$\chi_{c1}(1P)$

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

See the Review on "Branching Ratios of $\psi(2S)$, $\chi_{c0,1,2}$ and $\eta_c(1S)$"
before the $\chi_{c0}(1P)$ Listings.

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

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
3510.67 ± 0.05 OUR AVERAGE		Error includes scale factor of 1.2.		
3509.84 ± 0.69 ±0.64	2.8k	AAIJ	23AH LHCB	$B^+ \to K^+(K^0_S K \pi)$
3508.4 ± 1.9 ±0.7	460	[1] AAIJ	17BB LHCB	$pp \to b\bar{b}X \to 2(K^+K^-)X$
3510.71 ± 0.04 ±0.09	4.8k	[2] AAIJ	17BI LHCB	$\chi_{c1} \to J/\psi \mu^+ \mu^-$
3510.30 ± 0.14 ±0.16		ABLIKIM	05G BES2	$\psi(2S) \to \gamma \chi_{c1}$
3510.719± 0.051±0.019		ANDREOTTI	05A E835	$p\bar{p} \to e^+ e^- \gamma$
3509.4 ± 0.9		BAI	99B BES	$\psi(2S) \to \gamma X$
3510.60 ± 0.087±0.019	513	[3] ARMSTRONG	92 E760	$\bar{p}p \to e^+ e^- \gamma$
3511.3 ± 0.4 ±0.4	30	BAGLIN	86B SPEC	$\bar{p}p \to e^+ e^- X$
3512.3 ± 0.3 ±4.0		[4] GAISER	86 CBAL	$\psi(2S) \to \gamma X$
3507.4 ± 1.7	91	[5] LEMOIGNE	82 GOLI	$185 \pi^- Be \to \gamma \mu^+ \mu^- A$
3510.4 ± 0.6		OREGLIA	82 CBAL	$e^+ e^- \to J/\psi 2\gamma$
3510.1 ± 1.1	254	[6] HIMEL	80 MRK2	$e^+ e^- \to J/\psi 2\gamma$
3509 ±11	21	BRANDELIK	79B DASP	$e^+ e^- \to J/\psi 2\gamma$
3507 ± 3		[6] BARTEL	78B CNTR	$e^+ e^- \to J/\psi 2\gamma$
3505.0 ± 4 ±4		[6,7] TANENBAUM	78 MRK1	$e^+ e^-$
3513 ± 7	367	[6] BIDDICK	77 CNTR	$\psi(2S) \to \gamma X$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3500 ±10	40	TANENBAUM	75 MRK1	Hadrons γ

[1] From a fit of the $\phi\phi$ invariant mass with the width of $\chi_{c1}(1P)$ fixed to the PDG 16 value.

[2] AAIJ 17BI reports also m(χ_{c2}) − m(χ_{c1}) = 45.39 ± 0.07 ± 0.03 MeV.

[3] Recalculated by ANDREOTTI 05A, using the value of $\psi(2S)$ mass from AULCHENKO 03.

[4] Using mass of $\psi(2S)$ = 3686.0 MeV.

[5] $J/\psi(1S)$ mass constrained to 3097 MeV.

[6] Mass value shifted by us by amount appropriate for $\psi(2S)$ mass = 3686 MeV and $J/\psi(1S)$ mass = 3097 MeV.

[7] From a simultaneous fit to radiative and hadronic decay channels.

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

VALUE (MeV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
0.84 ±0.04 OUR FIT			Error includes scale factor of 1.1.		
0.88 ±0.05 OUR AVERAGE					
$1.39^{+0.40}_{-0.38}{}^{+0.26}_{-0.77}$			ABLIKIM	05G BES2	$\psi(2S) \to \gamma \chi_{c1}$
0.876±0.045±0.026			ANDREOTTI	05A E835	$p\bar{p} \to e^+ e^- \gamma$
0.87 ±0.11 ±0.08		513	[1] ARMSTRONG 92	E760	$\bar{p}p \to e^+ e^- \gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					

| <1.3 | 95 | BAGLIN | 86B | SPEC | $\overline{p}p \to e^+e^- X$ |
| <3.8 | 90 | GAISER | 86 | CBAL | $\psi(2S) \to \gamma X$ |

^{1} Recalculated by ANDREOTTI 05A.

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

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	hadrons		
Γ_2	e^+e^-	$(1.4\ ^{+1.5}_{-1.0}\ )\times 10^{-7}$	

Hadronic decays

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_3	$3(\pi^+\pi^-)$	$(1.04\pm0.16)\ \%$	S=4.6
Γ_4	$2(\pi^+\pi^-)$	$(7.6\ \pm2.6\ )\times 10^{-3}$	
Γ_5	$\pi^+\pi^-\pi^0\pi^0$	$(1.19\pm0.15)\ \%$	
Γ_6	$\rho^+\pi^-\pi^0+$ c.c.	$(1.45\pm0.24)\ \%$	
Γ_7	$\rho^0\pi^+\pi^-$	$(3.9\ \pm3.5\ )\times 10^{-3}$	
Γ_8	$4\pi^0$	$(5.4\ \pm0.8\ )\times 10^{-4}$	
Γ_9	$\pi^+\pi^- K^+ K^-$	$(4.5\ \pm1.0\ )\times 10^{-3}$	
Γ_{10}	$K^+ K^-\pi^0\pi^0$	$(1.12\pm0.27)\times 10^{-3}$	
Γ_{11}	$K^+ K^-\pi^+\pi^-\pi^0$	$(1.15\pm0.13)\ \%$	
Γ_{12}	$K^0_S K^\pm\pi^\mp\pi^+\pi^-$	$(7.5\ \pm0.8\ )\times 10^{-3}$	
Γ_{13}	$K^+\pi^-\overline{K}^0\pi^0+$ c.c.	$(8.6\ \pm1.4\ )\times 10^{-3}$	
Γ_{14}	$\rho^- K^+\overline{K}^0+$ c.c.	$(5.0\ \pm1.2\ )\times 10^{-3}$	
Γ_{15}	$K^*(892)^0\overline{K}^0\pi^0 \to$ $K^+\pi^-\overline{K}^0\pi^0+$ c.c.	$(2.3\ \pm0.6\ )\times 10^{-3}$	
Γ_{16}	$K^+ K^-\eta\pi^0$	$(1.12\pm0.34)\times 10^{-3}$	
Γ_{17}	$\pi^+\pi^- K^0_S K^0_S$	$(6.9\ \pm2.9\ )\times 10^{-4}$	
Γ_{18}	$K^+ K^-\eta$	$(3.2\ \pm1.0\ )\times 10^{-4}$	
Γ_{19}	$\overline{K}^0 K^+\pi^-+$ c.c.	$(7.0\ \pm0.6\ )\times 10^{-3}$	S=1.1
Γ_{20}	$K^*(892)^0\overline{K}^0+$ c.c.	$(1.03\pm0.15)\times 10^{-3}$	
Γ_{21}	$K^*(892)^+ K^-+$ c.c.	$(1.21\pm0.23)\times 10^{-3}$	
Γ_{22}	$K^*_J(1430)^0\overline{K}^0+$ c.c. $\to$ $K^0_S K^+\pi^-+$ c.c.	$<\ 8\qquad\ \times 10^{-4}$	CL=90%
Γ_{23}	$K^*_J(1430)^+ K^-+$ c.c. $\to$ $K^0_S K^+\pi^-+$ c.c.	$<\ 2.1\qquad\ \times 10^{-3}$	CL=90%
Γ_{24}	$K^+ K^-\pi^0$	$(1.81\pm0.24)\times 10^{-3}$	
Γ_{25}	$\eta\pi^+\pi^-$	$(4.62\pm0.24)\times 10^{-3}$	
Γ_{26}	$a_0(980)^+\pi^-+$ c.c. $\to \eta\pi^+\pi^-$	$(3.2\ \pm0.4\ )\times 10^{-3}$	S=2.1
Γ_{27}	$a_2(1320)^+\pi^-+$ c.c. $\to \eta\pi^+\pi^-$	$(1.76\pm0.24)\times 10^{-4}$	
Γ_{28}	$a_2(1700)^+\pi^-+$ c.c. $\to \eta\pi^+\pi^-$	$(4.6\ \pm0.7\ )\times 10^{-5}$	
Γ_{29}	$f_2(1270)\eta \to \eta\pi^+\pi^-$	$(3.5\ \pm0.6\ )\times 10^{-4}$	
Γ_{30}	$f_4(2050)\eta \to \eta\pi^+\pi^-$	$(2.5\ \pm0.9\ )\times 10^{-5}$	
Γ_{31}	$\pi_1(1400)^+\pi^-+$ c.c. $\to \eta\pi^+\pi^-$	$<\ 5\qquad\ \times 10^{-5}$	CL=90%

