

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

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	$B^+ \rightarrow K^+ (K_S^0 K \pi)$
3508.4 ± 1.9 ± 0.7	460	¹ AAIJ	17BB LHCB	$p p \rightarrow b \bar{b} X \rightarrow 2(K^+ K^-) X$
3510.71 ± 0.04 ± 0.09	4.8k	² AAIJ	17BI LHCB	$\chi_{c1} \rightarrow J/\psi \mu^+ \mu^-$
3510.30 ± 0.14 ± 0.16		ABLIKIM	05G BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$
3510.719 ± 0.051 ± 0.019		ANDREOTTI	05A E835	$p \bar{p} \rightarrow e^+ e^- \gamma$
3509.4 ± 0.9		BAI	99B BES	$\psi(2S) \rightarrow \gamma X$
3510.60 ± 0.087 ± 0.019	513	³ ARMSTRONG	92 E760	$\bar{p} p \rightarrow e^+ e^- \gamma$
3511.3 ± 0.4 ± 0.4	30	BAGLIN	86B SPEC	$\bar{p} p \rightarrow e^+ e^- X$
3512.3 ± 0.3 ± 4.0		⁴ GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X$
3507.4 ± 1.7	91	⁵ LEMOIGNE	82 GOLI	$185 \pi^- \text{Be} \rightarrow \gamma \mu^+ \mu^- \text{A}$
3510.4 ± 0.6		OREGLIA	82 CBAL	$e^+ e^- \rightarrow J/\psi 2\gamma$
3510.1 ± 1.1	254	⁶ HIMEL	80 MRK2	$e^+ e^- \rightarrow J/\psi 2\gamma$
3509 ± 11	21	BRANDELIK	79B DASP	$e^+ e^- \rightarrow J/\psi 2\gamma$
3507 ± 3		⁶ BARTEL	78B CNTR	$e^+ e^- \rightarrow J/\psi 2\gamma$
3505.0 ± 4 ± 4		^{6,7} TANENBAUM	78 MRK1	$e^+ e^-$
3513 ± 7	367	⁶ BIDDICK	77 CNTR	$\psi(2S) \rightarrow \gamma X$

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

3500 ± 10	40	TANENBAUM	75 MRK1	Hadrons γ
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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 $m(\chi_{c2}) - m(\chi_{c1}) = 45.39 \pm 0.07 \pm 0.03$ 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 +0.26 -0.38 -0.77			ABLIKIM	05G BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$
0.876 ± 0.045 ± 0.026			ANDREOTTI	05A E835	$p \bar{p} \rightarrow e^+ e^- \gamma$
0.87 ± 0.11 ± 0.08		513	¹ ARMSTRONG	92 E760	$\bar{p} p \rightarrow e^+ e^- \gamma$

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

<1.3	95	BAGLIN	86B	SPEC	$\bar{p}p \rightarrow e^+e^-X$
<3.8	90	GAISER	86	CBAL	$\psi(2S) \rightarrow \gamma X$
¹ Recalculated by ANDREOTTI 05A.					

