0 K^\pm \pi^\mp \pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{10}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
7.52 ± 0.11 ± 0.79	5.1k	¹ ABLIKIM 13B	BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c1}$

¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c1} \gamma) = (9.2 \pm 0.4)\%$.

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

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.87 ± 0.14 ± 0.03	141.3	¹ HE 08B	CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹HE 08B reports $0.92 \pm 0.09 \pm 0.11 \pm 0.06$ % from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

Γ_{12}/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.51±0.12±0.02	141.3	¹ HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹HE 08B reports $0.54 \pm 0.11 \pm 0.07 \pm 0.03$ % from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \rho^- K^+ \bar{K}^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

Γ_{13}/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.24±0.06±0.01	141.3	¹ HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹HE 08B reports $0.25 \pm 0.06 \pm 0.03 \pm 0.02$ % from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^*(892)^0 \bar{K}^0 \pi^0 \rightarrow K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

Γ_{14}/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.114±0.035±0.004	141.3	¹ HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹HE 08B reports $0.12 \pm 0.03 \pm 0.02 \pm 0.01$ % from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^+ K^- \eta \pi^0)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

Γ_{15}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
7.0±3.0±0.2	19.8 ± 7.7	¹ ABLIKIM	050 BES2	$\psi(2S) \rightarrow \chi_{c1} \gamma$

¹ABLIKIM 050 reports $[\Gamma(\chi_{c1}(1P) \rightarrow \pi^+ \pi^- K_S^0 K_S^0)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ $= (0.67 \pm 0.26 \pm 0.11) \times 10^{-4}$ which we divide by our best value $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

Γ_{16}/Γ

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
0.32±0.10±0.01	¹ ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ATHAR 07 reports $(0.34 \pm 0.10 \pm 0.04) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^+ K^- \eta)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 0.0907 \pm 0.0011 \pm 0.0054$, which we rescale to our best value $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{K}^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{17}/Γ VALUE (units 10^{-3})

DOCUMENT ID

7.1 $\pm$ 0.6 OUR FIT $\Gamma(K^*(892)^0 \overline{K}^0 + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{18}/Γ VALUE (units 10^{-3})

EVTS

DOCUMENT ID

TECN

COMMENT

1.00 $\pm$ 0.37 $\pm$ 0.03

22

1

ABLIKIM

06R

BES2

 $\psi(2S) \rightarrow \gamma \chi_{c1}$

¹ ABLIKIM 06R reports $(1.1 \pm 0.4 \pm 0.1) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^*(892)^0 \overline{K}^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(K^*(892)^+ K^- + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{19}/Γ VALUE (units 10^{-3})

EVTS

DOCUMENT ID

TECN

COMMENT

1.46 $\pm$ 0.66 $\pm$ 0.05

27

1

ABLIKIM

06R

BES2

 $\psi(2S) \rightarrow \gamma \chi_{c1}$

¹ ABLIKIM 06R reports $(1.6 \pm 0.7 \pm 0.2) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^*(892)^+ K^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(K_J^*(1430)^0 \overline{K}^0 + \text{c.c.} \rightarrow K_S^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{20}/Γ VALUE (units 10^{-3})

CL%

DOCUMENT ID

TECN

COMMENT

<0.8

90

1

ABLIKIM

06R

BES2

 $\psi(2S) \rightarrow \gamma \chi_{c1}$

¹ ABLIKIM 06R reports $< 0.9 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K_J^*(1430)^0 \overline{K}^0 + \text{c.c.} \rightarrow K_S^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

 $\Gamma(K_J^*(1430)^+ K^- + \text{c.c.} \rightarrow K_S^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{21}/Γ VALUE (units 10^{-3})

CL%

DOCUMENT ID

TECN

COMMENT

<2.2

90

1

ABLIKIM

06R

BES2

 $\psi(2S) \rightarrow \gamma \chi_{c1}$

¹ ABLIKIM 06R reports $< 2.4 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K_J^*(1430)^+ K^- + \text{c.c.} \rightarrow K_S^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

 $\Gamma(K^+ K^- \pi^0)/\Gamma_{\text{total}}$ Γ_{22}/Γ VALUE (units 10^{-3})

DOCUMENT ID

TECN

COMMENT

1.85 $\pm$ 0.24 $\pm$ 0.06

1

ATHAR

07

CLEO

 $\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ATHAR 07 reports $(1.95 \pm 0.16 \pm 0.23) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^+ K^- \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 0.0907 \pm 0.0011 \pm 0.0054$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
4.9 ± 0.5	OUR AVERAGE			
$4.7 \pm 0.5 \pm 0.2$		¹ ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$
$5.4 \pm 0.9 \pm 0.2$	222	² ABLIKIM 06R	BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$

¹ ATHAR 07 reports $(5.0 \pm 0.3 \pm 0.5) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = 0.0907 \pm 0.0011 \pm 0.0054$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ABLIKIM 06R reports $(5.9 \pm 0.7 \pm 0.8) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(a_0(980)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{24}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$1.8 \pm 0.6 \pm 0.1$	58	¹ ABLIKIM 06R	BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$

¹ ABLIKIM 06R reports $(2.0 \pm 0.5 \pm 0.5) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow a_0(980)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(f_2(1270)\eta)/\Gamma_{\text{total}}$ Γ_{25}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$2.7 \pm 0.8 \pm 0.1$	53	¹ ABLIKIM 06R	BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$

¹ ABLIKIM 06R reports $(3.0 \pm 0.7 \pm 0.5) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow f_2(1270)\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\pi^+\pi^-\eta')/\Gamma_{\text{total}}$ Γ_{26}/Γ

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
$2.3 \pm 0.5 \pm 0.1$	¹ ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ATHAR 07 reports $(2.4 \pm 0.4 \pm 0.3) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \pi^+\pi^-\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = 0.0907 \pm 0.0011 \pm 0.0054$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(K^+K^-\eta'(958))/\Gamma_{\text{total}}$ Γ_{27}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
8.75 ± 0.87	310	¹ ABLIKIM 14J	BES3	$\psi(2S) \rightarrow \gamma K^+ K^- \eta'(958)$

¹ Derived using $B(\psi(2S) \rightarrow \gamma\chi_{c1}) = (9.2 \pm 0.4)\%$. Uncertainty includes both statistical and systematic contributions combined in quadrature.