Γ_{32}	$\pi_1(1600)^+\pi^- + $ c.c. $\to~\eta\pi^+\pi^-$	$<~1.5$	$\times 10^{-5}$	CL=90%
Γ_{33}	$\pi_1(2015)^+\pi^- + $ c.c. $\to~\eta\pi^+\pi^-$	$<~8$	$\times 10^{-6}$	CL=90%
Γ_{34}	$f_2(1270)\eta$	$(~6.7~\pm 1.1~)\times 10^{-4}$		
Γ_{35}	$\pi^+\pi^-\eta'$	$(~2.2~\pm 0.4~)\times 10^{-3}$		
Γ_{36}	$K^+K^-\eta'(958)$	$(~8.8~\pm 0.9~)\times 10^{-4}$		
Γ_{37}	$K_0^*(1430)^+K^- + $ c.c.	$(~6.4~{}^{+2.2}_{-2.8})\times 10^{-4}$		
Γ_{38}	$f_0(980)\eta'(958)$	$(~1.6~{}^{+1.4}_{-0.7})\times 10^{-4}$		
Γ_{39}	$f_0(1710)\eta'(958)$	$(~7~{}^{+7}_{-5}~)\times 10^{-5}$		
Γ_{40}	$f_2'(1525)\eta'(958)$	$(~9~\pm 6~)\times 10^{-5}$		
Γ_{41}	$K_2^*(1430)^+K^- + $ c.c.	$(~1.61\pm 0.31)\times 10^{-3}$		
Γ_{42}	$K_2^*(1430)\overline{K}^0 + $ c.c.	$(~1.17\pm 0.20)\times 10^{-3}$		
Γ_{43}	$\pi^0 f_0(980) \to~\pi^0\pi^+\pi^-$	$(~3.5~\pm 0.9~)\times 10^{-7}$		
Γ_{44}	$K^+\overline{K}^*(892)^0\pi^- + $ c.c.	$(~3.2~\pm 2.1~)\times 10^{-3}$		
Γ_{45}	$K^*(892)^0\overline{K}^*(892)^0$	$(~1.4~\pm 0.4~)\times 10^{-3}$		
Γ_{46}	$K^+K^-K_S^0K_S^0$	$<~4$	$\times 10^{-4}$	CL=90%
Γ_{47}	$K_S^0K_S^0K_S^0K_S^0$	$(~3.5~\pm 1.0~)\times 10^{-5}$		
Γ_{48}	$K^+K^-K^+K^-$	$(~5.4~\pm 1.1~)\times 10^{-4}$		
Γ_{49}	$K^+K^-\phi$	$(~4.1~\pm 1.5~)\times 10^{-4}$		
Γ_{50}	$\overline{K}^0 K^+\pi^-\phi + $ c.c.	$(~3.3~\pm 0.5~)\times 10^{-3}$		
Γ_{51}	$K^+K^-\pi^0\phi$	$(~1.62\pm 0.30)\times 10^{-3}$		
Γ_{52}	$\phi\pi^+\pi^-\pi^0$	$(~7.5~\pm 1.0~)\times 10^{-4}$		
Γ_{53}	$\omega\omega$	$(~5.7~\pm 0.7~)\times 10^{-4}$		
Γ_{54}	ωK^+K^-	$(~7.8~\pm 0.9~)\times 10^{-4}$		
Γ_{55}	$\omega\phi$	$(~2.7~\pm 0.4~)\times 10^{-5}$		
Γ_{56}	$\phi\phi$	$(~4.26\pm 0.21)\times 10^{-4}$		
Γ_{57}	$\phi\phi\eta$	$(~3.0~\pm 0.5~)\times 10^{-4}$		
Γ_{58}	$p\overline{p}$	$(~7.6~\pm 0.4~)\times 10^{-5}$		S=1.2
Γ_{59}	$p\overline{p}\pi^0$	$(~1.55\pm 0.18)\times 10^{-4}$		
Γ_{60}	$p\overline{p}\eta$	$(~1.45\pm 0.25)\times 10^{-4}$		
Γ_{61}	$p\overline{p}\omega$	$(~2.12\pm 0.31)\times 10^{-4}$		
Γ_{62}	$p\overline{p}\phi$	$<~1.7$	$\times 10^{-5}$	CL=90%
Γ_{63}	$p\overline{p}\pi^+\pi^-$	$(~5.0~\pm 1.9~)\times 10^{-4}$		
Γ_{64}	$p\overline{p}\pi^0\pi^0$	$<~5$	$\times 10^{-4}$	CL=90%
Γ_{65}	$p\overline{p}K^+K^-$ (non-resonant)	$(~1.27\pm 0.22)\times 10^{-4}$		
Γ_{66}	$p\overline{p}K_S^0K_S^0$	$<~4.5$	$\times 10^{-4}$	CL=90%
Γ_{67}	$p\overline{n}\pi^-$	$(~3.8~\pm 0.5~)\times 10^{-4}$		
Γ_{68}	$\overline{p}n\pi^+$	$(~3.9~\pm 0.5~)\times 10^{-4}$		
Γ_{69}	$p\overline{n}\pi^-\pi^0$	$(~1.03\pm 0.12)\times 10^{-3}$		
Γ_{70}	$\overline{p}n\pi^+\pi^0$	$(~1.01\pm 0.12)\times 10^{-3}$		
Γ_{71}	$\Lambda\overline{\Lambda}$	$(~1.27\pm 0.09)\times 10^{-4}$		S=1.1
Γ_{72}	$\Lambda\overline{\Lambda}\pi^+\pi^-$	$(~2.9~\pm 0.5~)\times 10^{-4}$		
Γ_{73}	$\Lambda\overline{\Lambda}\pi^+\pi^-$ (non-resonant)	$(~2.5~\pm 0.6~)\times 10^{-4}$		

Γ_{74}	$\Sigma(1385)^+ \overline{\Lambda}\pi^- +$ c.c.	$<\ 1.3$	$\times 10^{-4}$	CL=90%
Γ_{75}	$\Sigma(1385)^- \overline{\Lambda}\pi^+ +$ c.c.	$<\ 1.3$	$\times 10^{-4}$	CL=90%
Γ_{76}	$\Lambda \overline{\Lambda}\eta$	$(\ 5.9\ \pm 1.5\ ) \times 10^{-5}$		
Γ_{77}	$K^+ \overline{p}\Lambda +$c.c.	$(\ 4.2\ \pm 0.4\ ) \times 10^{-4}$		S=1.2
Γ_{78}	$n K^0_S \overline{\Lambda} +$ c.c.	$(\ 1.66\pm 0.17) \times 10^{-4}$		
Γ_{79}	$K^*(892)^+ \overline{p}\Lambda +$ c.c.	$(\ 4.9\ \pm 0.7\ ) \times 10^{-4}$		
Γ_{80}	$K^+ \overline{p}\Lambda(1520) +$ c.c.	$(\ 1.7\ \pm 0.4\ ) \times 10^{-4}$		
Γ_{81}	$\Lambda(1520)\overline{\Lambda}(1520)$	$<\ 9$	$\times 10^{-5}$	CL=90%
Γ_{82}	$\Sigma^0 \overline{\Sigma}^0$	$(\ 4.2\ \pm 0.6\ ) \times 10^{-5}$		
Γ_{83}	$\Sigma^+ \overline{p} K^0_S +$ c.c.	$(\ 1.53\pm 0.12) \times 10^{-4}$		
Γ_{84}	$\Sigma^0 \overline{p} K^+ +$ c.c.	$(\ 1.46\pm 0.10) \times 10^{-4}$		
Γ_{85}	$\Sigma^+ \overline{\Sigma}^-$	$(\ 3.6\ \pm 0.7\ ) \times 10^{-5}$		
Γ_{86}	$\Sigma^- \overline{\Sigma}^+$	$(\ 5.7\ \pm 1.5\ ) \times 10^{-5}$		
Γ_{87}	$\Sigma(1385)^+ \overline{\Sigma}(1385)^-$	$<\ 9$	$\times 10^{-5}$	CL=90%
Γ_{88}	$\Sigma(1385)^- \overline{\Sigma}(1385)^+$	$<\ 5$	$\times 10^{-5}$	CL=90%
Γ_{89}	$K^- \Lambda \overline{\Xi}^+ +$ c.c.	$(\ 1.35\pm 0.24) \times 10^{-4}$		
Γ_{90}	$\Xi^0 \overline{\Xi}^0$	$(\ 7.5\ \pm 1.3\ ) \times 10^{-5}$		
Γ_{91}	$\Xi^- \overline{\Xi}^+$	$(\ 6.0\ \pm 0.6\ ) \times 10^{-5}$		
Γ_{92}	$\Omega^- \overline{\Omega}^+$	$(\ 1.49\pm 0.25) \times 10^{-5}$		
Γ_{93}	$\pi^+ \pi^- +\ K^+ K^-$	$<\ 2.1$	$\times 10^{-3}$	
Γ_{94}	$K^0_S K^0_S$	$<\ 6$	$\times 10^{-5}$	CL=90%
Γ_{95}	$\eta_c \pi^+ \pi^-$	$<\ 3.2$	$\times 10^{-3}$	CL=90%

Radiative decays

Γ_{96}	$\gamma J/\psi(1S)$	$(34.3\ \pm 1.3\ )\ \%$		S=1.3
Γ_{97}	$\gamma \rho^0$	$(\ 2.16\pm 0.17) \times 10^{-4}$		
Γ_{98}	$\gamma \omega$	$(\ 6.8\ \pm 0.8\ ) \times 10^{-5}$		
Γ_{99}	$\gamma \phi$	$(\ 2.4\ \pm 0.5\ ) \times 10^{-5}$		
Γ_{100}	$\gamma \gamma$	$<\ 6.3$	$\times 10^{-6}$	CL=90%
Γ_{101}	$e^+ e^- J/\psi(1S)$	$(\ 3.46\pm 0.24) \times 10^{-3}$		
Γ_{102}	$\mu^+ \mu^- J/\psi(1S)$	$(\ 2.33\pm 0.29) \times 10^{-4}$		

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 86 branching ratios uses 253 measurements to determine 49 parameters. The overall fit has a $\chi^2 = 389.6$ for 204 degrees of freedom.

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

x_{48}	4				
x_{58}	−1	0			
x_{71}	12	5	−1		
x_{96}	20	9	−25	23	
Γ	−9	−4	−60	−11	−31
	x_{19}	x_{48}	x_{58}	x_{71}	x_{96}

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

$\Gamma(e^+ e^-)$ Γ_2

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.12^{+0.13}_{-0.08}}$	250	[1] ABLIKIM	22AF	BES3	$e^+ e^- \to \chi_{c1} \to \gamma J/\psi$

[1] Assuming $\Gamma(\chi_{c1} \to \gamma J/\psi) = 0.28$ MeV.

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

$\Gamma(p\overline{p}) \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$ $\Gamma_{58}\Gamma_{96}/\Gamma$

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	$p\overline{p} \to e^+ e^- \gamma$
21.4±1.5±2.2	[1,2] ARMSTRONG	92	E760	$\overline{p}p \to e^+ e^- \gamma$
$19.9^{+4.4}_{-4.0}$	[1] BAGLIN	86B	SPEC	$\overline{p}p \to e^+ e^- X$

[1] Calculated by us using B$(J/\psi(1S) \to e^+ e^-) = 0.0593 \pm 0.0010$.
[2] Recalculated by ANDREOTTI 05A.

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

——— HADRONIC DECAYS ———

$\Gamma(3(\pi^+ \pi^-))/\Gamma_{\text{total}}$ Γ_3/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
10.4 ±1.6 OUR AVERAGE		Error includes scale factor of 4.6.			
10.92±0.23±0.30	84K	[1] ABLIKIM	22Q	BES3	$\psi(2S) \to \gamma 3(\pi^+ \pi^-)$
5.4 ±0.7 ±0.9		[2] BAI	99B	BES	$\psi(2S) \to \gamma \chi_{c1}$
16.0 ±5.9 ±0.8		[2] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma \chi_{c1}$

[1] ABLIKIM 22Q reports $(1.092 \pm 0.004 \pm 0.035) \times 10^{-2}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to 3(\pi^+\pi^-))/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.24) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

$\Gamma(2(\pi^+\pi^-))/\Gamma_{total}$ Γ_4/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±2.1±2.6		[1] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c1}$
12.5±4.2±0.6		[1] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c1}$

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

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

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.19±0.15±0.03	604.7	[1] HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[1] HE 08B reports $1.28 \pm 0.06 \pm 0.15 \pm 0.08$ % from a measurement of $[\Gamma(\chi_{c1}(1P) \to \pi^+\pi^-\pi^0\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\rho^+\pi^-\pi^0 + c.c.)/\Gamma_{total}$ Γ_6/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.45±0.24±0.04	712.3	[1,2] HE	08B	CLEO	$e^+e^- \to \gamma h^+ h^- h^0 h^0$

[1] HE 08B reports $1.56 \pm 0.13 \pm 0.22 \pm 0.10$ % from a measurement of $[\Gamma(\chi_{c1}(1P) \to \rho^+\pi^-\pi^0 + c.c.)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Calculated by us. We have added the values from HE 08B for $\rho^+\pi^-\pi^0$ and $\rho^-\pi^+\pi^0$ decays assuming uncorrelated statistical and fully correlated systematic uncertainties.