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

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	hadrons		
Γ_2	e^+e^-	$(1.4^{+1.5}_{-1.0}) \times 10^{-7}$	
Hadronic decays			
Γ_3	$3(\pi^+\pi^-)$	$(1.04 \pm 0.16) \%$	S=4.6
Γ_4	$2(\pi^+\pi^-)$	$(7.6 \pm 2.6) \times 10^{-3}$	
Γ_5	$\pi^+\pi^-\pi^0\pi^0$	$(1.19 \pm 0.15) \%$	
Γ_6	$\rho^+\pi^-\pi^0 + \text{c.c.}$	$(1.45 \pm 0.24) \%$	
Γ_7	$\rho^0\pi^+\pi^-$	$(3.9 \pm 3.5) \times 10^{-3}$	
Γ_8	$4\pi^0$	$(5.4 \pm 0.8) \times 10^{-4}$	
Γ_9	$\pi^+\pi^-K^+K^-$	$(4.5 \pm 1.0) \times 10^{-3}$	
Γ_{10}	$K^+K^-\pi^0\pi^0$	$(1.12 \pm 0.27) \times 10^{-3}$	
Γ_{11}	$K^+K^-\pi^+\pi^-\pi^0$	$(1.15 \pm 0.13) \%$	
Γ_{12}	$K_S^0 K^\pm \pi^\mp \pi^+ \pi^-$	$(7.5 \pm 0.8) \times 10^{-3}$	
Γ_{13}	$K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	$(8.6 \pm 1.4) \times 10^{-3}$	
Γ_{14}	$\rho^-K^+\bar{K}^0 + \text{c.c.}$	$(5.0 \pm 1.2) \times 10^{-3}$	
Γ_{15}	$K^*(892)^0\bar{K}^0\pi^0 \rightarrow K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	$(2.3 \pm 0.6) \times 10^{-3}$	
Γ_{16}	$K^+K^-\eta\pi^0$	$(1.12 \pm 0.34) \times 10^{-3}$	
Γ_{17}	$\pi^+\pi^-K_S^0K_S^0$	$(6.9 \pm 2.9) \times 10^{-4}$	
Γ_{18}	$K^+K^-\eta$	$(3.2 \pm 1.0) \times 10^{-4}$	
Γ_{19}	$\bar{K}^0K^+\pi^- + \text{c.c.}$	$(7.0 \pm 0.6) \times 10^{-3}$	S=1.1
Γ_{20}	$K^*(892)^0\bar{K}^0 + \text{c.c.}$	$(1.03 \pm 0.15) \times 10^{-3}$	
Γ_{21}	$K^*(892)^+K^- + \text{c.c.}$	$(1.21 \pm 0.23) \times 10^{-3}$	
Γ_{22}	$K_J^*(1430)^0\bar{K}^0 + \text{c.c.} \rightarrow K_S^0K^+\pi^- + \text{c.c.}$	$< 8 \times 10^{-4}$	CL=90%
Γ_{23}	$K_J^*(1430)^+K^- + \text{c.c.} \rightarrow K_S^0K^+\pi^- + \text{c.c.}$	$< 2.1 \times 10^{-3}$	CL=90%
Γ_{24}	$K^+K^-\pi^0$	$(1.81 \pm 0.24) \times 10^{-3}$	
Γ_{25}	$\eta\pi^+\pi^-$	$(4.62 \pm 0.24) \times 10^{-3}$	
Γ_{26}	$a_0(980)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-$	$(3.2 \pm 0.4) \times 10^{-3}$	S=2.1
Γ_{27}	$a_2(1320)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-$	$(1.76 \pm 0.24) \times 10^{-4}$	
Γ_{28}	$a_2(1700)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-$	$(4.6 \pm 0.7) \times 10^{-5}$	
Γ_{29}	$f_2(1270)\eta \rightarrow \eta\pi^+\pi^-$	$(3.5 \pm 0.6) \times 10^{-4}$	
Γ_{30}	$f_4(2050)\eta \rightarrow \eta\pi^+\pi^-$	$(2.5 \pm 0.9) \times 10^{-5}$	
Γ_{31}	$\pi_1(1400)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-$	$< 5 \times 10^{-5}$	CL=90%

Γ_{32}	$\pi_1(1600)^+ \pi^- + \text{c.c.} \rightarrow \eta \pi^+ \pi^-$	$< 1.5 \times 10^{-5}$	CL=90%
Γ_{33}	$\pi_1(2015)^+ \pi^- + \text{c.c.} \rightarrow \eta \pi^+ \pi^-$	$< 8 \times 10^{-6}$	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}	$K_0^*(1430)^+ K^- + \text{c.c.}$	$(6.4 \pm_{-2.8}^{+2.2}) \times 10^{-4}$	
Γ_{38}	$f_0(980) \eta'(958)$	$(1.6 \pm_{-0.7}^{+1.4}) \times 10^{-4}$	
Γ_{39}	$f_0(1710) \eta'(958)$	$(7 \pm_5^+ 7) \times 10^{-5}$	
Γ_{40}	$f_2'(1525) \eta'(958)$	$(9 \pm 6) \times 10^{-5}$	
Γ_{41}	$K_2^*(1430)^+ K^- + \text{c.c.}$	$(1.61 \pm 0.31) \times 10^{-3}$	
Γ_{42}	$K_2^*(1430) \bar{K}^0 + \text{c.c.}$	$(1.17 \pm 0.20) \times 10^{-3}$	
Γ_{43}	$\pi^0 f_0(980) \rightarrow \pi^0 \pi^+ \pi^-$	$(3.5 \pm 0.9) \times 10^{-7}$	
Γ_{44}	$K^+ \bar{K}^*(892)^0 \pi^- + \text{c.c.}$	$(3.2 \pm 2.1) \times 10^{-3}$	
Γ_{45}	$K^*(892)^0 \bar{K}^*(892)^0$	$(1.4 \pm 0.4) \times 10^{-3}$	
Γ_{46}	$K^+ K^- K_S^0 K_S^0$	$< 4 \times 10^{-4}$	CL=90%
Γ_{47}	$K_S^0 K_S^0 K_S^0 K_S^0$	$(3.5 \pm 1.0) \times 10^{-5}$	
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}	$\bar{K}^0 K^+ \pi^- \phi + \text{c.c.}$	$(3.3 \pm 0.5) \times 10^{-3}$	
Γ_{51}	$K^+ K^- \pi^0 \phi$	$(1.62 \pm 0.30) \times 10^{-3}$	
Γ_{52}	$3(K^+ K^-)$	$(4.2 \pm 1.1) \times 10^{-6}$	
Γ_{53}	$\phi \pi^+ \pi^- \pi^0$	$(7.5 \pm 1.0) \times 10^{-4}$	
Γ_{54}	$\omega \omega$	$(5.7 \pm 0.7) \times 10^{-4}$	
Γ_{55}	$\omega K^+ K^-$	$(7.8 \pm 0.9) \times 10^{-4}$	
Γ_{56}	$\omega \phi$	$(2.7 \pm 0.4) \times 10^{-5}$	
Γ_{57}	$\phi \phi$	$(4.26 \pm 0.21) \times 10^{-4}$	
Γ_{58}	$\phi \phi \eta$	$(3.0 \pm 0.5) \times 10^{-4}$	
Γ_{59}	$p \bar{p}$	$(7.6 \pm 0.4) \times 10^{-5}$	S=1.2
Γ_{60}	$p \bar{p} \pi^0$	$(1.55 \pm 0.18) \times 10^{-4}$	
Γ_{61}	$p \bar{p} \eta$	$(1.45 \pm 0.25) \times 10^{-4}$	
Γ_{62}	$p \bar{p} \omega$	$(2.12 \pm 0.31) \times 10^{-4}$	
Γ_{63}	$p \bar{p} \phi$	$< 1.7 \times 10^{-5}$	CL=90%
Γ_{64}	$p \bar{p} \pi^+ \pi^-$	$(5.0 \pm 1.9) \times 10^{-4}$	
Γ_{65}	$p \bar{p} \pi^0 \pi^0$	$< 5 \times 10^{-4}$	CL=90%
Γ_{66}	$p \bar{p} K^+ K^- (\text{non-resonant})$	$(1.27 \pm 0.22) \times 10^{-4}$	
Γ_{67}	$p \bar{p} K_S^0 K_S^0$	$< 4.5 \times 10^{-4}$	CL=90%
Γ_{68}	$p \bar{p} K_S^0 K^- \pi^+ + \text{c.c.}$	$(4.2 \pm 0.5) \times 10^{-5}$	
Γ_{69}	$p \bar{n} \pi^-$	$(3.8 \pm 0.5) \times 10^{-4}$	
Γ_{70}	$\bar{p} n \pi^+$	$(3.9 \pm 0.5) \times 10^{-4}$	
Γ_{71}	$p \bar{n} \pi^- \pi^0$	$(1.03 \pm 0.12) \times 10^{-3}$	
Γ_{72}	$\bar{p} n \pi^+ \pi^0$	$(1.01 \pm 0.12) \times 10^{-3}$	
Γ_{73}	$\Lambda \bar{\Lambda}$	$(1.27 \pm 0.09) \times 10^{-4}$	S=1.1