$$\Gamma(K_0^*(1430)^+ K^- + \text{c.c.})/\Gamma_{\text{total}} \quad \Gamma_{28}/\Gamma$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
$6.41 \pm 0.57^{+2.09}_{-2.71}$	¹ ABLIKIM	14J	BES3 $\psi(2S) \rightarrow \gamma K^+ K^- \eta'(958)$

¹ Normalized to $B(\chi_{c1} \rightarrow K^+ K^- \eta'(958))$ branching fraction.

$$\Gamma(f_0(980)\eta'(958))/\Gamma_{\text{total}} \quad \Gamma_{29}/\Gamma$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
$1.65 \pm 0.47^{+1.32}_{-0.56}$	¹ ABLIKIM	14J	BES3 $\psi(2S) \rightarrow \gamma K^+ K^- \eta'(958)$

¹ Normalized to $B(\chi_{c1} \rightarrow K^+ K^- \eta'(958))$ branching fraction.

$$\Gamma(f_0(1710)\eta'(958))/\Gamma_{\text{total}} \quad \Gamma_{30}/\Gamma$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
$0.71 \pm 0.22^{+0.68}_{-0.48}$	¹ ABLIKIM	14J	BES3 $\psi(2S) \rightarrow \gamma K^+ K^- \eta'(958)$

¹ Normalized to $B(\chi_{c1} \rightarrow K^+ K^- \eta'(958))$ branching fraction.

$$\Gamma(f_2'(1525)\eta'(958))/\Gamma_{\text{total}} \quad \Gamma_{31}/\Gamma$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
$0.92 \pm 0.23^{+0.55}_{-0.51}$	¹ ABLIKIM	14J	BES3 $\psi(2S) \rightarrow \gamma K^+ K^- \eta'(958)$

¹ Normalized to $B(\chi_{c1} \rightarrow K^+ K^- \eta'(958))$ branching fraction.

$$\Gamma(\pi^0 f_0(980) \rightarrow \pi^0 \pi^+ \pi^-)/\Gamma_{\text{total}} \quad \Gamma_{32}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 6 \times 10^{-6}$	90	¹ ABLIKIM	11D	BES3 $\psi(2S) \rightarrow \gamma \pi^0 \pi^+ \pi^-$

¹ ABLIKIM 11D reports $[\Gamma(\chi_{c1}(1P) \rightarrow \pi^0 f_0(980) \rightarrow \pi^0 \pi^+ \pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))] < 6.0 \times 10^{-7}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

$$\Gamma(K^+ \bar{K}^*(892)^0 \pi^- + \text{c.c.})/\Gamma_{\text{total}} \quad \Gamma_{33}/\Gamma$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
32 ± 21	¹ TANENBAUM	78	MRK1 $\psi(2S) \rightarrow \gamma \chi_{c1}$

¹ Estimated using $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 0.087$. The errors do not contain the uncertainty in the $\psi(2S)$ decay.

$$\Gamma(K^*(892)^0 \bar{K}^*(892)^0)/\Gamma_{\text{total}} \quad \Gamma_{34}/\Gamma$$

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$1.47 \pm 0.36 \pm 0.05$	28.4 ± 5.5	^{1,2} ABLIKIM	04H	BES $\psi(2S) \rightarrow \gamma K^+ K^- \pi^+ \pi^-$

¹ ABLIKIM 04H reports $[\Gamma(\chi_{c1}(1P) \rightarrow K^*(892)^0 \bar{K}^*(892)^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))] = (1.40 \pm 0.27 \pm 0.22) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

$\Gamma(K^+ K^- K_S^0 K_S^0)/\Gamma_{\text{total}}$ Γ_{35}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<4	90	3.2 ± 2.4	¹ ABLIKIM	050 BES2	$\psi(2S) \rightarrow \chi_{c1} \gamma$
¹ ABLIKIM 050 reports $[\Gamma(\chi_{c1}(1P) \rightarrow K^+ K^- K_S^0 K_S^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))] < 4.2 \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.					

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

VALUE (units 10^{-3})	DOCUMENT ID
0.55 ± 0.11 OUR FIT	

 $\Gamma(K^+ K^- \phi)/\Gamma_{\text{total}}$ Γ_{37}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$0.42 \pm 0.15 \pm 0.01$	17	¹ ABLIKIM	06T BES2	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$
¹ ABLIKIM 06T reports $(0.46 \pm 0.16 \pm 0.06) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^+ K^- \phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.				

 $\Gamma(\bar{K}^0 K^+ \pi^- \phi + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{38}/Γ

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
$3.27 \pm 0.28 \pm 0.46$	ABLIKIM	15M BES3	$\psi(2S) \rightarrow \gamma \chi_{c1}$

 $\Gamma(K^+ K^- \pi^0 \phi)/\Gamma_{\text{total}}$ Γ_{39}/Γ

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
$1.62 \pm 0.12 \pm 0.28$	ABLIKIM	15M BES3	$\psi(2S) \rightarrow \gamma \chi_{c1}$

 $\Gamma(\phi \pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}$ Γ_{40}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$0.75 \pm 0.06 \pm 0.08$	373	¹ ABLIKIM	13B BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c1}$
¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c1} \gamma) = (9.2 \pm 0.4)\%$.				

 $\Gamma(\omega \omega)/\Gamma_{\text{total}}$ Γ_{41}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$5.8 \pm 0.7 \pm 0.2$	597	¹ ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma \text{ hadrons}$
¹ ABLIKIM 11K reports $(6.0 \pm 0.3 \pm 0.7) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \omega \omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.				

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

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$0.78 \pm 0.04 \pm 0.08$	628	¹ ABLIKIM	13B BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c1}$
¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c1} \gamma) = (9.2 \pm 0.4)\%$.				