$\Gamma(\rho^0\pi^+\pi^-)/\Gamma_{total}$ Γ_7/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
3.9±3.5	[1] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c1}$

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

$\Gamma(4\pi^0)/\Gamma_{total}$ Γ_8/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
5.4±0.8±0.1	608	[1] ABLIKIM	11A	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c1}$

[1] ABLIKIM 11A reports $(0.57 \pm 0.03 \pm 0.08) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to 4\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\pi^+\pi^- K^+ K^-)/\Gamma_{total}$ Γ_9/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	$\psi(2S) \to \gamma\chi_{c1}$
7.3±3.0±0.4	[1] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c1}$

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

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

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.12±0.27±0.03	45.1	[1] HE	08B	CLEO	$e^+ e^- \to \gamma h^+ h^- h^0 h^0$

[1] HE 08B reports $(0.12 \pm 0.02 \pm 0.02 \pm 0.01) \times 10^{-2}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+ K^- \pi^0 \pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

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

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

$\Gamma(K^0_S K^\pm \pi^\mp \pi^+ \pi^-)/\Gamma_{total}$ Γ_{12}/Γ

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

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

$\Gamma(K^+ \pi^- \overline{K}^0 \pi^0 + \text{c.c.})/\Gamma_{total}$ Γ_{13}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.86±0.13±0.02	141.3	[1] HE	08B	CLEO	$e^+ e^- \to \gamma h^+ h^- h^0 h^0$

[1] HE 08B reports $0.92 \pm 0.09 \pm 0.11 \pm 0.06$ % from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+ \pi^- \overline{K}^0 \pi^0 + \text{c.c.})/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\left(\rho^- K^+ \overline{K}^0 + \text{c.c.}\right)/\Gamma_{\text{total}}$ $\qquad$ Γ_{14}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.50±0.12±0.01	141.3	[1] HE	08B	CLEO	$e^+ e^- \to \gamma h^+ h^- h^0 h^0$

[1] HE 08B reports $0.54 \pm 0.11 \pm 0.07 \pm 0.03$ % from a measurement of $[\Gamma(\chi_{c1}(1P) \to \rho^- K^+ \overline{K}^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\left(K^*(892)^0 \overline{K}^0 \pi^0 \to K^+ \pi^- \overline{K}^0 \pi^0 + \text{c.c.}\right)/\Gamma_{\text{total}}$ $\qquad$ Γ_{15}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.23±0.06±0.01	141.3	[1] HE	08B	CLEO	$e^+ e^- \to \gamma h^+ h^- h^0 h^0$

[1] HE 08B reports $0.25 \pm 0.06 \pm 0.03 \pm 0.02$ % from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^*(892)^0 \overline{K}^0 \pi^0 \to K^+ \pi^- \overline{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\left(K^+ K^- \eta \pi^0\right)/\Gamma_{\text{total}}$ $\qquad$ Γ_{16}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.112±0.034±0.003	141.3	[1] HE	08B	CLEO	$e^+ e^- \to \gamma h^+ h^- h^0 h^0$

[1] HE 08B reports $0.12 \pm 0.03 \pm 0.02 \pm 0.01$ % from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+ K^- \eta \pi^0)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\left(\pi^+ \pi^- K^0_S K^0_S\right)/\Gamma_{\text{total}}$ $\qquad$ Γ_{17}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
6.9±2.9±0.2	19.8 ± 7.7	[1] ABLIKIM	05O	BES2	$\psi(2S) \to \chi_{c1}\gamma$

[1] ABLIKIM 05O reports $[\Gamma(\chi_{c1}(1P) \to \pi^+ \pi^- K^0_S K^0_S)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P))] = (0.67 \pm 0.26 \pm 0.11) \times 10^{-4}$ which we divide by our best value $\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\left(K^+ K^- \eta\right)/\Gamma_{\text{total}}$ $\qquad$ Γ_{18}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
3.2±1.0±0.1	[1] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[1] ATHAR 07 reports $(0.34 \pm 0.10 \pm 0.04) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+ K^- \eta)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P)) = 0.0907 \pm 0.0011 \pm 0.0054$, which we rescale to our best value $\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\left(K^*(892)^0\overline{K}^0 + \text{c.c.}\right)/\Gamma_{\text{total}}$ $\qquad$ Γ_{20}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.03±0.15 OUR AVERAGE					
1.04±0.13±0.10	262	[1] AAIJ	23AH	LHCB	$B^+ \to K^+(K^0_S K\pi)$
0.98±0.37±0.03	22	[2] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[1] AAIJ 23AH reports $(1.04 \pm 0.13 \pm 0.04 \pm 0.09) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^*(892)^0\overline{K}^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\chi_{c1}(1P) \to \overline{K}^0 K^+\pi^- + \text{c.c.})]$ assuming $B(\chi_{c1}(1P) \to \overline{K}^0 K^+\pi^- + \text{c.c.}) = (7.0 \pm 0.6) \times 10^{-3}$.

[2] ABLIKIM 06R reports $(1.1 \pm 0.4 \pm 0.1) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^*(892)^0\overline{K}^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\left(K^*(892)^+ K^- + \text{c.c.}\right)/\Gamma_{\text{total}}$ $\qquad$ Γ_{21}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.21±0.23 OUR AVERAGE					
1.18±0.17±0.17	288	[1] AAIJ	23AH	LHCB	$B^+ \to K^+(K^0_S K\pi)$
1.43±0.65±0.04	27	[2] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[1] AAIJ 23AH reports $(1.18 \pm 0.17 \pm 0.14 \pm 0.10) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^*(892)^+ K^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\chi_{c1}(1P) \to \overline{K}^0 K^+\pi^- + \text{c.c.})]$ assuming $B(\chi_{c1}(1P) \to \overline{K}^0 K^+\pi^- + \text{c.c.}) = (7.0 \pm 0.6) \times 10^{-3}$.

[2] ABLIKIM 06R reports $(1.6 \pm 0.7 \pm 0.2) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^*(892)^+ K^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\left(K^*_J(1430)^0\overline{K}^0 + \text{c.c.} \to K^0_S K^+\pi^- + \text{c.c.}\right)/\Gamma_{\text{total}}$ $\qquad$ Γ_{22}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8 \times 10^{-4}$	90	[1] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[1] ABLIKIM 06R reports $< 0.9 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^*_J(1430)^0\overline{K}^0 + \text{c.c.} \to K^0_S K^+\pi^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma\left(K^*_J(1430)^+ K^- + \text{c.c.} \to K^0_S K^+\pi^- + \text{c.c.}\right)/\Gamma_{\text{total}}$ $\qquad$ Γ_{23}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.1 \times 10^{-3}$	90	[1] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[1] ABLIKIM 06R reports $< 2.4 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^*_J(1430)^+ K^- + \text{c.c.} \to K^0_S K^+\pi^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma\left(K^+ K^- \pi^0\right)/\Gamma_{total}$ $\qquad$ Γ_{24}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
1.81±0.24±0.05	[1] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[1] ATHAR 07 reports $(1.95 \pm 0.16 \pm 0.23) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+ K^- \pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 0.0907 \pm 0.0011 \pm 0.0054$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\left(\eta\pi^+\pi^-\right)/\Gamma_{total}$ $\qquad$ Γ_{25}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
4.62±0.24 OUR AVERAGE					
4.58±0.23±0.13		[1,2] ABLIKIM	17K	BES3	$\psi(2S) \to \gamma\eta\pi^+\pi^-$
4.7 ±0.5 ±0.1		[3] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$
5.3 ±0.9 ±0.1	222	[4] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[1] From an amplitude analysis using an isobar model.

[2] ABLIKIM 17K reports $(4.67 \pm 0.03 \pm 0.23 \pm 0.16) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \eta\pi^+\pi^-)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] ATHAR 07 reports $(5.0 \pm 0.3 \pm 0.5) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \eta\pi^+\pi^-)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 0.0907 \pm 0.0011 \pm 0.0054$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[4] ABLIKIM 06R reports $(5.9 \pm 0.7 \pm 0.8) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \eta\pi^+\pi^-)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\left(a_0(980)^+\pi^- + c.c. \to \eta\pi^+\pi^-\right)/\Gamma_{total}$ $\qquad$ Γ_{26}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
3.2 ±0.4 OUR AVERAGE Error includes scale factor of 2.1.					
3.33±0.19±0.09		[1,2] ABLIKIM	17K	BES3	$\psi(2S) \to \gamma\eta\pi^+\pi^-$
1.79±0.63±0.05	58	[3] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[1] From an amplitude analysis using an isobar model.

[2] ABLIKIM 17K reports $(3.40 \pm 0.03 \pm 0.19 \pm 0.11) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to a_0(980)^+\pi^- + c.c. \to \eta\pi^+\pi^-)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] ABLIKIM 06R reports $(2.0 \pm 0.5 \pm 0.5) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to a_0(980)^+\pi^- + c.c. \to \eta\pi^+\pi^-)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\big(a_2(1320)^+\pi^- + \text{c.c.} \to \eta\pi^+\pi^-\big)/\Gamma_{\text{total}}$ Γ_{27}/Γ

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
0.176±0.023±0.005	[1,2] ABLIKIM	17K BES3	$\psi(2S) \to \gamma\eta\pi^+\pi^-$

[1] From an amplitude analysis using an isobar model.
[2] ABLIKIM 17K reports $(0.18 \pm 0.01 \pm 0.02 \pm 0.01) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to a_2(1320)^+\pi^- + \text{c.c.} \to \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\big(a_2(1700)^+\pi^- + \text{c.c.} \to \eta\pi^+\pi^-\big)/\Gamma_{\text{total}}$ Γ_{28}/Γ

VALUE (units 10^{-5})	DOCUMENT ID	TECN	COMMENT
4.6±0.7±0.1	[1,2] ABLIKIM	17K BES3	$\psi(2S) \to \gamma\eta\pi^+\pi^-$

[1] From an amplitude analysis using an isobar model.
[2] ABLIKIM 17K reports $(4.7 \pm 0.4 \pm 0.6 \pm 0.2) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to a_2(1700)^+\pi^- + \text{c.c.} \to \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\big(f_2(1270)\eta \to \eta\pi^+\pi^-\big)/\Gamma_{\text{total}}$ Γ_{29}/Γ

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
3.5±0.6±0.1	[1,2] ABLIKIM	17K BES3	$\psi(2S) \to \gamma\eta\pi^+\pi^-$

[1] From an amplitude analysis using an isobar model.
[2] ABLIKIM 17K reports $(0.36 \pm 0.01 \pm 0.06 \pm 0.01) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to f_2(1270)\eta \to \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\big(f_4(2050)\eta \to \eta\pi^+\pi^-\big)/\Gamma_{\text{total}}$ Γ_{30}/Γ

VALUE (units 10^{-5})	DOCUMENT ID	TECN	COMMENT
2.5±0.9±0.1	[1,2] ABLIKIM	17K BES3	$\psi(2S) \to \gamma\eta\pi^+\pi^-$

[1] From an amplitude analysis using an isobar model.
[2] ABLIKIM 17K reports $(2.6 \pm 0.4 \pm 0.8 \pm 0.1) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to f_4(2050)\eta \to \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\big(\pi_1(1400)^+\pi^- + \text{c.c.} \to \eta\pi^+\pi^-\big)/\Gamma_{\text{total}}$ Γ_{31}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<5 × 10^{-5}	90	[1,2] ABLIKIM	17K BES3	$\psi(2S) \to \gamma\eta\pi^+\pi^-$

[1] From an amplitude analysis using an isobar model.
[2] ABLIKIM 17K reports $< 4.6 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \pi_1(1400)^+\pi^- + \text{c.c.} \to \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma\left(\pi_1(1600)^+\pi^- + \text{c.c.} \to \eta\pi^+\pi^-\right)/\Gamma_{\text{total}}$ $\qquad$ Γ_{32}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.5 \times 10^{-5}$	90	[1,2] ABLIKIM 17K	BES3	$\psi(2S) \to \gamma\eta\pi^+\pi^-$

[1] From an amplitude analysis using an isobar model.