Γ_{74}	$\Lambda\bar{\Lambda}\pi^+\pi^-$	$(2.9 \pm 0.5) \times 10^{-4}$	
Γ_{75}	$\Lambda\bar{\Lambda}\pi^+\pi^-$ (non-resonant)	$(2.5 \pm 0.6) \times 10^{-4}$	
Γ_{76}	$\Sigma(1385)^+\bar{\Lambda}\pi^- + \text{c.c.}$	$< 1.3 \times 10^{-4}$	CL=90%
Γ_{77}	$\Sigma(1385)^-\bar{\Lambda}\pi^+ + \text{c.c.}$	$< 1.3 \times 10^{-4}$	CL=90%
Γ_{78}	$\Lambda\bar{\Lambda}\eta$	$(5.9 \pm 1.5) \times 10^{-5}$	
Γ_{79}	$\Lambda\bar{\Lambda}\omega$	$(1.01 \pm 0.16) \times 10^{-4}$	
Γ_{80}	$\Lambda\bar{\Lambda}\phi$	$(6.0 \pm 1.0) \times 10^{-5}$	
Γ_{81}	$K^+\bar{p}\Lambda + \text{c.c.}$	$(4.2 \pm 0.4) \times 10^{-4}$	S=1.2
Γ_{82}	$nK_S^0\bar{\Lambda} + \text{c.c.}$	$(1.66 \pm 0.17) \times 10^{-4}$	
Γ_{83}	$\bar{p}\Lambda(1520)K_S^0\pi^+ + \text{c.c.}$	$(4.1 \pm 0.9) \times 10^{-5}$	
Γ_{84}	$K^*(892)^+\bar{p}\Lambda + \text{c.c.}$	$(4.9 \pm 0.7) \times 10^{-4}$	
Γ_{85}	$K^+\bar{p}\Lambda(1520) + \text{c.c.}$	$(1.7 \pm 0.4) \times 10^{-4}$	
Γ_{86}	$\Lambda(1520)\bar{\Lambda}(1520)$	$< 9 \times 10^{-5}$	CL=90%
Γ_{87}	$\Sigma^0\bar{\Sigma}^0$	$(4.2 \pm 0.6) \times 10^{-5}$	
Γ_{88}	$\Sigma^+\bar{p}K_S^0 + \text{c.c.}$	$(1.53 \pm 0.12) \times 10^{-4}$	
Γ_{89}	$\Sigma^0\bar{p}K^+ + \text{c.c.}$	$(1.46 \pm 0.10) \times 10^{-4}$	
Γ_{90}	$\Sigma^+\bar{\Sigma}^-$	$(3.6 \pm 0.7) \times 10^{-5}$	
Γ_{91}	$\Sigma^+\bar{\Sigma}^-\eta$	$(5.1 \pm 1.4) \times 10^{-5}$	
Γ_{92}	$\Sigma^-\bar{\Sigma}^+$	$(5.7 \pm 1.5) \times 10^{-5}$	
Γ_{93}	$\Sigma(1385)^+\bar{\Sigma}(1385)^-$	$< 9 \times 10^{-5}$	CL=90%
Γ_{94}	$\Sigma(1385)^-\bar{\Sigma}(1385)^+$	$< 5 \times 10^{-5}$	CL=90%
Γ_{95}	$K^-\Lambda\Xi^+ + \text{c.c.}$	$(1.35 \pm 0.24) \times 10^{-4}$	
Γ_{96}	$\Xi^0\Xi^0$	$(7.5 \pm 1.3) \times 10^{-5}$	
Γ_{97}	$\Xi^-\Xi^+$	$(6.0 \pm 0.6) \times 10^{-5}$	
Γ_{98}	$\Omega^-\Omega^+$	$(1.49 \pm 0.25) \times 10^{-5}$	
Γ_{99}	$\pi^+\pi^- + K^+K^-$	$< 2.1 \times 10^{-3}$	
Γ_{100}	$K_S^0K_S^0$	$< 6 \times 10^{-5}$	CL=90%
Γ_{101}	$\eta_c\pi^+\pi^-$	$< 3.2 \times 10^{-3}$	CL=90%