$\Gamma(\omega\phi)/\Gamma_{\text{total}}$ Γ_{43}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$0.21 \pm 0.06 \pm 0.01$	15	¹ ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma$ hadrons

¹ ABLIKIM 11K reports $(0.22 \pm 0.06 \pm 0.02) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \omega\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\phi\phi)/\Gamma_{\text{total}}$ Γ_{44}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$4.2 \pm 0.5 \pm 0.1$	366	¹ ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma$ hadrons

¹ ABLIKIM 11K reports $(4.4 \pm 0.3 \pm 0.5) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \phi\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(p\bar{p})/\Gamma_{\text{total}}$ Γ_{45}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
0.772 ± 0.035 OUR FIT	

 $\Gamma(p\bar{p}\pi^0)/\Gamma_{\text{total}}$ Γ_{46}/Γ

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
0.159 ± 0.019 OUR AVERAGE			
$0.166 \pm 0.020 \pm 0.005$	¹ ONYISI	10 CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$
$0.114 \pm 0.048 \pm 0.004$	² ATHAR	07 CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ONYISI 10 reports $(1.75 \pm 0.16 \pm 0.13 \pm 0.11) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p}\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ATHAR 07 reports $(1.2 \pm 0.5 \pm 0.1) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p}\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(p\bar{p}\eta)/\Gamma_{\text{total}}$ Γ_{47}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
$0.148 \pm 0.025 \pm 0.005$		¹ ONYISI	10 CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$

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

<0.15	90	² ATHAR	07 CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$
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¹ ONYISI 10 reports $(1.56 \pm 0.22 \pm 0.14 \pm 0.10) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p}\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$.

$\gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ATHAR 07 reports $< 0.16 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p}\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

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

Γ_{48}/Γ

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
0.216±0.031±0.007	¹ ONYISI	10 CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$

¹ ONYISI 10 reports $(2.28 \pm 0.28 \pm 0.16 \pm 0.14) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p}\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

Γ_{49}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
<1.8	90	¹ ABLIKIM	11F BES3	$\psi(2S) \rightarrow \gamma p\bar{p}K^+K^-$

¹ ABLIKIM 11F reports $< 1.82 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p}\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

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

Γ_{50}/Γ

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
0.50±0.19 OUR EVALUATION	Treating systematic error as correlated.		
0.50±0.19 OUR AVERAGE			
0.46±0.12±0.15	¹ BAI	99B BES	$\psi(2S) \rightarrow \gamma\chi_{c1}$
1.08±0.77±0.05	¹ TANENBAUM	78 MRK1	$\psi(2S) \rightarrow \gamma\chi_{c1}$

¹ Rescaled by us using $B(\psi(2S) \rightarrow \gamma\chi_{c1}) = (8.8 \pm 0.4)\%$ and $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (32.6 \pm 0.5)\%$.

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

Γ_{51}/Γ

VALUE (%)	CL%	DOCUMENT ID	TECN	COMMENT
<0.05	90	¹ HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+h^-h^0h^0$

¹ HE 08B reports $< 0.05\%$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p}\pi^0\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

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

Γ_{52}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
1.30±0.23±0.04	82 ± 9	¹ ABLIKIM	11F BES3	$\psi(2S) \rightarrow \gamma p\bar{p}K^+K^-$

¹ ABLIKIM 11F reports $(1.35 \pm 0.15 \pm 0.19) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p}K^+K^- \text{ (non-resonant)})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\bar{p}K_S^0 K_S^0)/\Gamma_{\text{total}}$ Γ_{53}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<4.5	90	¹ ABLIKIM	06D	BES2 $\psi(2S) \rightarrow \gamma\chi_{c1}$

¹ Using $B(\psi(2S) \rightarrow \chi_{c1}\gamma)$ ($9.1 \pm 0.6\%$).

 $\Gamma(p\bar{n}\pi^-)/\Gamma_{\text{total}}$ Γ_{54}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$3.9 \pm 0.5 \pm 0.1$	1412	¹ ABLIKIM	12J	BES3 $\psi(2S) \rightarrow \gamma p\bar{n}\pi^-$

¹ ABLIKIM 12J reports $[\Gamma(\chi_{c1}(1P) \rightarrow p\bar{n}\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))] = (0.37 \pm 0.02 \pm 0.04) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\bar{p}n\pi^+)/\Gamma_{\text{total}}$ Γ_{55}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$4.0 \pm 0.5 \pm 0.1$	1625	¹ ABLIKIM	12J	BES3 $\psi(2S) \rightarrow \gamma\bar{p}n\pi^+$

¹ ABLIKIM 12J reports $[\Gamma(\chi_{c1}(1P) \rightarrow \bar{p}n\pi^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))] = (0.38 \pm 0.02 \pm 0.04) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(p\bar{n}\pi^- \pi^0)/\Gamma_{\text{total}}$ Γ_{56}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$10.5 \pm 1.2 \pm 0.3$	1082	¹ ABLIKIM	12J	BES3 $\psi(2S) \rightarrow \gamma p\bar{n}\pi^- \pi^0$

¹ ABLIKIM 12J reports $[\Gamma(\chi_{c1}(1P) \rightarrow p\bar{n}\pi^- \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))] = (1.00 \pm 0.05 \pm 0.10) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$10.3 \pm 1.2 \pm 0.3$	1261	¹ ABLIKIM	12J	BES3 $\psi(2S) \rightarrow \gamma\bar{p}n\pi^+ \pi^0$

¹ ABLIKIM 12J reports $[\Gamma(\chi_{c1}(1P) \rightarrow \bar{p}n\pi^+ \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))] = (0.98 \pm 0.05 \pm 0.10) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\Lambda\bar{\Lambda})/\Gamma_{\text{total}}$ Γ_{58}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
1.16 ± 0.12 OUR FIT	

 $\Gamma(\Lambda\bar{\Lambda}\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{59}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$30 \pm 5 \pm 1$		105	¹ ABLIKIM	12i	BES3 $\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}\pi^+\pi^-$

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

<150	90	² ABLIKIM	06D	BES2 $\psi(2S) \rightarrow \gamma\chi_{c1}$
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¹ ABLIKIM 12I reports $(31.1 \pm 3.4 \pm 3.9) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Lambda \bar{\Lambda} \pi^+ \pi^-) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² Using $B(\psi(2S) \rightarrow \chi_{c1} \gamma) (9.1 \pm 0.6)\%$.