[2] ABLIKIM 17K reports $< 1.5 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \pi_1(1600)^+\pi^- + \text{c.c.} \to \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma\left(\pi_1(2015)^+\pi^- + \text{c.c.} \to \eta\pi^+\pi^-\right)/\Gamma_{\text{total}}$ $\qquad$ Γ_{33}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<8 \times 10^{-6}$	90	[1,2] ABLIKIM 17K	BES3	$\psi(2S) \to \gamma\eta\pi^+\pi^-$

[1] From an amplitude analysis using an isobar model.

[2] ABLIKIM 17K reports $< 8 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \pi_1(2015)^+\pi^- + \text{c.c.} \to \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma\left(f_2(1270)\eta\right)/\Gamma_{\text{total}}$ $\qquad$ Γ_{34}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
0.67±0.11 OUR AVERAGE				
$0.63\pm0.11\pm0.02$		[1,2] ABLIKIM 17K	BES3	$\psi(2S) \to \gamma\eta\pi^+\pi^-$
$2.7 \pm0.8 \pm0.1$	53	[3] ABLIKIM 06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[1] ABLIKIM 17K reports $(6.4 \pm 1.1) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to f_2(1270)\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] From an amplitude analysis using an isobar model.

[3] ABLIKIM 06R reports $(3.0 \pm 0.7 \pm 0.5) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to f_2(1270)\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\left(\pi^+\pi^-\eta'\right)/\Gamma_{\text{total}}$ $\qquad$ Γ_{35}/Γ

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
2.2±0.4±0.1	[1] ATHAR 07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[1] ATHAR 07 reports $(2.4 \pm 0.4 \pm 0.3) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \pi^+\pi^-\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 0.0907 \pm 0.0011 \pm 0.0054$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+ K^- \eta'(958))/\Gamma_{total}$ $\qquad$ Γ_{36}/Γ

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

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

$\Gamma(K_2^*(1430)^+ K^- + c.c.)/\Gamma_{total}$ $\qquad$ Γ_{41}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.61±0.19±0.24	351	[1] AAIJ	23AH	LHCB	$B^+ \to K^+ (K_S^0 K\pi)$

[1] AAIJ 23AH reports $(1.61 \pm 0.19 \pm 0.19 \pm 0.14) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K_2^*(1430)^+ K^- + c.c.)/\Gamma_{total}] \times [B(\chi_{c1}(1P) \to \overline{K}^0 K^+ \pi^- + c.c.)]$ assuming B($\chi_{c1}(1P) \to \overline{K}^0 K^+ \pi^- + c.c.) = (7.0 \pm 0.6) \times 10^{-3}$.

$\Gamma(K_2^*(1430)\overline{K}^0 + c.c.)/\Gamma_{total}$ $\qquad$ Γ_{42}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.17±0.16±0.11	278	[1] AAIJ	23AH	LHCB	$B^+ \to K^+ (K_S^0 K\pi)$

[1] AAIJ 23AH reports $(1.17 \pm 0.16 \pm 0.05 \pm 0.10) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K_2^*(1430)\overline{K}^0 + c.c.)/\Gamma_{total}] \times [B(\chi_{c1}(1P) \to \overline{K}^0 K^+ \pi^- + c.c.)]$ assuming B($\chi_{c1}(1P) \to \overline{K}^0 K^+ \pi^- + c.c.) = (7.0 \pm 0.6) \times 10^{-3}$.

$\Gamma(K_0^*(1430)^+ K^- + c.c.)/\Gamma_{total}$ $\qquad$ Γ_{37}/Γ

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

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

$\Gamma(f_0(980)\eta'(958))/\Gamma_{total}$ $\qquad$ Γ_{38}/Γ

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

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

$\Gamma(f_0(1710)\eta'(958))/\Gamma_{total}$ $\qquad$ Γ_{39}/Γ

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

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

$\Gamma(f_2'(1525)\eta'(958))/\Gamma_{total}$ $\qquad$ Γ_{40}/Γ

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

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

$\Gamma\big(\pi^0 f_0(980) \to \pi^0 \pi^+ \pi^-\big)/\Gamma_{\text{total}}$ Γ_{43}/Γ

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
0.35±0.09		ABLIKIM	18D	BES3	$\psi(2S) \to \gamma\pi^0\pi^+\pi^-$

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

<6	90	[1] ABLIKIM	11D	BES3	$\psi(2S) \to \gamma\pi^0\pi^+\pi^-$

[1] ABLIKIM 11D reports $[\Gamma\big(\chi_{c1}(1P) \to \pi^0 f_0(980) \to \pi^0\pi^+\pi^-\big)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P))] < 6.0 \times 10^{-7}$ which we divide by our best value $\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma\big(K^+ \overline{K}^*(892)^0 \pi^- + \text{c.c.}\big)/\Gamma_{\text{total}}$ Γ_{44}/Γ

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

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

$\Gamma\big(K^*(892)^0 \overline{K}^*(892)^0\big)/\Gamma_{\text{total}}$ Γ_{45}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.44±0.36±0.04	28.4±5.5	[1,2] ABLIKIM	04H	BES	$\psi(2S) \to \gamma K^+ K^- \pi^+ \pi^-$

[1] ABLIKIM 04H reports $[\Gamma\big(\chi_{c1}(1P) \to K^*(892)^0 \overline{K}^*(892)^0\big)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P))] = (1.40 \pm 0.27 \pm 0.22) \times 10^{-4}$ which we divide by our best value $\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Assumes $\text{B}(K^*(892)^0 \to K^- \pi^+) = 2/3$.

$\Gamma\big(K^+ K^- K_S^0 K_S^0\big)/\Gamma_{\text{total}}$ Γ_{46}/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<4 × 10^{-4}	90	3.2±2.4	[1] ABLIKIM	05O	BES2	$\psi(2S) \to \chi_{c1}\gamma$

[1] ABLIKIM 05O reports $[\Gamma\big(\chi_{c1}(1P) \to K^+ K^- K_S^0 K_S^0\big)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P))] < 4.2 \times 10^{-5}$ which we divide by our best value $\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma\big(K_S^0 K_S^0 K_S^0 K_S^0\big)/\Gamma_{\text{total}}$ Γ_{47}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.35±0.10±0.01	22	[1] ABLIKIM	19AA	BES3	$\psi(2S) \to \gamma 4K_S^0$

[1] Using $\text{B}(K_S^0 \to \pi^+ \pi^-) = (69.20 \pm 0.05)\%$. ABLIKIM 19AA reports $[\Gamma\big(\chi_{c1}(1P) \to K_S^0 K_S^0 K_S^0 K_S^0\big)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P))] = (3.4 \pm 0.9 \pm 0.3) \times 10^{-6}$ which we divide by our best value $\text{B}(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value..

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

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
0.41±0.15±0.01	17	[1] ABLIKIM	06T	BES2	$\psi(2S) \to \gamma 2K^+ 2K^-$

[1] ABLIKIM 06T reports $(0.46 \pm 0.16 \pm 0.06) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+ K^- \phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{K}{}^0 K^+ \pi^- \phi + \text{c.c.})/\Gamma_{total}$ Γ_{50}/Γ

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

$\Gamma(K^+ K^- \pi^0 \phi)/\Gamma_{total}$ Γ_{51}/Γ

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

$\Gamma(\phi\pi^+\pi^-\pi^0)/\Gamma_{total}$ Γ_{52}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
0.75±0.06±0.08	373	[1] ABLIKIM	13B	BES3	$e^+ e^- \to \psi(2S) \to \gamma\chi_{c1}$

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

$\Gamma(\omega\omega)/\Gamma_{total}$ Γ_{53}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
5.7±0.7±0.2	597	[1] ABLIKIM	11K	BES3	$\psi(2S) \to \gamma$ hadrons

[1] ABLIKIM 11K reports $(6.0 \pm 0.3 \pm 0.7) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \omega\omega)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\omega K^+ K^-)/\Gamma_{total}$ Γ_{54}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
0.78±0.04±0.08	628	[1] ABLIKIM	13B	BES3	$e^+ e^- \to \psi(2S) \to \gamma\chi_{c1}$

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

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

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.27±0.04±0.01	105	[1] ABLIKIM	19J	BES3	$\psi(2S) \to \gamma$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.21±0.06±0.01	15	[2,3] ABLIKIM	11K	BES3	$\psi(2S) \to \gamma$ hadrons

[1] ABLIKIM 19J reports $[\Gamma(\chi_{c1}(1P) \to \omega\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))] = (2.67 \pm 0.31 \pm 0.27) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] ABLIKIM 11K reports $(0.22 \pm 0.06 \pm 0.02) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \omega\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] Superseded by ABLIKIM 19J.

$\Gamma(\phi\phi)/\Gamma_{total}$ $\qquad$ Γ_{56}/Γ

VALUE (units 10^{-4})	EVTS		DOCUMENT ID	TECN	COMMENT
4.26±0.17±0.12	1529	[1,2] ABLIKIM	23N	BES3	$\psi(2S) \to \gamma$ hadrons

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

4.2 ±0.5 ±0.1	366	[3] ABLIKIM	11K	BES3	$\psi(2S) \to \gamma$ hadrons

[1] Using B($\phi \to K^+ K^-$) = $(49.2 \pm 0.5) \times 10^{-2}$ from PDG 22.

[2] ABLIKIM 23N reports $(4.26 \pm 0.13 \pm 0.15) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \phi\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.24) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] ABLIKIM 11K reports $(4.4 \pm 0.3 \pm 0.5) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \phi\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\phi\phi\eta)/\Gamma_{total}$ $\qquad$ Γ_{57}/Γ

VALUE (units 10^{-4})	EVTS		DOCUMENT ID	TECN	COMMENT
3.0±0.5±0.1	83.6	[1] ABLIKIM	20B	BES3	$\psi(2S) \to \gamma\phi\phi\eta$

[1] ABLIKIM 20B reports $(2.96 \pm 0.43 \pm 0.22) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \phi\phi\eta)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.24) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\overline{p}\pi^0)/\Gamma_{total}$ $\qquad$ Γ_{59}/Γ

VALUE (units 10^{-3})		DOCUMENT ID	TECN	COMMENT
0.155±0.018 OUR AVERAGE				
0.163±0.019±0.004	[1] ONYISI	10	CLE3	$\psi(2S) \to \gamma p\overline{p}X$
0.112±0.047±0.003	[2] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[1] ONYISI 10 reports $(1.75 \pm 0.16 \pm 0.13 \pm 0.11) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] ATHAR 07 reports $(1.2 \pm 0.5 \pm 0.1) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\overline{p}\eta)/\Gamma_{total}$ $\qquad$ Γ_{60}/Γ

VALUE (units 10^{-3})	CL%		DOCUMENT ID	TECN	COMMENT
0.145±0.024±0.004		[1] ONYISI	10	CLE3	$\psi(2S) \to \gamma p\overline{p}X$

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

<0.15	90	[2] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[1] ONYISI 10 reports $(1.56 \pm 0.22 \pm 0.14 \pm 0.10) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\eta)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] ATHAR 07 reports $< 0.16 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\eta)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma(p\overline{p}\omega)/\Gamma_{total}$ Γ_{61}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.212±0.030±0.006	[1] ONYISI	10	CLE3	$\psi(2S) \to \gamma p\overline{p}X$