Radiative decays

Γ_{102}	$\gamma J/\psi(1S)$	$(34.3 \pm 1.3) \%$	S=1.3
Γ_{103}	$\gamma\rho^0$	$(2.16 \pm 0.17) \times 10^{-4}$	
Γ_{104}	$\gamma\omega$	$(6.8 \pm 0.8) \times 10^{-5}$	
Γ_{105}	$\gamma\phi$	$(2.4 \pm 0.5) \times 10^{-5}$	
Γ_{106}	$\gamma\gamma$	$< 6.3 \times 10^{-6}$	CL=90%
Γ_{107}	$e^+e^- J/\psi(1S)$	$(3.46 \pm 0.24) \times 10^{-3}$	
Γ_{108}	$\mu^+\mu^- J/\psi(1S)$	$(2.33 \pm 0.29) \times 10^{-4}$	

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 88 branching ratios uses 255 measurements to determine 49 parameters. The overall fit has a $\chi^2 = 393.1$ for 206 degrees of freedom.

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

x_{48}	4				
x_{59}	−1	0			
x_{73}	12	5	−1		
x_{102}	20	9	−25	23	
Γ	−9	−4	−60	−11	−31
	x_{19}	x_{48}	x_{59}	x_{73}	x_{102}

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

$\Gamma(e^+e^-)$					Γ_2
VALUE (eV)	EVTs	DOCUMENT ID	TECN	COMMENT	
$0.12^{+0.13}_{-0.08}$	250	¹ ABLIKIM	22AF BES3	$e^+e^- \rightarrow \chi_{c1} \rightarrow \gamma J/\psi$	
¹ Assuming $\Gamma(\chi_{c1} \rightarrow \gamma J/\psi) = 0.28$ MeV.					

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

$\Gamma(p\bar{p}) \times \Gamma(\gamma J/\psi(1S)) / \Gamma_{\text{total}}$					$\Gamma_{59} \Gamma_{102} / \Gamma$
VALUE (eV)		DOCUMENT ID	TECN	COMMENT	
21.9 ± 0.8 OUR FIT					
21.4 ± 0.9 OUR AVERAGE					
21.5 ± 0.5 ± 0.8		¹ ANDREOTTI 05A	E835	$p\bar{p} \rightarrow e^+e^-\gamma$	
21.4 ± 1.5 ± 2.2		^{1,2} ARMSTRONG 92	E760	$\bar{p}p \rightarrow e^+e^-\gamma$	
19.9 ^{+4.4} _{−4.0}		¹ BAGLIN	86B SPEC	$\bar{p}p \rightarrow e^+e^-X$	
¹ Calculated by us using $B(J/\psi(1S) \rightarrow e^+e^-) = 0.0593 \pm 0.0010$.					
² Recalculated by ANDREOTTI 05A.					