$\Gamma(\Lambda \bar{\Lambda} \pi^+ \pi^- (\text{non-resonant})) / \Gamma_{\text{total}}$ Γ_{60} / Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
$25 \pm 6 \pm 1$	13	¹ ABLIKIM 12I	BES3	$\psi(2S) \rightarrow \gamma \Lambda \bar{\Lambda} \pi^+ \pi^-$

¹ ABLIKIM 12I reports $(26.2 \pm 5.5 \pm 3.3) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Lambda \bar{\Lambda} \pi^+ \pi^- (\text{non-resonant})) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Sigma(1385)^+ \bar{\Lambda} \pi^- + \text{c.c.}) / \Gamma_{\text{total}}$ Γ_{61} / Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
< 13	90	¹ ABLIKIM 12I	BES3	$\psi(2S) \rightarrow \gamma \Sigma(1385)^+ \bar{\Lambda} \pi^-$

¹ ABLIKIM 12I reports $< 14 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Sigma(1385)^+ \bar{\Lambda} \pi^- + \text{c.c.}) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

$\Gamma(\Sigma(1385)^- \bar{\Lambda} \pi^+ + \text{c.c.}) / \Gamma_{\text{total}}$ Γ_{62} / Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
< 13	90	¹ ABLIKIM 12I	BES3	$\psi(2S) \rightarrow \gamma \Sigma(1385)^- \bar{\Lambda} \pi^+$

¹ ABLIKIM 12I reports $< 14 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Sigma(1385)^- \bar{\Lambda} \pi^+ + \text{c.c.}) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

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

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
4.2 ± 0.4 OUR AVERAGE	Error includes scale factor of 1.1.			
$4.3 \pm 0.4 \pm 0.1$	3k	^{1,2} ABLIKIM 13D	BES3	$\psi(2S) \rightarrow \gamma \Lambda \bar{p} K^+$
$3.1 \pm 0.9 \pm 0.1$		³ ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ABLIKIM 13D reports $(4.5 \pm 0.2 \pm 0.4) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^+ \bar{p} \Lambda) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

³ ATHAR 07 reports $(3.3 \pm 0.9 \pm 0.4) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^+ \bar{p} \Lambda) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+ \bar{p} \Lambda(1520) + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{64}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$1.7 \pm 0.4 \pm 0.1$	48 ± 10	¹ ABLIKIM	11F BES3	$\psi(2S) \rightarrow \gamma p \bar{p} K^+ K^-$

¹ ABLIKIM 11F reports $(1.81 \pm 0.38 \pm 0.28) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^+ \bar{p} \Lambda(1520) + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\Lambda(1520) \bar{\Lambda}(1520))/\Gamma_{\text{total}}$ Γ_{65}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
< 1.0	90	¹ ABLIKIM	11F BES3	$\psi(2S) \rightarrow \gamma p \bar{p} K^+ K^-$

¹ ABLIKIM 11F reports $< 1.00 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Lambda(1520) \bar{\Lambda}(1520))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

 $\Gamma(\Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}$ Γ_{66}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
< 0.4	90	3.8 ± 2.5	¹ NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$

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

< 0.6	90		² ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$
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¹ NAIK 08 reports $< 0.44 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

² ABLIKIM 13H reports $< 0.62 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

 $\Gamma(\Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}$ Γ_{67}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
< 0.6	90	4.3 ± 2.3	¹ NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$

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

< 0.8	90		² ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$
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¹ NAIK 08 reports $< 0.65 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

² ABLIKIM 13H reports $< 0.87 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

$\Gamma(\Sigma(1385)^+\bar{\Sigma}(1385)^-)/\Gamma_{\text{total}}$ Γ_{68}/Γ

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

¹ ABLIKIM 12I reports $< 10 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Sigma(1385)^+\bar{\Sigma}(1385)^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

 $\Gamma(\Sigma(1385)^-\bar{\Sigma}(1385)^+)/\Gamma_{\text{total}}$ Γ_{69}/Γ

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

¹ ABLIKIM 12I reports $< 5.7 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Sigma(1385)^-\bar{\Sigma}(1385)^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

 $\Gamma(K^- \Lambda \Xi^+ + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{70}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$1.38 \pm 0.24 \pm 0.05$	49	¹ ABLIKIM	15I BES3	$\psi(2S) \rightarrow \gamma K^- \Lambda \Xi^+ + \text{c.c.}$

¹ ABLIKIM 15I reports $[\Gamma(\chi_{c1}(1P) \rightarrow K^- \Lambda \Xi^+ + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ $= (1.32 \pm 0.20 \pm 0.12) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\Xi^0 \Xi^0)/\Gamma_{\text{total}}$ Γ_{71}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<0.6	90	1.7 ± 2.4	¹ NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Xi^0 \Xi^0$

¹ NAIK 08 reports $< 0.60 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Xi^0 \Xi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

 $\Gamma(\Xi^- \Xi^+)/\Gamma_{\text{total}}$ Γ_{72}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$0.82 \pm 0.22 \pm 0.03$	16.4 ± 4.3		¹ NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Xi^+ \Xi^-$

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

< 3.4	90	² ABLIKIM	06D BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$
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¹ NAIK 08 reports $(0.86 \pm 0.22 \pm 0.08) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Xi^- \Xi^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² Using $B(\psi(2S) \rightarrow \chi_{c1} \gamma) (9.1 \pm 0.6)\%$.

$$[\Gamma(\pi^+\pi^-) + \Gamma(K^+K^-)]/\Gamma_{\text{total}} \quad \Gamma_{73}/\Gamma$$

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<21		¹ FELDMAN 77	MRK1	$\psi(2S) \rightarrow \gamma\chi_{c1}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<38	90	¹ BRANDELIK 79B	DASP	$\psi(2S) \rightarrow \gamma\chi_{c1}$
¹ Estimated using $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = 0.087$. The errors do not contain the uncertainty in the $\psi(2S)$ decay.				

$$\Gamma(K_S^0 K_S^0)/\Gamma_{\text{total}} \quad \Gamma_{74}/\Gamma$$

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<0.6	90	¹ ABLIKIM 050	BES2	$\psi(2S) \rightarrow \chi_{c1}\gamma$
¹ ABLIKIM 050 reports $[\Gamma(\chi_{c1}(1P) \rightarrow K_S^0 K_S^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ $< 0.6 \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = 9.55 \times 10^{-2}$.				

$$\Gamma(\eta_c \pi^+ \pi^-)/\Gamma_{\text{total}} \quad \Gamma_{75}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<3.2 $\times 10^{-3}$	90	^{1,2} ABLIKIM 13B	BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c1}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<4.4 $\times 10^{-3}$	90	^{1,3} ABLIKIM 13B	BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c1}$
¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c1}\gamma) = (9.2 \pm 0.4)\%$.				
² Using the $\eta_c \rightarrow K_S^0 K^\pm \pi^\mp$ decays.				
³ Using the $\eta_c \rightarrow K^+ K^- \pi^0$ decays.				