[1] ONYISI 10 reports $(2.28 \pm 0.28 \pm 0.16 \pm 0.14) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\omega)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\overline{p}\phi)/\Gamma_{total}$ Γ_{62}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.7 × 10⁻⁵	90	[1] ABLIKIM	11F	BES3	$\psi(2S) \to \gamma p\overline{p}K^+K^-$

[1] ABLIKIM 11F reports $< 1.82 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma(p\overline{p}\pi^+\pi^-)/\Gamma_{total}$ Γ_{63}/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	$\psi(2S) \to \gamma\chi_{c1}$
1.08±0.77±0.05	[1] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c1}$

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

$\Gamma(p\overline{p}\pi^0\pi^0)/\Gamma_{total}$ Γ_{64}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5 × 10⁻⁴	90	[1] HE	08B	CLEO	$e^+e^- \to \gamma h^+h^-h^0h^0$

[1] HE 08B reports $< 0.05 \times 10^{-2}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\pi^0\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma(p\overline{p}K^+K^-(\text{non-resonant}))/\Gamma_{total}$ Γ_{65}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.27±0.22±0.04	82 ± 9	[1] ABLIKIM	11F	BES3	$\psi(2S) \to \gamma p\overline{p}K^+K^-$

[1] ABLIKIM 11F reports $(1.35 \pm 0.15 \pm 0.19) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}K^+K^-$ (non-resonant))$/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\overline{p}K^0_S K^0_S)/\Gamma_{total}$ $\qquad$ Γ_{66}/Γ

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

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

$\Gamma(p\overline{n}\pi^-)/\Gamma_{total}$ $\qquad$ Γ_{67}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
3.8±0.5±0.1	1412	[1] ABLIKIM 12J	BES3	$\psi(2S) \to \gamma p\overline{n}\pi^-$

[1] ABLIKIM 12J reports $[\Gamma(\chi_{c1}(1P) \to p\overline{n}\pi^-)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))] = (0.37 \pm 0.02 \pm 0.04) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{p}n\pi^+)/\Gamma_{total}$ $\qquad$ Γ_{68}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
3.9±0.5±0.1	1625	[1] ABLIKIM 12J	BES3	$\psi(2S) \to \gamma\overline{p}n\pi^+$

[1] ABLIKIM 12J reports $[\Gamma(\chi_{c1}(1P) \to \overline{p}n\pi^+)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))] = (0.38 \pm 0.02 \pm 0.04) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(p\overline{n}\pi^-\pi^0)/\Gamma_{total}$ $\qquad$ Γ_{69}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
10.3±1.1±0.3	1082	[1] ABLIKIM 12J	BES3	$\psi(2S) \to \gamma p\overline{n}\pi^-\pi^0$

[1] ABLIKIM 12J reports $[\Gamma(\chi_{c1}(1P) \to p\overline{n}\pi^-\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))] = (1.00 \pm 0.05 \pm 0.10) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{p}n\pi^+\pi^0)/\Gamma_{total}$ $\qquad$ Γ_{70}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
10.1±1.1±0.3	1261	[1] ABLIKIM 12J	BES3	$\psi(2S) \to \gamma\overline{p}n\pi^+\pi^0$

[1] ABLIKIM 12J reports $[\Gamma(\chi_{c1}(1P) \to \overline{p}n\pi^+\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))] = (0.98 \pm 0.05 \pm 0.10) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Lambda\overline{\Lambda}\pi^+\pi^-)/\Gamma_{total}$ $\qquad$ Γ_{72}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
29±5±1		105	[1] ABLIKIM	12I	BES3	$\psi(2S) \to \gamma\Lambda\overline{\Lambda}\pi^+\pi^-$

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

<150	90		[2] ABLIKIM	06D	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[1] ABLIKIM 12I reports $(31.1 \pm 3.4 \pm 3.9) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Lambda\overline{\Lambda}\pi^+\pi^-)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

$\Gamma(\Lambda\overline{\Lambda}\pi^+\pi^- \text{(non-resonant)})/\Gamma_{total}$ $\qquad$ Γ_{73}/Γ

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

[1] ABLIKIM 12I reports $(26.2 \pm 5.5 \pm 3.3) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Lambda\overline{\Lambda}\pi^+\pi^- \text{(non-resonant)})/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.3 × 10^{-4}	90	[1] ABLIKIM	12I	BES3	$\psi(2S) \to \gamma\Sigma(1385)^+\overline{\Lambda}\pi^-$

[1] ABLIKIM 12I reports $< 14 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Sigma(1385)^+\overline{\Lambda}\pi^- + \text{c.c.})/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma(\Sigma(1385)^-\overline{\Lambda}\pi^+ + \text{c.c.})/\Gamma_{total}$ $\qquad$ Γ_{75}/Γ

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

[1] ABLIKIM 12I reports $< 14 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Sigma(1385)^-\overline{\Lambda}\pi^+ + \text{c.c.})/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma(K^+\overline{p}\Lambda + \text{c.c.})/\Gamma_{total}$ $\qquad$ Γ_{77}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
4.2±0.4 OUR AVERAGE	Error includes scale factor of 1.2.				
$9.2^{+2.8}_{-2.4}\pm0.4$	24	[1] LU	19	BELL	$B^+ \to \overline{p}\Lambda K^+ K^+$
$4.2\pm0.4\pm0.1$	3k	[2,3] ABLIKIM	13D	BES3	$\psi(2S) \to \gamma\Lambda\overline{p}K^+$
$3.1\pm0.9\pm0.1$		[4] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[1] LU 19 reports $(9.15^{+2.63}_{-2.25} \pm 0.86) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+\overline{p}\Lambda+\text{c.c.})/\Gamma_{\text{total}}] \times [B(B^+ \to \chi_{c1}(1P)K^+)]$ assuming $B(B^+ \to \chi_{c1}(1P)K^+)$ $= (4.79 \pm 0.23) \times 10^{-4}$, which we rescale to our best value $B(B^+ \to \chi_{c1}(1P)K^+)$ $= (4.74 \pm 0.22) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] ABLIKIM 13D reports $(4.5 \pm 0.2 \pm 0.4) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+\overline{p}\Lambda+\text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P))$ $= (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) =$ $(9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] Using $B(\Lambda \to p\pi^-) = 63.9\%$.

[4] ATHAR 07 reports $(3.3 \pm 0.9 \pm 0.4) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+\overline{p}\Lambda+\text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) =$ $(9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P))$ $= (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(nK^0_S\overline{\Lambda}+\text{c.c.})/\Gamma_{\text{total}}$ Γ_{78}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.66±0.16±0.05	399	[1] ABLIKIM	21AV	BES3	$\psi(2S) \to \gamma nK^0_S\overline{\Lambda} + \text{c.c.}$

[1] ABLIKIM 21AV reports $(1.66 \pm 0.12 \pm 0.12) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to nK^0_S\overline{\Lambda} + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 0.0975 \pm 0.0024$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Also uses $B(\overline{\Lambda} \to \overline{p}\pi^+) = (63.9 \pm 0.5)\%$ and $B(K^0_S \to \pi^+\pi^-) = (69.20 \pm 0.05)\%$.

$\Gamma(K^*(892)^+\overline{p}\Lambda+\text{c.c.})/\Gamma_{\text{total}}$ Γ_{79}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
4.9±0.7±0.1	328	[1] ABLIKIM	19AU	BES3	$\psi(2S) \to \gamma K^{*+}\overline{p}\Lambda$

[1] ABLIKIM 19AU reports $[\Gamma(\chi_{c1}(1P) \to K^*(892)^+\overline{p}\Lambda+ \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))] = (4.8 \pm 0.5 \pm 0.4) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+\overline{p}\Lambda(1520)+\text{c.c.})/\Gamma_{\text{total}}$ Γ_{80}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.71±0.44±0.05	48 ± 10	[1] ABLIKIM	11F	BES3	$\psi(2S) \to \gamma p\overline{p}K^+K^-$

[1] ABLIKIM 11F reports $(1.81 \pm 0.38 \pm 0.28) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+\overline{p}\Lambda(1520)+ \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\big(\Lambda(1520)\overline{\Lambda}(1520)\big)/\Gamma_{total}$ $\qquad\qquad\qquad\Gamma_{81}/\Gamma$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<9 \times 10^{-5}$	90	[1] ABLIKIM	11F	BES3	$\psi(2S) \to \gamma p\overline{p}K^+K^-$

[1] ABLIKIM 11F reports $< 1.00 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Lambda(1520)\overline{\Lambda}(1520))/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma\big(\Sigma^0\overline{\Sigma}^0\big)/\Gamma_{total}$ $\qquad\qquad\qquad\qquad\qquad\Gamma_{82}/\Gamma$

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$4.2 \pm 0.6 \pm 0.1$		103	[1] ABLIKIM	18V	BES3	$\psi(2S) \to \gamma\Sigma^0\overline{\Sigma}^0$

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

<6	90		[2] ABLIKIM	13H	BES3	$\psi(2S) \to \gamma\Sigma^0\overline{\Sigma}^0$
<4	90	3.8 ± 2.5	[3] NAIK	08	CLEO	$\psi(2S) \to \gamma\Sigma^0\overline{\Sigma}^0$

[1] ABLIKIM 18V reports $[\Gamma(\chi_{c1}(1P) \to \Sigma^0\overline{\Sigma}^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))] = (0.41 \pm 0.05 \pm 0.03) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] ABLIKIM 13H reports $< 0.62 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Sigma^0\overline{\Sigma}^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

[3] NAIK 08 reports $< 0.44 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Sigma^0\overline{\Sigma}^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma\big(\Sigma^+\overline{\Sigma}^-\big)/\Gamma_{total}$ $\qquad\qquad\qquad\qquad\qquad\Gamma_{85}/\Gamma$

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$3.6 \pm 0.6 \pm 0.1$		59	[1] ABLIKIM	18V	BES3	$\psi(2S) \to \gamma\Sigma^+\overline{\Sigma}^-$

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

<8	90		[2] ABLIKIM	13H	BES3	$\psi(2S) \to \gamma\Sigma^+\overline{\Sigma}^-$
<6	90	4.3 ± 2.3	[3] NAIK	08	CLEO	$\psi(2S) \to \gamma\Sigma^+\overline{\Sigma}^-$

[1] ABLIKIM 18V reports $[\Gamma(\chi_{c1}(1P) \to \Sigma^+\overline{\Sigma}^-)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))] = (0.35 \pm 0.06 \pm 0.02) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] ABLIKIM 13H reports $< 0.87 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Sigma^+\overline{\Sigma}^-)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

[3] NAIK 08 reports $< 0.65 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Sigma^+\overline{\Sigma}^-)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma\left(\Sigma^-\,\overline{\Sigma}^+\right)/\Gamma_{total}$ $\qquad$ Γ_{86}/Γ

VALUE (units 10^{-5})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
5.7±1.5±0.2	214	[1] ABLIKIM	20I	BES3	$\psi(2S) \to \gamma\Sigma^-\,\overline{\Sigma}^+$

[1] ABLIKIM 20I reports $(5.7 \pm 1.4 \pm 0.6) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Sigma^-\,\overline{\Sigma}^+)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.24) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\left(\Sigma(1385)^+\,\overline{\Sigma}(1385)^-\right)/\Gamma_{total}$ $\qquad$ Γ_{87}/Γ

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<9 × 10^{-5}	90	[1] ABLIKIM	12I	BES3	$\psi(2S) \to \gamma\Lambda\overline{\Lambda}\pi^+\pi^-$