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

HADRONIC DECAYS

$\Gamma(3(\pi^+\pi^-)) / \Gamma_{\text{total}}$					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	$\psi(2S) \rightarrow \gamma 3(\pi^+\pi^-)$	
5.4 ± 0.7 ± 0.9		² BAI	99B BES	$\psi(2S) \rightarrow \gamma \chi_{c1}$	
16.0 ± 5.9 ± 0.8		² TANENBAUM 78	MRK1	$\psi(2S) \rightarrow \gamma \chi_{c1}$	

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

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

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

Γ_4/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
7.6 $\pm$ 2.6	OUR EVALUATION	Treating systematic error as correlated.		
8 $\pm$ 4	OUR AVERAGE	Error includes scale factor of 1.5.		
4.6 $\pm$ 2.1 $\pm$ 2.6		¹ BAI	99B BES	$\psi(2S) \rightarrow \gamma\chi_{c1}$
12.5 $\pm$ 4.2 $\pm$ 0.6		¹ TANENBAUM	78 MRK1	$\psi(2S) \rightarrow \gamma\chi_{c1}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
6.85 $\pm$ 0.26 $\pm$ 0.19	670	² ABLIKIM	24BT BES3	$\psi(2S) \rightarrow \gamma\chi_{c1}$

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

²ABLIKIM 24BT reports $(0.685 \pm 0.001 \pm 0.031) \times 10^{-2}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow 2(\pi^+\pi^-))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.75 \pm 0.24) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

Γ_5/Γ

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

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

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

Γ_6/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.45 $\pm$ 0.24 $\pm$ 0.04	712.3	^{1,2} HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$

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

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

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

Γ_7/Γ

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

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

$\Gamma(4\pi^0)/\Gamma_{\text{total}}$ Γ_8/Γ

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

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

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

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

7.3 ± 3.0 ± 0.4

¹ TANENBAUM

78

MRK1

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\Gamma(\rho^- K^+ \bar{K}^0 + \text{c.c.})/\Gamma_{\text{total}} \quad \Gamma_{14}/\Gamma$$

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

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

$$\Gamma(K^*(892)^0 \bar{K}^0 \pi^0 \rightarrow K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}} \quad \Gamma_{15}/\Gamma$$

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

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

$$\Gamma(K^+ K^- \eta \pi^0)/\Gamma_{\text{total}} \quad \Gamma_{16}/\Gamma$$

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

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

$$\Gamma(\pi^+ \pi^- K_S^0 K_S^0)/\Gamma_{\text{total}} \quad \Gamma_{17}/\Gamma$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
6.9±2.9±0.2	19.8 ± 7.7	¹ ABLIKIM	050 BES2	$\psi(2S) \rightarrow \chi_{c1} \gamma$

¹ ABLIKIM 050 reports $[\Gamma(\chi_{c1}(1P) \rightarrow \pi^+ \pi^- K_S^0 K_S^0)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ $= (0.67 \pm 0.26 \pm 0.11) \times 10^{-4}$ which we divide by our best value $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(K^+ K^- \eta)/\Gamma_{\text{total}} \quad \Gamma_{18}/\Gamma$$

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

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

4.30 ± 0.05	8690	² ABLIKIM	24BWBES3	$\psi(2S) \rightarrow \gamma \chi_{c1}$
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¹ ATHAR 07 reports $(0.34 \pm 0.10 \pm 0.04) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^+ K^- \eta)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 0.0907 \pm 0.0011 \pm 0.0054$, which we rescale to our best value $\text{B}(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² No systematic error reported.

$$\Gamma(K^*(892)^0 \bar{K}^0 + \text{c.c.})/\Gamma_{\text{total}} \quad \Gamma_{20}/\Gamma$$

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
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1.03 $\pm$ 0.15 OUR AVERAGE

1.04 $\pm$ 0.13 $\pm$ 0.10	262	¹ AAIJ	23AH LHCb	$B^+ \rightarrow K^+(K_S^0 K \pi)$
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0.98 $\pm$ 0.37 $\pm$ 0.03	22	² ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$
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¹ AAIJ 23AH reports $(1.04 \pm 0.13 \pm 0.04 \pm 0.09) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^*(892)^0 \bar{K}^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\chi_{c1}(1P) \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.})]$ assuming $B(\chi_{c1}(1P) \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.}) = (7.0 \pm 0.6) \times 10^{-3}$.

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

$$\Gamma(K^*(892)^+ K^- + \text{c.c.})/\Gamma_{\text{total}} \quad \Gamma_{21}/\Gamma$$

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
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1.21 $\pm$ 0.23 OUR AVERAGE

1.18 $\pm$ 0.17 $\pm$ 0.17	288	¹ AAIJ	23AH LHCb	$B^+ \rightarrow K^+(K_S^0 K \pi)$
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1.43 $\pm$ 0.65 $\pm$ 0.04	27	² ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$
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¹ AAIJ 23AH reports $(1.18 \pm 0.17 \pm 0.14 \pm 0.10) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K^*(892)^+ K^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\chi_{c1}(1P) \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.})]$ assuming $B(\chi_{c1}(1P) \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.}) = (7.0 \pm 0.6) \times 10^{-3}$.