RADIATIVE DECAYS

$$\Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}} \quad \Gamma_{76}/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
0.339 $\pm$ 0.012 OUR FIT			
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.379 $\pm$ 0.008 $\pm$ 0.021	¹ ADAM 05A	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c1}$
¹ Uses $B(\psi(2S) \rightarrow \gamma\chi_{c1} \rightarrow \gamma\gamma J/\psi)$ from ADAM 05A and $B(\psi(2S) \rightarrow \gamma\chi_{c1})$ from ATHAR 04.			

$$\Gamma(\gamma\rho^0)/\Gamma_{\text{total}} \quad \Gamma_{77}/\Gamma$$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
220 $\pm$ 18 OUR AVERAGE				
220 $\pm$ 23 $\pm$ 7	432 $\pm$ 25	¹ ABLIKIM 11E	BES3	$\psi(2S) \rightarrow \gamma\gamma\rho^0$
221 $\pm$ 24 $\pm$ 7	186 $\pm$ 15	² BENNETT 08A	CLEO	$\psi(2S) \rightarrow \gamma\gamma\rho^0$
¹ ABLIKIM 11E reports $(228 \pm 13 \pm 22) \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \gamma\rho^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.				
² BENNETT 08A reports $(243 \pm 19 \pm 22) \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \gamma\rho^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.				

$\Gamma(\gamma\omega)/\Gamma_{\text{total}}$ Γ_{78}/Γ

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
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69 ± 8 OUR AVERAGE

$67 \pm 9 \pm 2$	136 ± 14	¹ ABLIKIM	11E BES3	$\psi(2S) \rightarrow \gamma\gamma\omega$
$76 \pm 17 \pm 2$	39 ± 7	² BENNETT	08A CLEO	$\psi(2S) \rightarrow \gamma\gamma\omega$

¹ ABLIKIM 11E reports $(69.7 \pm 7.2 \pm 6.6) \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \gamma\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² BENNETT 08A reports $(83 \pm 15 \pm 12) \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \gamma\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\gamma\phi)/\Gamma_{\text{total}}$ Γ_{79}/Γ

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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$25 \pm 5 \pm 1$	43 ± 9	¹ ABLIKIM	11E BES3	$\psi(2S) \rightarrow \gamma\gamma\phi$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 24	90	5.2 ± 3.1	² BENNETT	08A CLEO $\psi(2S) \rightarrow \gamma\gamma\phi$
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¹ ABLIKIM 11E reports $(25.8 \pm 5.2 \pm 2.3) \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \gamma\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² BENNETT 08A reports $< 26 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \gamma\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = 9.55 \times 10^{-2}$.

$\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ Γ_{80}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 3.5	90	ECKLUND	08A CLEO	$\psi(2S) \rightarrow \gamma\chi_{c1} \rightarrow 3\gamma$
< 150	90	¹ YAMADA	77 DASP	$e^+e^- \rightarrow 3\gamma$

¹ Estimated using $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = 0.087$. The errors do not contain the uncertainty in the $\psi(2S)$ decay.

$\chi_{c1}(1P)$ CROSS-PARTICLE BRANCHING RATIOS

$\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)$

$\Gamma_{45}/\Gamma \times \Gamma_{133}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10^{-5})	DOCUMENT ID	TECN	COMMENT
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2.14 ± 0.11 OUR FIT

1.1 ± 1.0	¹ BAI	98I BES	$\psi(2S) \rightarrow \gamma\chi_{c1} \rightarrow \gamma p\bar{p}$
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¹ Calculated by us. The value for $B(\chi_{c1} \rightarrow p\bar{p})$ reported in BAI 98I is derived using $B(\psi(2S) \rightarrow \gamma\chi_{c1}) = (8.7 \pm 0.8)\%$ and $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow \Lambda \bar{\Lambda})}{\Gamma_{\text{total}}} \times \frac{\Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))}{\Gamma_{\text{total}}} \frac{\Gamma_{58}/\Gamma \times \Gamma_{133}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}{\Gamma_{133}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
11.1±1.1 OUR FIT				
10.9±1.1 OUR AVERAGE				
11.2±1.0±0.9	136	¹ ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Lambda \bar{\Lambda}$
10.5±1.6±0.6	46 ± 7	² NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Lambda \bar{\Lambda}$

¹ Calculated by us. ABLIKIM 13H reports $B(\chi_{c1} \rightarrow \Lambda \bar{\Lambda}) = (12.2 \pm 1.1 \pm 1.1) \times 10^{-5}$ from a measurement of $B(\chi_{c1} \rightarrow \Lambda \bar{\Lambda}) \times B(\psi(2S) \rightarrow \gamma \chi_{c1})$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}) = (9.2 \pm 0.4)\%$.

² Calculated by us. NAIK 08 reports $B(\chi_{c1} \rightarrow \Lambda \bar{\Lambda}) = (11.6 \pm 1.8 \pm 0.7 \pm 0.7) \times 10^{-5}$ using $B(\psi(2S) \rightarrow \gamma \chi_{c1}) = (9.07 \pm 0.11 \pm 0.54)\%$.

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow \Lambda \bar{\Lambda})}{\Gamma_{\text{total}}} \times \frac{\Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))}{\Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-)} \frac{\Gamma_{58}/\Gamma \times \Gamma_{133}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}{\Gamma_{133}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
3.22±0.31 OUR FIT				
7.1 ^{+2.8}_{-2.4} ±1.3	9.0 ^{+3.5}_{-3.1}	¹ BAI	03E BES	$\psi(2S) \rightarrow \gamma \Lambda \bar{\Lambda}$

¹ BAI 03E reports $[B(\chi_{c1} \rightarrow \Lambda \bar{\Lambda}) B(\psi(2S) \rightarrow \gamma \chi_{c1}) / B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-)] \times [B^2(\Lambda \rightarrow \pi^- p) / B(J/\psi \rightarrow p \bar{p})] = (1.33^{+0.52}_{-0.46} \pm 0.25)\%$. We calculate from this measurement the presented value using $B(\Lambda \rightarrow \pi^- p) = (63.9 \pm 0.5)\%$ and $B(J/\psi \rightarrow p \bar{p}) = (2.17 \pm 0.07) \times 10^{-3}$.