[1] ABLIKIM 12I reports $< 10 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Sigma(1385)^+\,\overline{\Sigma}(1385)^-)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma\left(\Sigma(1385)^-\,\overline{\Sigma}(1385)^+\right)/\Gamma_{total}$ $\qquad$ Γ_{88}/Γ

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<5 × 10^{-5}	90	[1] ABLIKIM	12I	BES3	$\psi(2S) \to \gamma\Lambda\overline{\Lambda}\pi^+\pi^-$

[1] ABLIKIM 12I reports $< 5.7 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Sigma(1385)^-\,\overline{\Sigma}(1385)^+)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma\left(K^-\,\Lambda\overline{\Xi}^+ + \text{c.c.}\right)/\Gamma_{total}$ $\qquad$ Γ_{89}/Γ

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.35±0.24±0.04	49	[1] ABLIKIM	15I	BES3	$\psi(2S) \to \gamma K^-\,\Lambda\overline{\Xi}^+ + \text{c.c.}$

[1] ABLIKIM 15I reports $[\Gamma(\chi_{c1}(1P) \to K^-\,\Lambda\overline{\Xi}^+ + \text{c.c.})/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))] = (1.32 \pm 0.20 \pm 0.12) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma\left(\Xi^0\,\overline{\Xi}^0\right)/\Gamma_{total}$ $\qquad$ Γ_{90}/Γ

VALUE (units 10^{-5})	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
7.5±1.2±0.2		325	[1] ABLIKIM	22O	BES3	$\psi(2S) \to \gamma\Xi^0\,\overline{\Xi}^0$

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

<6	90	1.7 ± 2.4	[2] NAIK	08	CLEO	$\psi(2S) \to \gamma\Xi^0\,\overline{\Xi}^0$

[1] ABLIKIM 22O reports $(0.75 \pm 0.11 \pm 0.06) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Xi^0\,\overline{\Xi}^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.24) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] NAIK 08 reports $< 0.60 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Xi^0\,\overline{\Xi}^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma\left(\Xi^-\overline{\Xi}^+\right)/\Gamma_{total}$ $\qquad\qquad$ Γ_{91}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.60±0.06 OUR AVERAGE						
0.58±0.06±0.02		692	[1] ABLIKIM	22O	BES3	$\psi(2S)\to\gamma\Xi^-\overline{\Xi}^+$
0.80±0.21±0.02		16.4±4.3	[2] NAIK	08	CLEO	$\psi(2S)\to\gamma\Xi^+\overline{\Xi}^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 3.4	90		[3] ABLIKIM	06D	BES2	$\psi(2S)\to\gamma\chi_{c1}$

[1] ABLIKIM 22O reports $(0.58\pm0.04\pm0.05)\times10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P)\to\Xi^-\overline{\Xi}^+)/\Gamma_{total}]\times[B(\psi(2S)\to\gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S)\to\gamma\chi_{c1}(1P))=(9.75\pm0.24)\times10^{-2}$, which we rescale to our best value $B(\psi(2S)\to\gamma\chi_{c1}(1P))=(9.75\pm0.27)\times10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] NAIK 08 reports $(0.86\pm0.22\pm0.08)\times10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P)\to\Xi^-\overline{\Xi}^+)/\Gamma_{total}]\times[B(\psi(2S)\to\gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S)\to\gamma\chi_{c1}(1P))=(9.07\pm0.11\pm0.54)\times10^{-2}$, which we rescale to our best value $B(\psi(2S)\to\gamma\chi_{c1}(1P))=(9.75\pm0.27)\times10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] Using $B(\psi(2S)\to\chi_{c1}\gamma)$ $(9.1\pm0.6)\%$.

$\Gamma\left(\Omega^-\overline{\Omega}^+\right)/\Gamma_{total}$ $\qquad\qquad$ Γ_{92}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
1.49±0.23±0.10	277	ABLIKIM	23T	BES3	$\chi_{cJ}\to\Omega^-\overline{\Omega}^+$

$\left[\Gamma\left(\pi^+\pi^-\right)+\Gamma\left(K^+K^-\right)\right]/\Gamma_{total}$ $\qquad\qquad$ Γ_{93}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<21 × 10⁻⁴		[1] FELDMAN	77	MRK1	$\psi(2S)\to\gamma\chi_{c1}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<38 × 10⁻⁴	90	[1] BRANDELIK	79B	DASP	$\psi(2S)\to\gamma\chi_{c1}$

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

$\Gamma\left(K^0_S K^0_S\right)/\Gamma_{total}$ $\qquad\qquad$ Γ_{94}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<6 × 10⁻⁵	90	[1] ABLIKIM	05O	BES2	$\psi(2S)\to\chi_{c1}\gamma$

[1] ABLIKIM 05O reports $[\Gamma(\chi_{c1}(1P)\to K^0_S K^0_S)/\Gamma_{total}]\times[B(\psi(2S)\to\gamma\chi_{c1}(1P))]<0.6\times10^{-5}$ which we divide by our best value $B(\psi(2S)\to\gamma\chi_{c1}(1P))=9.75\times10^{-2}$.

$\Gamma\left(\eta_c\pi^+\pi^-\right)/\Gamma_{total}$ $\qquad\qquad$ Γ_{95}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.2 × 10⁻³	90	[1,2] ABLIKIM	13B	BES3	$e^+e^-\to\psi(2S)\to\gamma\chi_{c1}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<4.4 × 10⁻³	90	[1,3] ABLIKIM	13B	BES3	$e^+e^-\to\psi(2S)\to\gamma\chi_{c1}$

[1] Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S)\to\chi_{c1}\gamma)=(9.2\pm0.4)\%$.

[2] Using the $\eta_c\to K^0_S K^\pm\pi^\mp$ decays.

[3] Using the $\eta_c\to K^+K^-\pi^0$ decays.

———— RADIATIVE DECAYS ————

$\Gamma(\gamma\rho^0)/\Gamma_{total}$ Γ_{97}/Γ

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
216±17 OUR AVERAGE					
215±22±6	432 ± 25	[1] ABLIKIM	11E	BES3	$\psi(2S) \to \gamma\gamma\rho^0$
217±24±6	186 ± 15	[2] BENNETT	08A	CLEO	$\psi(2S) \to \gamma\gamma\rho^0$

[1] ABLIKIM 11E reports $(228 \pm 13 \pm 22) \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \gamma\rho^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] BENNETT 08A reports $(243 \pm 19 \pm 22) \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \gamma\rho^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\gamma\omega)/\Gamma_{total}$ Γ_{98}/Γ

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
68± 8 OUR AVERAGE					
66± 9±2	136 ± 14	[1] ABLIKIM	11E	BES3	$\psi(2S) \to \gamma\gamma\omega$
74±17±2	39 ± 7	[2] BENNETT	08A	CLEO	$\psi(2S) \to \gamma\gamma\omega$

[1] ABLIKIM 11E reports $(69.7 \pm 7.2 \pm 6.6) \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \gamma\omega)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] BENNETT 08A reports $(83 \pm 15 \pm 12) \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \gamma\omega)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\gamma\phi)/\Gamma_{total}$ Γ_{99}/Γ

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
24±5±1		43 ± 9	[1] ABLIKIM	11E	BES3	$\psi(2S) \to \gamma\gamma\phi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<23	90	5.2 ± 3.1	[2] BENNETT	08A	CLEO	$\psi(2S) \to \gamma\gamma\phi$

[1] ABLIKIM 11E reports $(25.8 \pm 5.2 \pm 2.3) \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \gamma\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] BENNETT 08A reports $< 26 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \gamma\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma(\gamma\gamma)/\Gamma_{total}$ Γ_{100}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$< \ 6.3 \times 10^{-6}$	90	ABLIKIM	17AE	BES3	$\psi(2S) \to \ \gamma\chi_{c1} \to \ 3\gamma$

$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$

$< \ 3.5 \times 10^{-5}$	90	ECKLUND	08A	CLEO	$\psi(2S) \to \ \gamma\chi_{c1} \to \ 3\gamma$
$<150 \ \times 10^{-5}$	90	[1] YAMADA	77	DASP	$e^+ e^- \to \ 3\gamma$

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

$\Gamma(e^+ e^- J/\psi(1S))/\Gamma_{total}$ Γ_{101}/Γ

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

$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$

$3.65 \pm 0.23 \pm 0.10$	1.9k	[1,2] ABLIKIM	17I	BES3	$\psi(2S) \to \ \gamma e^+ e^- J/\psi$

[1] ABLIKIM 17I reports $(3.73 \pm 0.09 \pm 0.25) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to e^+ e^- J/\psi(1S))/\Gamma_{total}] \times [B(\psi(2S) \to \ \gamma\chi_{c1}(1P))]$ assuming B($\psi(2S) \to \ \gamma\chi_{c1}(1P)$) $= (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value B($\psi(2S) \to \ \gamma\chi_{c1}(1P)$) $= (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Not independent from other measurements reported by ABLIKIM 17I

$\Gamma(e^+ e^- J/\psi(1S))/\Gamma(\gamma J/\psi(1S))$ Γ_{101}/Γ_{96}

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
$10.1 \pm 0.3 \pm 0.5$	1.9k	[1] ABLIKIM	17I	BES3	$\psi(2S) \to \ e^+ e^- \gamma J/\psi$

[1] Uses B($\psi(2S) \to \ \gamma\chi_{c1}(1P)$) $\times$ B($\chi_{c1}(1P) \to \ \gamma J/\psi(1S)$) $= (351.8 \pm 1.0 \pm 12.0) \times 10^{-4}$ from ABLIKIM 17N and accounts for common systematic errors.

$\Gamma(\mu^+ \mu^- J/\psi(1S))/\Gamma(e^+ e^- J/\psi(1S))$ $\Gamma_{102}/\Gamma_{101}$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
$6.73 \pm 0.51 \pm 0.50$	222	ABLIKIM	19Z	BES3	$\psi(2S) \to \ \gamma\chi_c \to$ $\gamma(\mu^+ \mu^- J/\psi)$

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

$\Gamma(\chi_{c1}(1P) \to p\overline{p})/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c1}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{58}/\Gamma \times \Gamma_{180}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}$

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
2.13 ± 0.13 OUR FIT Error includes scale factor of 1.3.				
1.1 ± 1.0	[1] BAI	98I	BES	$\psi(2S) \to \ \gamma\chi_{c1} \to \ \gamma\overline{p}p$

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

$\Gamma\big(\chi_{c1}(1P)\to\Lambda\overline{\Lambda}\big)/\Gamma_{total}\times\Gamma\big(\psi(2S)\to\gamma\chi_{c1}(1P)\big)/\Gamma_{total}$

$$\Gamma_{71}/\Gamma\times\Gamma_{180}^{\psi(2S)}/\Gamma^{\psi(2S)}$$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
12.4±0.9 OUR FIT	Error includes scale factor of 1.1.				
12.3±0.9 OUR AVERAGE	Error includes scale factor of 1.2.				
12.8±0.6±0.6	528	ABLIKIM	21L	BES3	$\psi(2S)\to\gamma p\pi^-\overline{p}\pi^+$
10.5±1.6±0.6	46	[1] NAIK	08	CLEO	$\psi(2S)\to\gamma\Lambda\overline{\Lambda}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
11.2±1.0±0.9	136	[2,3] ABLIKIM	13H	BES3	$\psi(2S)\to\gamma\Lambda\overline{\Lambda}$

[1] Calculated by us. NAIK 08 reports $B(\chi_{c1}\to\Lambda\overline{\Lambda})=(11.6\pm1.8\pm0.7\pm0.7)\times10^{-5}$ using $B(\psi(2S)\to\gamma\chi_{c1})=(9.07\pm0.11\pm0.54)\%$.