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

$$\Gamma(K_J^*(1430)^0 \bar{K}^0 + \text{c.c.} \rightarrow K_S^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}} \quad \Gamma_{22}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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$< 8 \times 10^{-4}$	90	¹ ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$
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¹ ABLIKIM 06R reports $< 0.9 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K_J^*(1430)^0 \bar{K}^0 + \text{c.c.} \rightarrow K_S^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$$\Gamma(K_J^*(1430)^+ K^- + \text{c.c.} \rightarrow K_S^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}} \quad \Gamma_{23}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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$< 2.1 \times 10^{-3}$	90	¹ ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$
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¹ ABLIKIM 06R reports $< 2.4 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow K_J^*(1430)^+ K^- + \text{c.c.} \rightarrow K_S^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

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

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

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

 $\Gamma(\eta \pi^+ \pi^-)/\Gamma_{\text{total}}$ 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 $\psi(2S) \rightarrow \gamma \eta \pi^+ \pi^-$
4.7 ± 0.5 ± 0.1		³ ATHAR	07	CLEO $\psi(2S) \rightarrow \gamma h^+ h^- h^0$
5.3 ± 0.9 ± 0.1	222	⁴ ABLIKIM	06R	BES2 $\psi(2S) \rightarrow \gamma \chi_{c1}$

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 $[\Gamma(\chi_{c1}(1P) \rightarrow \eta \pi^+ \pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $[\Gamma(\chi_{c1}(1P) \rightarrow \eta \pi^+ \pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 0.0907 \pm 0.0011 \pm 0.0054$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $[\Gamma(\chi_{c1}(1P) \rightarrow \eta \pi^+ \pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(a_0(980)^+ \pi^- + \text{c.c.} \rightarrow \eta \pi^+ \pi^-)/\Gamma_{\text{total}}$ 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 $\psi(2S) \rightarrow \gamma \eta \pi^+ \pi^-$
1.79 ± 0.63 ± 0.05	58	³ ABLIKIM	06R	BES2 $\psi(2S) \rightarrow \gamma \chi_{c1}$

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 $[\Gamma(\chi_{c1}(1P) \rightarrow a_0(980)^+ \pi^- + \text{c.c.} \rightarrow \eta \pi^+ \pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $[\Gamma(\chi_{c1}(1P) \rightarrow a_0(980)^+ \pi^- + \text{c.c.} \rightarrow \eta \pi^+ \pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(a_2(1320)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}} \quad \Gamma_{27}/\Gamma$$

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

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 $[\Gamma(\chi_{c1}(1P) \rightarrow a_2(1320)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $\text{B}(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(a_2(1700)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}} \quad \Gamma_{28}/\Gamma$$

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

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 $[\Gamma(\chi_{c1}(1P) \rightarrow a_2(1700)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $\text{B}(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(f_2(1270)\eta \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}} \quad \Gamma_{29}/\Gamma$$

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

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

$$\Gamma(f_4(2050)\eta \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}} \quad \Gamma_{30}/\Gamma$$

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

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 $[\Gamma(\chi_{c1}(1P) \rightarrow f_4(2050)\eta \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [\text{B}(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $\text{B}(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $\text{B}(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(\pi_1(1400)^+\pi^- + \text{c.c.} \rightarrow \eta\pi^+\pi^-)/\Gamma_{\text{total}} \quad \Gamma_{31}/\Gamma$$

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

¹ From an amplitude analysis using an isobar model.

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

$$\Gamma(\pi_1(1600)^+ \pi^- + \text{c.c.} \rightarrow \eta \pi^+ \pi^-) / \Gamma_{\text{total}} \quad \Gamma_{32} / \Gamma$$

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

¹ From an amplitude analysis using an isobar model.

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

$$\Gamma(\pi_1(2015)^+ \pi^- + \text{c.c.} \rightarrow \eta \pi^+ \pi^-) / \Gamma_{\text{total}} \quad \Gamma_{33} / \Gamma$$

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

¹ From an amplitude analysis using an isobar model.

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

$$\Gamma(f_2(1270)\eta) / \Gamma_{\text{total}} \quad \Gamma_{34} / \Gamma$$

VALUE (units 10^{-3})	EVT5	DOCUMENT ID	TECN	COMMENT
0.67 ± 0.11 OUR AVERAGE				
$0.63 \pm 0.11 \pm 0.02$		1,2 ABLIKIM	17K BES3	$\psi(2S) \rightarrow \gamma \eta \pi^+ \pi^-$
$2.7 \pm 0.8 \pm 0.1$	53	³ ABLIKIM	06R BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$

¹ ABLIKIM 17K reports $(6.4 \pm 1.1) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow f_2(1270)\eta) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $[\Gamma(\chi_{c1}(1P) \rightarrow f_2(1270)\eta) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(\pi^+ \pi^- \eta') / \Gamma_{\text{total}} \quad \Gamma_{35} / \Gamma$$

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

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

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

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

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

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

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$1.61 \pm 0.19 \pm 0.24$	351	¹ AAIJ	23AH LHCb	$B^+ \rightarrow K^+ (K_S^0 K \pi)$

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

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

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$1.17 \pm 0.16 \pm 0.11$	278	¹ AAIJ	23AH LHCb	$B^+ \rightarrow K^+ (K_S^0 K \pi)$

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\Gamma(\pi^0 f_0(980) \rightarrow \pi^0 \pi^+ \pi^-) / \Gamma_{\text{total}} \quad \Gamma_{43} / \Gamma$$