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S))}{\Gamma_{\text{total}}} \times \frac{\Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))}{\Gamma_{\text{total}}} \frac{\Gamma_{76}/\Gamma \times \Gamma_{133}^{\psi(2S)}/\Gamma_{133}^{\psi(2S)}}{\Gamma_{133}^{\psi(2S)}/\Gamma_{133}^{\psi(2S)}}$$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
3.24 ±0.07 OUR FIT				
2.93 ±0.15 OUR AVERAGE		Error includes scale factor of 1.4. See the ideogram below.		
3.377±0.009±0.183	142k	ABLIKIM	120 BES3	$\psi(2S) \rightarrow \gamma \chi_{c1}$
2.81 ±0.05 ±0.23	13k	BAI	04i BES2	$\psi(2S) \rightarrow J/\psi \gamma \gamma$
2.56 ±0.12 ±0.20		GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X$
2.78 ±0.30		¹ OREGLIA	82 CBAL	$\psi(2S) \rightarrow \gamma \chi_{c1}$
2.2 ±0.5		² BRANDELIK	79B DASP	$\psi(2S) \rightarrow \gamma \chi_{c1}$
2.9 ±0.5		² BARTEL	78B CNTR	$\psi(2S) \rightarrow \gamma \chi_{c1}$
5.0 ±1.5		³ BIDDICK	77 CNTR	$e^+ e^- \rightarrow \gamma X$
2.8 ±0.9		¹ WHITAKER	76 MRK1	$e^+ e^-$

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

3.56 ±0.03 ±0.12	24.9k	⁴ MENDEZ	08 CLEO	$\psi(2S) \rightarrow \gamma \chi_{c1}$
3.44 ±0.06 ±0.13	3.7k	⁵ ADAM	05A CLEO	Repl. by MENDEZ 08

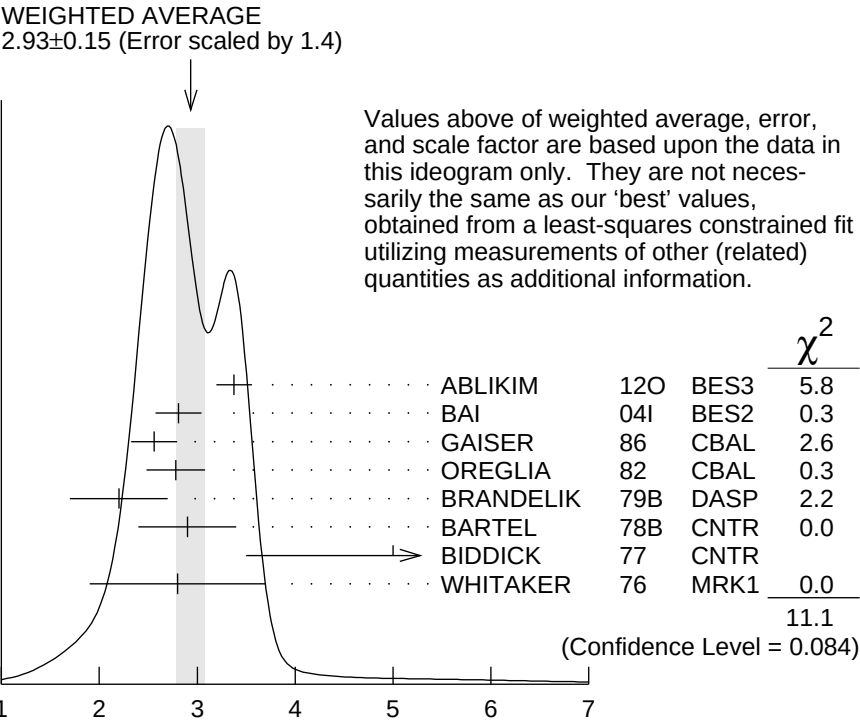
¹ Recalculated by us using $B(J/\psi(1S) \rightarrow \ell^+ \ell^-) = 0.1181 \pm 0.0020$.

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

³ Assumes isotropic gamma distribution.

⁴ Not independent from other measurements of MENDEZ 08.

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



$\Gamma(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))/\Gamma_{\text{total}}$ (units 10^{-2})

$\Gamma(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\text{anything})$
 $\Gamma_{76}/\Gamma \times \Gamma_{133}^{\psi(2S)}/\Gamma_9^{\psi(2S)}$
 $\Gamma_{76}/\Gamma \times \Gamma_{133}^{\psi(2S)}/(\Gamma_{11}^{\psi(2S)} + \Gamma_{12}^{\psi(2S)} + \Gamma_{13}^{\psi(2S)} + 0.339\Gamma_{133}^{\psi(2S)} + 0.192\Gamma_{134}^{\psi(2S)})$

VALUE (units 10 ⁻²)	EVTS	DOCUMENT ID	TECN	COMMENT
5.31±0.11 OUR FIT				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
5.70±0.04±0.15	24.9k	¹ MENDEZ	08	CLEO $\psi(2S) \rightarrow \gamma \chi_{c1}$
5.77±0.10±0.12	3.7k	ADAM	05A	CLEO Repl. by MENDEZ 08
¹ Not independent from other measurements of MENDEZ 08.				

$\Gamma(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)$
 $\Gamma_{76}/\Gamma \times \Gamma_{133}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

VALUE (units 10 ⁻²)	EVTS	DOCUMENT ID	TECN	COMMENT
9.40±0.21 OUR FIT				
10.15±0.28 OUR AVERAGE				
10.17±0.07±0.27	24.9k	MENDEZ	08	CLEO $\psi(2S) \rightarrow \gamma \chi_{c1}$
12.6 ±0.3 ±3.8	3k	¹ ABLIKIM	04B	BES $\psi(2S) \rightarrow J/\psi X$
8.5 ±2.1		² HIMEL	80	MRK2 $\psi(2S) \rightarrow \gamma \chi_{c1}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
10.24±0.17±0.23	3.7k	³ ADAM	05A	CLEO Repl. by MENDEZ 08

¹ From a fit to the J/ψ recoil mass spectra.