[2] Superseded by ABLIKIM 21L

[3] Calculated by us. ABLIKIM 13H reports $B(\chi_{c1}\to\Lambda\overline{\Lambda})=(12.2\pm1.1\pm1.1)\times10^{-5}$ from a measurement of $B(\chi_{c1}\to\Lambda\overline{\Lambda})\times B(\psi(2S)\to\gamma\chi_{c1})$ assuming $B(\psi(2S)\to\gamma\chi_{c1})=(9.2\pm0.4)\%$.

$\Gamma\big(\chi_{c1}(1P)\to\Lambda\overline{\Lambda}\big)/\Gamma_{total}\times\Gamma\big(\psi(2S)\to\gamma\chi_{c1}(1P)\big)/\Gamma\big(\psi(2S)\to J/\psi(1S)\pi^+\pi^-\big)$

$$\Gamma_{71}/\Gamma\times\Gamma_{180}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}$$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
3.58±0.25 OUR FIT	Error includes scale factor of 1.1.				
7.1 $^{+2.8}_{-2.4}$ ±1.3	9.0$^{+3.5}_{-3.1}$	[1] BAI	03E	BES	$\psi(2S)\to\gamma\Lambda\overline{\Lambda}$

[1] BAI 03E reports $[\,B(\chi_{c1}\to\Lambda\overline{\Lambda})\,B(\psi(2S)\to\gamma\chi_{c1})\,/\,B(\psi(2S)\to J/\psi\pi^+\pi^-)\,]\times[B^2(\Lambda\to\pi^-p)\,/\,B(J/\psi\to p\overline{p})]=(1.33^{+0.52}_{-0.46}\pm0.25)\%$. We calculate from this measurement the presented value using $B(\Lambda\to\pi^-p)=(63.9\pm0.5)\%$ and $B(J/\psi\to p\overline{p})=(2.17\pm0.07)\times10^{-3}$.

$\Gamma\big(\chi_{c1}(1P)\to\Lambda\overline{\Lambda}\eta\big)/\Gamma_{total}\times\Gamma\big(\psi(2S)\to\gamma\chi_{c1}(1P)\big)/\Gamma_{total}$

$$\Gamma_{76}/\Gamma\times\Gamma_{180}^{\psi(2S)}/\Gamma^{\psi(2S)}$$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
5.72±1.34±0.65	21	ABLIKIM	22AO BES3	$\psi(2S)\to\gamma p\pi^-\overline{p}\pi^+\gamma\gamma$

$\Gamma\big(\chi_{c1}(1P)\to\gamma J/\psi(1S)\big)/\Gamma_{total}\times\Gamma\big(\psi(2S)\to\gamma\chi_{c1}(1P)\big)/\Gamma_{total}$

$$\Gamma_{96}/\Gamma\times\Gamma_{180}^{\psi(2S)}/\Gamma^{\psi(2S)}$$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
3.34 ±0.10 OUR FIT	Error includes scale factor of 1.7.				
3.24 ±0.16 OUR AVERAGE	Error includes scale factor of 2.1. See the ideogram below.				
3.518±0.010±0.120	143k	[1] ABLIKIM	17N	BES3	$\psi(2S)\to\gamma\gamma J/\psi$
3.442±0.010±0.132	1.9M	ABLIKIM	17U	BES3	$e^+e^-\to\gamma X$
2.81 ±0.05 ±0.23	13k	BAI	04I	BES2	$\psi(2S)\to J/\psi\gamma\gamma$
2.56 ±0.12 ±0.20		GAISER	86	CBAL	$\psi(2S)\to\gamma X$
2.78 ±0.30		[2] OREGLIA	82	CBAL	$\psi(2S)\to\gamma\chi_{c1}$
2.2 ±0.5		[3] BRANDELIK	79B	DASP	$\psi(2S)\to\gamma\chi_{c1}$
2.9 ±0.5		[3] BARTEL	78B	CNTR	$\psi(2S)\to\gamma\chi_{c1}$
5.0 ±1.5		[4] BIDDICK	77	CNTR	$e^+e^-\to\gamma X$
2.8 ±0.9		[2] WHITAKER	76	MRK1	e^+e^-

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

$3.377 \pm 0.009 \pm 0.183$	142k	[5] ABLIKIM	12O	BES3	$\psi(2S) \to \gamma\chi_{c1}$
$3.56 \pm 0.03 \pm 0.12$	24.9k	[6] MENDEZ	08	CLEO	$\psi(2S) \to \gamma\chi_{c1}$
$3.44 \pm 0.06 \pm 0.13$	3.7k	[7] ADAM	05A	CLEO	Repl. by MENDEZ 08

[1] Uses B($J/\psi \to e^+e^-$) = $(5.971 \pm 0.032)\%$ and B($J/\psi \to \mu^+\mu^-$) = $(5.961 \pm 0.033)\%$.

[2] Recalculated by us using B($J/\psi(1S) \to \ell^+\ell^-$) = 0.1181 ± 0.0020.

[3] Recalculated by us using B($J/\psi(1S) \to \mu^+\mu^-$) = 0.0588 ± 0.0010.
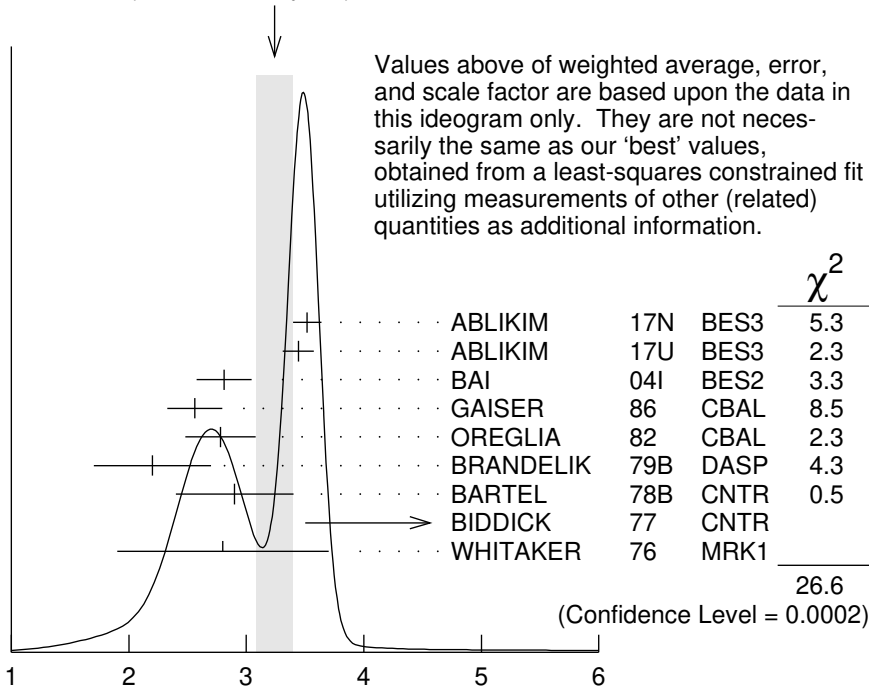
[4] Assumes isotropic gamma distribution.

[5] Superseded by ABLIKIM 17N.

[6] Not independent from other measurements of MENDEZ 08.

[7] Not independent from other values reported by ADAM 05A.

WEIGHTED AVERAGE
3.24±0.16 (Error scaled by 2.1)

Values above of weighted average, error, and scale factor are based upon the data in this ideogram only. They are not necessarily the same as our 'best' values, obtained from a least-squares constrained fit utilizing measurements of other (related) quantities as additional information.

			χ^2
ABLIKIM	17N	BES3	5.3
ABLIKIM	17U	BES3	2.3
BAI	04I	BES2	3.3
GAISER	86	CBAL	8.5
OREGLIA	82	CBAL	2.3
BRANDELIK	79B	DASP	4.3
BARTEL	78B	CNTR	0.5
BIDDICK	77	CNTR	
WHITAKER	76	MRK1	
			26.6

(Confidence Level = 0.0002)

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

$\Gamma(\chi_{c1}(1P) \to \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c1}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\qquad \Gamma_{96}/\Gamma \times \Gamma_{180}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
9.63±0.29 OUR FIT	Error includes scale factor of 1.7.				
10.15±0.28 OUR AVERAGE					
$10.17 \pm 0.07 \pm 0.27$	24.9k	MENDEZ	08	CLEO	$\psi(2S) \to \gamma\chi_{c1}$
$12.6 \pm 0.3 \pm 3.8$	3k	[1] ABLIKIM	04B	BES	$\psi(2S) \to J/\psi X$
8.5 ± 2.1		[2] HIMEL	80	MRK2	$\psi(2S) \to \gamma\chi_{c1}$

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

$10.24 \pm 0.17 \pm 0.23$	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 $B(\psi(2S) \to \gamma\chi_{c1}) \times B(\chi_{c1} \to \gamma J/\psi(1S))$ quoted in HIMEL 80 is derived using $B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) = (33 \pm 3)\%$ and $B(J/\psi(1S) \to \ell^+\ell^-) = 0.138 \pm 0.018$. Calculated by us using $B(J/\psi(1S) \to \ell^+\ell^-) = 0.1181 \pm 0.0020$.

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

$\Gamma\big(\chi_{c1}(1P) \to \overline{K}{}^0 K^+ \pi^- + \text{c.c.}\big)/\Gamma_{\text{total}} \times \Gamma\big(\psi(2S) \to \gamma\chi_{c1}(1P)\big)/\Gamma_{\text{total}}$
$$\Gamma_{19}/\Gamma \times \Gamma_{180}^{\psi(2S)}/\Gamma^{\psi(2S)}$$

VALUE (units 10^{-4})		DOCUMENT ID		TECN	COMMENT
6.8±0.6 OUR FIT Error includes scale factor of 1.1.					
7.2±0.6 OUR AVERAGE					
7.3±0.5±0.5	[1]	ATHAR	07	CLEO	$\psi(2S) \to \gamma K_S^0 K^+ \pi^-$
7.0±0.5±0.9	[2]	ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

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

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

$\Gamma\big(\chi_{c1}(1P) \to \overline{K}{}^0 K^+ \pi^- + \text{c.c.}\big)/\Gamma_{\text{total}} \times \Gamma\big(\psi(2S) \to \gamma\chi_{c1}(1P)\big)/\Gamma\big(\psi(2S) \to J/\psi(1S)\pi^+\pi^-\big)$
$$\Gamma_{19}/\Gamma \times \Gamma_{180}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}$$

VALUE (units 10^{-4})		DOCUMENT ID		TECN	COMMENT
19.6±1.6 OUR FIT Error includes scale factor of 1.1.					
13.2±2.4±3.2	[1]	BAI	99B	BES	$\psi(2S) \to \gamma K_S^0 K^+ \pi^-$

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

$\Gamma\big(\chi_{c1}(1P) \to K^+ K^- K^+ K^-\big)/\Gamma_{\text{total}} \times \Gamma\big(\psi(2S) \to \gamma\chi_{c1}(1P)\big)/\Gamma_{\text{total}}$
$$\Gamma_{48}/\Gamma \times \Gamma_{180}^{\psi(2S)}/\Gamma^{\psi(2S)}$$