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

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

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

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

$$\Gamma(K^+ \bar{K}^*(892)^0 \pi^- + \text{c.c.}) / \Gamma_{\text{total}} \quad \Gamma_{44} / \Gamma$$

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

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

$$\Gamma(K^*(892)^0 \bar{K}^*(892)^0) / \Gamma_{\text{total}} \quad \Gamma_{45} / \Gamma$$

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

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

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

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

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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<4 × 10⁻⁴ 90 3.2 ± 2.4 ¹ ABLIKIM 050 BES2 $\psi(2S) \rightarrow \chi_{c1} \gamma$

¹ ABLIKIM 050 reports $[\Gamma(\chi_{c1}(1P) \rightarrow K^+ K^- K_S^0 K_S^0) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))] < 4.2 \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$$\Gamma(K_S^0 K_S^0 K_S^0 K_S^0) / \Gamma_{\text{total}} \quad \Gamma_{47} / \Gamma$$

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

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

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

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

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

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

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

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

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

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

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

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

$\Gamma(\omega \omega) / \Gamma_{\text{total}}$ Γ_{54} / Γ

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

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

$\Gamma(\omega K^+ K^-) / \Gamma_{\text{total}}$ Γ_{55} / Γ

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

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

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

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$0.27 \pm 0.04 \pm 0.01$	105	¹ ABLIKIM	19J	BES3 $\psi(2S) \rightarrow \gamma$ hadrons

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

$0.21 \pm 0.06 \pm 0.01$ 15 ^{2,3} ABLIKIM 11K BES3 $\psi(2S) \rightarrow \gamma$ hadrons

¹ ABLIKIM 19J reports $[\Gamma(\chi_{c1}(1P) \rightarrow \omega \phi) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ = $(2.67 \pm 0.31 \pm 0.27) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $[\Gamma(\chi_{c1}(1P) \rightarrow \omega \phi) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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.

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

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$4.26 \pm 0.17 \pm 0.12$	1529	^{1,2} ABLIKIM	23N BES3	$\psi(2S) \rightarrow \gamma \text{ hadrons}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$4.2 \pm 0.5 \pm 0.1$	366	³ ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma \text{ hadrons}$

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

² ABLIKIM 23N reports $(4.26 \pm 0.13 \pm 0.15) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \phi\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.75 \pm 0.24) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $[\Gamma(\chi_{c1}(1P) \rightarrow \phi\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\phi\phi\eta)/\Gamma_{\text{total}}$ Γ_{58}/Γ

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

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

 $\Gamma(p\bar{p}\pi^0)/\Gamma_{\text{total}}$ Γ_{60}/Γ

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

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

 $\Gamma(p\bar{p}\eta)/\Gamma_{\text{total}}$ Γ_{61}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
$0.145 \pm 0.024 \pm 0.004$		¹ ONYISI	10 CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.15	90	² ATHAR	07 CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ONYISI 10 reports $(1.56 \pm 0.22 \pm 0.14 \pm 0.10) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p}\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $[\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p}\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

 $\Gamma(p\bar{p}\omega)/\Gamma_{\text{total}}$ **Γ_{62}/Γ**

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
$0.212 \pm 0.030 \pm 0.006$	¹ ONYISI 10	CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$

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

 $\Gamma(p\bar{p}\phi)/\Gamma_{\text{total}}$ **Γ_{63}/Γ**

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.7 \times 10^{-5}$	90	¹ ABLIKIM 11F	BES3	$\psi(2S) \rightarrow \gamma p\bar{p}K^+K^-$

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

 $\Gamma(p\bar{p}\pi^+\pi^-)/\Gamma_{\text{total}}$ **Γ_{64}/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			

$0.46 \pm 0.12 \pm 0.15$	¹ BAI 99B	BES	$\psi(2S) \rightarrow \gamma\chi_{c1}$
$1.08 \pm 0.77 \pm 0.05$	¹ TANENBAUM 78	MRK1	$\psi(2S) \rightarrow \gamma\chi_{c1}$

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

 $\Gamma(p\bar{p}\pi^0\pi^0)/\Gamma_{\text{total}}$ **Γ_{65}/Γ**

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 5 \times 10^{-4}$	90	¹ HE 08B	CLEO	$e^+e^- \rightarrow \gamma h^+h^-h^0h^0$

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

 $\Gamma(p\bar{p}K^+K^- \text{ (non-resonant)})/\Gamma_{\text{total}}$ **Γ_{66}/Γ**

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

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

$\Gamma(p\bar{p}K_S^0 K_S^0)/\Gamma_{\text{total}}$ Γ_{67}/Γ

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

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

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

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

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

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

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

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

$\Gamma(p\bar{n}\pi^-\pi^0)/\Gamma_{\text{total}}$ Γ_{71}/Γ

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

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

$\Gamma(\bar{p}n\pi^+\pi^0)/\Gamma_{\text{total}}$ Γ_{72}/Γ

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

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

$\Gamma(\Lambda\bar{\Lambda}\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{74}/Γ

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

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

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

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

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

$\Gamma(\Lambda\bar{\Lambda}\pi^+\pi^- (\text{non-resonant}))/\Gamma_{\text{total}}$ Γ_{75}/Γ

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

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

$\Gamma(\Sigma(1385)^+\bar{\Lambda}\pi^- + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{76}/Γ

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

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

$\Gamma(\Sigma(1385)^-\bar{\Lambda}\pi^+ + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{77}/Γ

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

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

$\Gamma(K^+\bar{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{81}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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4.2 ± 0.4 OUR AVERAGE Error includes scale factor of 1.2.