² The value for $B(\psi(2S) \rightarrow \gamma\chi_{c1}) \times B(\chi_{c1} \rightarrow \gamma J/\psi(1S))$ quoted 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 $B(J/\psi(1S) \rightarrow \ell^+\ell^-) = 0.1181 \pm 0.0020$.

³ Not independent from other values reported by ADAM 05A.

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma_{\text{total}}}{\Gamma_{17}/\Gamma \times \Gamma_{133}^{\psi(2S)}/\Gamma_{\psi(2S)}}$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
6.8±0.5 OUR FIT			
7.2±0.6 OUR AVERAGE			
7.3±0.5±0.5	¹ ATHAR	07 CLEO	$\psi(2S) \rightarrow \gamma K_S^0 K^+ \pi^-$
7.0±0.5±0.9	² ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma\chi_{c1}$

¹ Calculated by us. The value of $B(\chi_{c1} \rightarrow K_S^0 K^+ \pi^- + \text{c.c.})$ reported by ATHAR 07 was derived using $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54)\%$.

² Calculated by us. ABLIKIM 06R reports $B(\chi_{c1} \rightarrow K_S^0 K^+ \pi^-) = (4.0 \pm 0.3 \pm 0.5) \times 10^{-3}$. We use $B(\psi(2S) \rightarrow \gamma\chi_{c1}) = (8.7 \pm 0.4) \times 10^{-2}$.

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma_{\text{total}}}{\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \times \Gamma_{17}/\Gamma \times \Gamma_{133}^{\psi(2S)}/\Gamma_{\psi(2S)}}$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
19.7±1.6 OUR FIT			
13.2±2.4±3.2	¹ BAI	99B BES	$\psi(2S) \rightarrow \gamma K_S^0 K^+ \pi^-$

¹ Calculated by us. The value of $B(\chi_{c1} \rightarrow K_S^0 K^+ \pi^-)$ reported by BAI 99B was derived using $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (8.7 \pm 0.8)\%$ and $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow K^+ K^- K^+ K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma_{\text{total}}}{\Gamma_{36}/\Gamma \times \Gamma_{133}^{\psi(2S)}/\Gamma_{\psi(2S)}}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
0.52±0.11 OUR FIT				
0.61±0.11±0.08	54	¹ ABLIKIM	06T BES2	$\psi(2S) \rightarrow \gamma K^+ K^+ K^- K^-$

¹ Calculated by us. The value of $B(\chi_{c1} \rightarrow 2K^+ 2K^-)$ reported by ABLIKIM 06T was derived using $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (8.7 \pm 0.8)\%$.

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow K^+ K^- K^+ K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma_{\text{total}}}{\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \times \Gamma_{36}/\Gamma \times \Gamma_{133}^{\psi(2S)}/\Gamma_{\psi(2S)}}$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
1.52±0.31 OUR FIT			
1.13±0.40±0.29	¹ BAI	99B BES	$\psi(2S) \rightarrow \gamma K^+ K^+ K^- K^-$

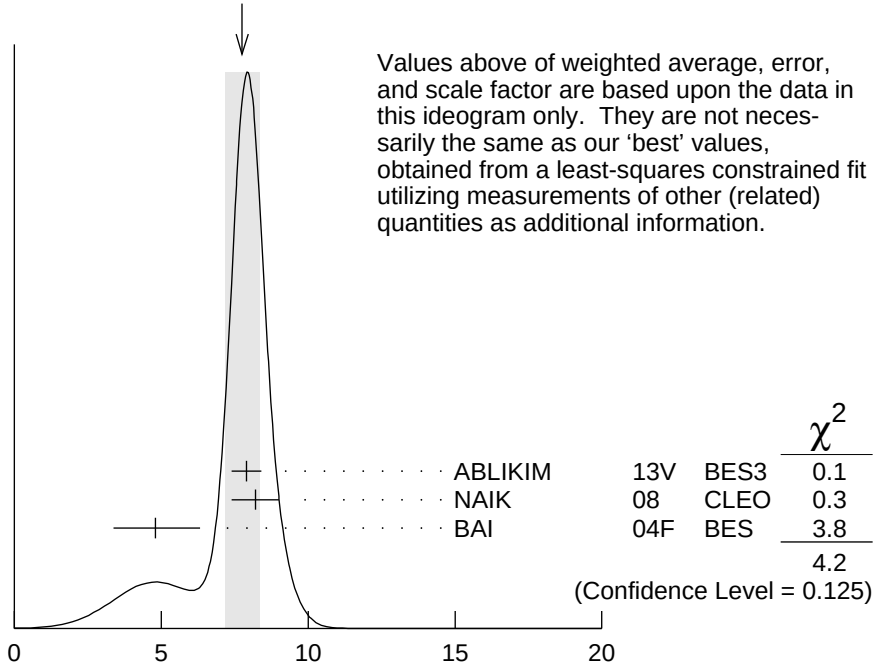
¹ Calculated by us. The value of $B(\chi_{c1} \rightarrow 2K^+ 2K^-)$ reported by BAI 99B was derived using $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (8.7 \pm 0.8)\%$ and $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$$\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma_{\text{total}} \times \Gamma_{45}/\Gamma \times \Gamma_{133}^{\psi(2S)}/\Gamma^{\psi(2S)}$$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
7.4 ± 0.4 OUR FIT				
7.8 ± 0.6 OUR AVERAGE				Error includes scale factor of 1.4. See the ideogram below.
$7.9 \pm 0.4 \pm 0.3$	453	ABLIKIM	13v BES3	$\psi(2S) \rightarrow \gamma p\bar{p}$
$8.2 \pm 0.7 \pm 0.4$	141 ± 13	¹ NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma p\bar{p}$
$4.8^{+1.4}_{-1.3} \pm 0.6$	$18.2^{+5.5}_{-4.9}$	BAI	04F BES	$\psi(2S) \rightarrow \gamma\chi_{c1}(1P) \rightarrow \gamma\bar{p}p$

¹ Calculated by us. NAIK 08 reports $B(\chi_{c1} \rightarrow p\bar{p}) = (9.0 \pm 0.8 \pm 0.4 \pm 0.5) \times 10^{-5}$ using $B(\psi(2S) \rightarrow \gamma\chi_{c1}) = (9.07 \pm 0.11 \pm 0.54)\%$.