VALUE (units 10^{-4})	EVTS		DOCUMENT ID		TECN	COMMENT
0.53±0.11 OUR FIT						
0.61±0.11±0.08	54	[1]	ABLIKIM	06T	BES2	$\psi(2S) \to \gamma K^+ K^+ K^- K^-$

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

$\Gamma\big(\chi_{c1}(1P) \to K^+ K^- K^+ K^-\big)/\Gamma_{\text{total}} \times \Gamma\big(\psi(2S) \to \gamma\chi_{c1}(1P)\big)/\Gamma\big(\psi(2S) \to J/\psi(1S)\pi^+\pi^-\big)$
$$\Gamma_{48}/\Gamma \times \Gamma_{180}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}$$

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

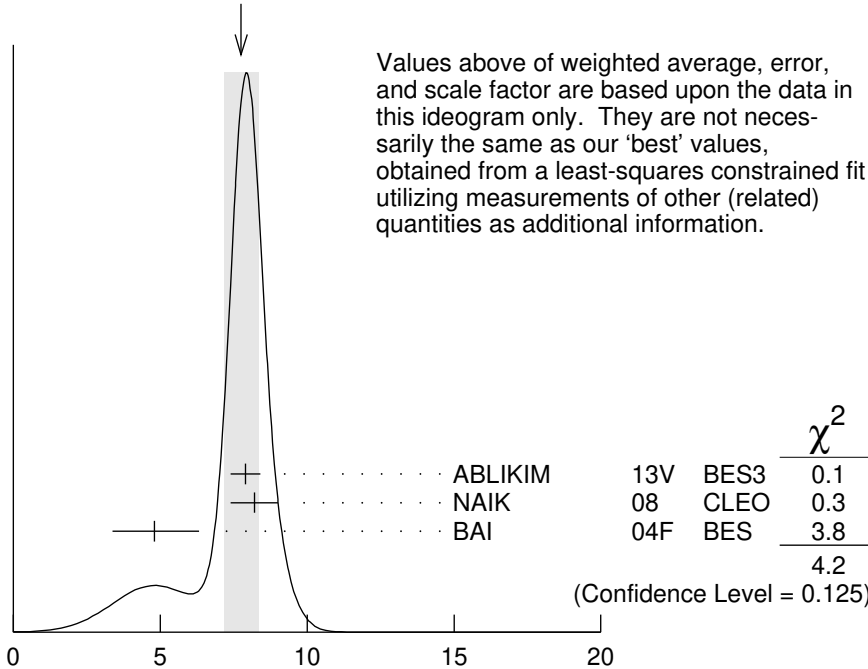[1] Calculated by us. The value of $B(\chi_{c1} \to 2K^+ 2K^-)$ reported by BAI 99B was derived using $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.8)\%$ and $B(\psi(2S) \to J/\psi\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$\Gamma\left(\chi_{c1}(1P) \to p\overline{p}\right)/\Gamma_{\text{total}} \times \Gamma\left(\psi(2S) \to \gamma\chi_{c1}(1P)\right)/\Gamma_{\text{total}}$

$$\Gamma_{58}/\Gamma \times \Gamma_{180}^{\psi(2S)}/\Gamma^{\psi(2S)}$$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
7.4±0.4 OUR FIT	Error includes scale factor of 1.3.				
7.8±0.6 OUR AVERAGE	Error includes scale factor of 1.4. See the ideogram below.				
7.9±0.4±0.3	453		ABLIKIM 13V	BES3	$\psi(2S) \to \gamma p\overline{p}$
8.2±0.7±0.4	141 ± 13	[1]	NAIK 08	CLEO	$\psi(2S) \to \gamma p\overline{p}$
$4.8^{+1.4}_{-1.3}\pm0.6$	$18.2^{+5.5}_{-4.9}$		BAI 04F	BES	$\psi(2S) \to \gamma\chi_{c1}(1P) \to \gamma\overline{p}p$

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

WEIGHTED AVERAGE
7.8±0.6 (Error scaled by 1.4)

Values above of weighted average, error, and scale factor are based upon the data in this ideogram only. They are not necessarily the same as our 'best' values, obtained from a least-squares constrained fit utilizing measurements of other (related) quantities as additional information.

			χ^2
ABLIKIM	13V	BES3	0.1
NAIK	08	CLEO	0.3
BAI	04F	BES	3.8
			4.2

(Confidence Level = 0.125)

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

$\Gamma\left(\chi_{c1}(1P) \to \Sigma^+\overline{p}K_S^0 + \text{c.c.}\right)/\Gamma_{\text{total}} \times \Gamma\left(\psi(2S) \to \gamma\chi_{c1}(1P)\right)/\Gamma_{\text{total}}$

$$\Gamma_{83}/\Gamma \times \Gamma_{180}^{\psi(2S)}/\Gamma^{\psi(2S)}$$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
1.49±0.09±0.07	258	[1]	ABLIKIM 19BB	BES3	$\psi(2S) \to \gamma\Sigma^+\overline{p}K_S^0 + \text{c.c.}$

[1] Calculated by us. ABLIKIM 19BB reports B($\chi_{c1} \to \Sigma^+\overline{p}K_S^0 + \text{c.c.}$) = $(1.53 \pm 0.10 \pm 0.08) \times 10^{-4}$ using B($\psi(2S) \to \gamma\chi_{c1}$) = $(9.75 \pm 0.24)\%$ and other branching fractions from PDG 18.

$$\Gamma\big(\chi_{c1}(1P)\to \Sigma^0\overline{p}K^+ + \text{c.c.}\big)/\Gamma_{\text{total}} \times \Gamma\big(\psi(2S)\to \gamma\chi_{c1}(1P)\big)/\Gamma_{\text{total}}$$

$$\Gamma_{84}/\Gamma \times \Gamma^{\psi(2S)}_{180}/\Gamma^{\psi(2S)}$$

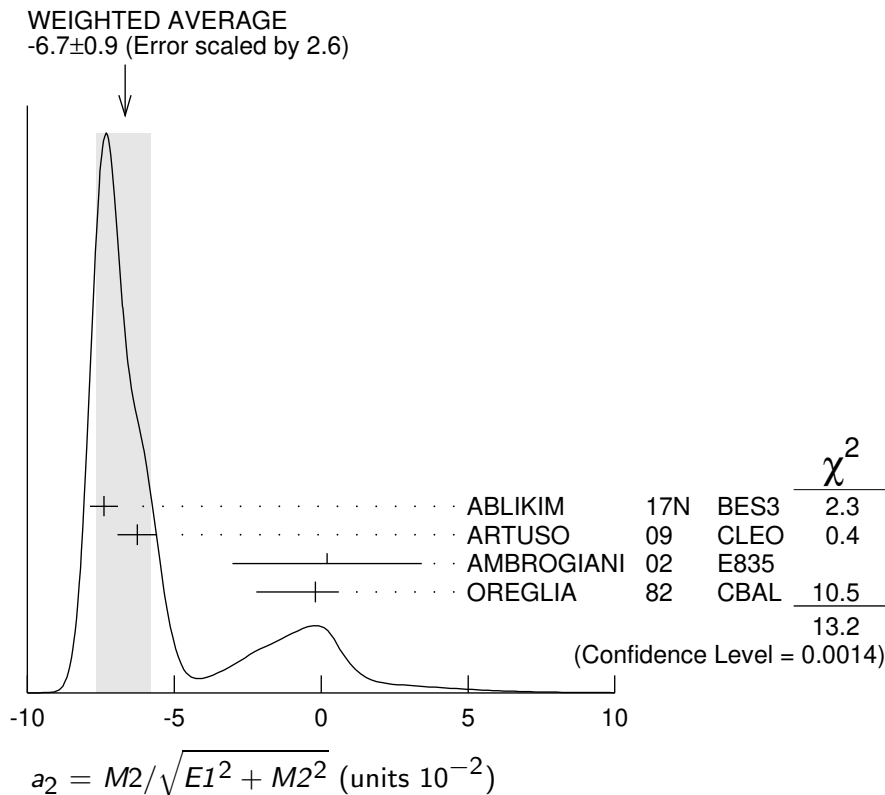| *VALUE* (units 10^{-5})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.42±0.07±0.06	493	[1] ABLIKIM	20AE	BES3	$\psi(2S)\to \gamma\Sigma^0\overline{p}K^+$
					+ c.c.

[1] Calculated by us. ABLIKIM 20AE reports $B(\chi_{c1}\to \Sigma^0\overline{p}K^+ + \text{c.c.}) = (1.46 \pm 0.07 \pm 0.07) \times 10^{-4}$ using $B(\psi(2S)\to \gamma\chi_c^0) = (9.75 \pm 0.24)\%$ and other branching fractions from PDG 20.

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

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

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
−6.7 ±0.9 OUR AVERAGE		Error includes scale factor of 2.6. See the ideogram below.			
−7.40±0.33±0.34	164k	[1] ABLIKIM	17N	BES3	$\psi(2S)\to \gamma\gamma\ell^+\ell^-$
−6.26±0.63±0.24	39k	ARTUSO	09	CLEO	$\psi(2S)\to \gamma\gamma\ell^+\ell^-$
0.2 ±3.2 ±0.4	2090	AMBROGIANI	02	E835	$p\overline{p}\to \chi_{c1}\to J/\psi\gamma$
−0.2 $^{+0.8}_{-2.0}$	921	OREGLIA	82	CBAL	$\psi(2S)\to \chi_{c1}\gamma\to J/\psi\gamma\gamma$

[1] Correlated with b_2 with correlation coefficient $\rho_{a_2 b_2} = 0.133$.

WEIGHTED AVERAGE
-6.7±0.9 (Error scaled by 2.6)

			χ^2
ABLIKIM	17N	BES3	2.3
ARTUSO	09	CLEO	0.4
AMBROGIANI	02	E835	
OREGLIA	82	CBAL	10.5
			13.2

(Confidence Level = 0.0014)

$a_2 = M2/\sqrt{E1^2 + M2^2}$ (units 10^{-2})

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

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

VALUE (units 10^{-2})	EVTS		DOCUMENT ID		TECN	COMMENT
2.5 ±0.4 OUR AVERAGE						
$2.29 \pm 0.39 \pm 0.27$	164k	[1]	ABLIKIM	17N	BES3	$\psi(2S) \to \gamma\gamma\ell^+\ell^-$
$2.76 \pm 0.73 \pm 0.23$	39k		ARTUSO	09	CLEO	$\psi(2S) \to \gamma\gamma\ell^+\ell^-$
$7.7\ ^{+5.0}_{-4.5}$	921		OREGLIA	82	CBAL	$\psi(2S) \to \gamma\gamma\ell^+\ell^-$

[1] Correlated with a_2 with correlation coefficient $\rho_{a_2 b_2} = 0.133$.

MULTIPOLE AMPLITUDE RATIOS IN RADIATIVE DECAYS
$\psi(2S) \to \gamma\chi_{c1}(1S)$ and $\chi_{c1} \to \gamma J/\psi(1S)$

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	$\psi(2S) \to \gamma\gamma\ell^+\ell^-$

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

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ABLIKIM	22O	JHEP 2206 074	M. Ablikim *et al.*	(BESIII Collab.)
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