WEIGHTED AVERAGE
 7.8 ± 0.6 (Error scaled by 1.4)



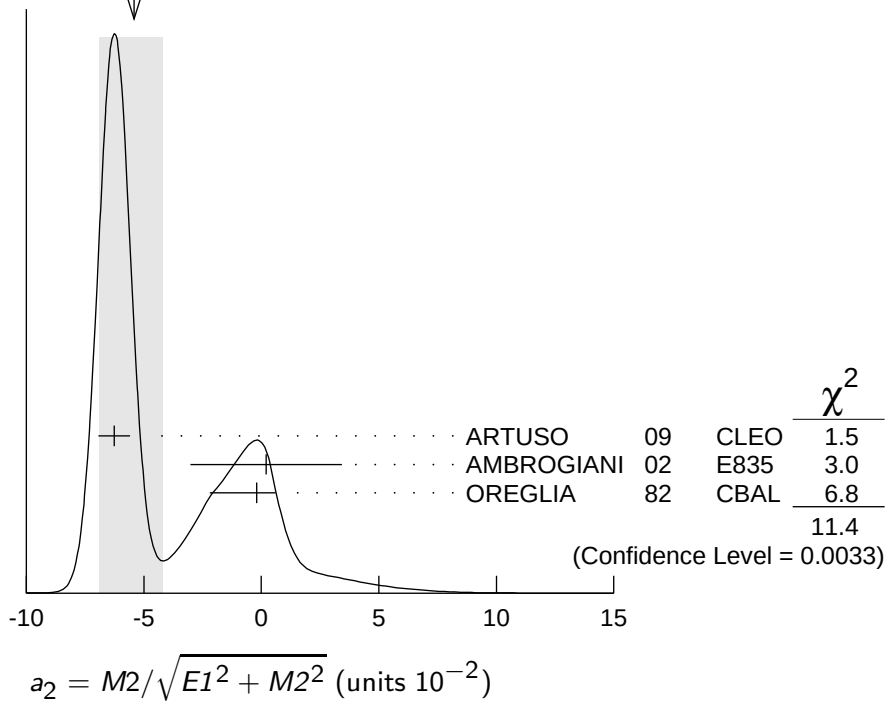
$$\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma_{\text{total}} \text{ (units } 10^{-6}\text{)}$$

MULTIPOLE AMPLITUDES IN $\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S)$

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
$-5.4^{+1.2}_{-1.5}$ OUR AVERAGE				Error includes scale factor of 2.4. See the ideogram below.
$-6.26 \pm 0.63 \pm 0.24$	39k	ARTUSO	09 CLEO	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$
$0.2 \pm 3.2 \pm 0.4$	2090	AMBROGIANI	02 E835	$p\bar{p} \rightarrow \chi_{c1} \rightarrow J/\psi\gamma$
$-0.2^{+0.8}_{-2.0}$	921	OREGLIA	82 CBAL	$\psi(2S) \rightarrow \chi_{c1}\gamma \rightarrow J/\psi\gamma\gamma$

WEIGHTED AVERAGE
 $-5.4 \pm 1.2 - 1.5$ (Error scaled by 2.4)



MULTIPOLE AMPLITUDES IN $\psi(2S) \rightarrow \gamma\chi_{c1}(1S)$ RADIATIVE DECAY

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

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
2.9 ± 0.8 OUR AVERAGE				
$2.76 \pm 0.73 \pm 0.23$	39k	ARTUSO	09	CLEO $\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$
$7.7^{+5.0}_{-4.5}$	921	OREGLIA	82	CBAL $\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$

MULTIPOLE AMPLITUDE RATIOS IN RADIATIVE DECAYS

$\psi(2S) \rightarrow \gamma\chi_{c1}(1S)$ and $\chi_{c1} \rightarrow \gamma J/\psi(1S)$

a_2/b_2 Magnetic quadrupole transition amplitude ratio

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
$-2.27^{+0.57}_{-0.99}$	39k	¹ ARTUSO	09	CLEO $\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$

¹ Statistical and systematic errors combined. Not independent of $a_2(\chi_{c1})$ and $b_2(\chi_{c1})$ values from ARTUSO 09.

$\chi_{c1}(1P)$ REFERENCES

ABLIKIM	15I	PR D91 092006	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	15M	PR D91 112008	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	14J	PR D89 074030	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	13B	PR D87 012002	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	13D	PR D87 012007	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	13H	PR D87 032007	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	13V	PR D88 112001	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	12I	PR D86 052004	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	12J	PR D86 052011	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	12O	PRL 109 172002	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	11A	PR D83 012006	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	11D	PR D83 032003	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	11E	PR D83 112005	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	11F	PR D83 112009	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	11K	PRL 107 092001	M. Ablikim <i>et al.</i>	(BES III Collab.)
ONYISI	10	PR D82 011103	P.U.E. Onyisi <i>et al.</i>	(CLEO Collab.)
ARTUSO	09	PR D80 112003	M. Artuso <i>et al.</i>	(CLEO 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.)
ATHAR	07	PR D75 032002	S.B. Athar <i>et al.</i>	(CLEO Collab.)
ABLIKIM	06D	PR D73 052006	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06R	PR D74 072001	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06T	PL B642 197	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	05G	PR D71 092002	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	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.)
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.)
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	03E	PR D67 112001	J.Z. Bai <i>et al.</i>	(BES Collab.)
AMBROGIANI	02	PR D65 052002	M. Ambrogiani <i>et al.</i>	(FNAL E835 Collab.)
BAI	99B	PR D60 072001	J.Z. Bai <i>et al.</i>	(BES Collab.)
BAI	98D	PR D58 092006	J.Z. Bai <i>et al.</i>	(BES Collab.)
BAI	98I	PRL 81 3091	J.Z. Bai <i>et al.</i>	(BES Collab.)
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	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.)
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)
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+)
FELDMAN	77	PRPL 33C 285	G.J. Feldman, M.L. Perl	(LBL, SLAC)
YAMADA	77	Hamburg Conf. 69	S. Yamada	(DASP Collab.)
WHITAKER	76	PRL 37 1596	J.S. Whitaker <i>et al.</i>	(SLAC, LBL)
TANENBAUM	75	PRL 35 1323	W.M. Tanenbaum <i>et al.</i>	(LBL, SLAC)