$9.2^{+2.8}_{-2.4} \pm 0.4$ 24 ¹ LU 19 BELL $B^+ \rightarrow \bar{p}\Lambda K^+ K^+$

$4.2 \pm 0.4 \pm 0.1$ 3k ^{2,3} ABLIKIM 13D BES3 $\psi(2S) \rightarrow \gamma\Lambda\bar{p}K^+$

$3.1 \pm 0.9 \pm 0.1$ ⁴ ATHAR 07 CLEO $\psi(2S) \rightarrow \gamma h^+ h^- h^0$

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

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

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

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

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

Γ_{82}/Γ

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

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

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

Γ_{84}/Γ

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

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

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

Γ_{85}/Γ

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

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

$\Gamma(\Lambda(1520)\bar{\Lambda}(1520))/\Gamma_{\text{total}}$ Γ_{86}/Γ

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

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

 $\Gamma(\Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}$ Γ_{87}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$4.2 \pm 0.6 \pm 0.1$		103	¹ ABLIKIM	18V BES3	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$
<6	90		² ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$
<4	90	3.8 ± 2.5	³ NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{\Sigma}^0$

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

¹ ABLIKIM 18V reports $[\Gamma(\chi_{c1}(1P) \rightarrow \Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))] = (0.41 \pm 0.05 \pm 0.03) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $[\Gamma(\chi_{c1}(1P) \rightarrow \Sigma^0 \bar{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

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

 $\Gamma(\Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}$ Γ_{90}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$3.6 \pm 0.6 \pm 0.1$		59	¹ ABLIKIM	18V BES3	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$
<8	90		² ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$
<6	90	4.3 ± 2.3	³ NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Sigma^+ \bar{\Sigma}^-$

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

¹ ABLIKIM 18V reports $[\Gamma(\chi_{c1}(1P) \rightarrow \Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))] = (0.35 \pm 0.06 \pm 0.02) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $[\Gamma(\chi_{c1}(1P) \rightarrow \Sigma^+ \bar{\Sigma}^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

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

$\Gamma(\Sigma^+ \bar{\Sigma}^- \eta)/\Gamma_{\text{total}}$ Γ_{91}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
$5.1 \pm 1.4 \pm 0.1$	36	¹ ABLIKIM	24CA BES3	$\psi(2S) \rightarrow \gamma \chi_{c1}(1P)$

¹ ABLIKIM 24CA reports $(5.10 \pm 1.21 \pm 0.67) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Sigma^+ \bar{\Sigma}^- \eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.24) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\Sigma^- \bar{\Sigma}^+)/\Gamma_{\text{total}}$ Γ_{92}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
$5.7 \pm 1.5 \pm 0.2$	214	¹ ABLIKIM	20I BES3	$\psi(2S) \rightarrow \gamma \Sigma^- \bar{\Sigma}^+$

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

 $\Gamma(\Sigma(1385)^+ \bar{\Sigma}(1385)^-)/\Gamma_{\text{total}}$ Γ_{93}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 9 \times 10^{-5}$	90	¹ ABLIKIM	12I BES3	$\psi(2S) \rightarrow \gamma \Lambda \bar{\Lambda} \pi^+ \pi^-$

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

 $\Gamma(\Sigma(1385)^- \bar{\Sigma}(1385)^+)/\Gamma_{\text{total}}$ Γ_{94}/Γ

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

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

 $\Gamma(K^- \Lambda \bar{\Xi}^+ + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{95}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$1.35 \pm 0.24 \pm 0.04$	49	¹ ABLIKIM	15I BES3	$\psi(2S) \rightarrow \gamma K^- \Lambda \bar{\Xi}^+ + \text{c.c.}$

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

$\Gamma(\Xi^0 \Xi^0)/\Gamma_{\text{total}}$ Γ_{96}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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$7.5 \pm 1.2 \pm 0.2$		325	¹ ABLIKIM	220 BES3	$\psi(2S) \rightarrow \gamma \Xi^0 \Xi^0$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<6	90	1.7 ± 2.4	² NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Xi^0 \Xi^0$
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¹ ABLIKIM 220 reports $(0.75 \pm 0.11 \pm 0.06) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Xi^0 \Xi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.24) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $[\Gamma(\chi_{c1}(1P) \rightarrow \Xi^0 \Xi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

$\Gamma(\Xi^- \Xi^+)/\Gamma_{\text{total}}$ Γ_{97}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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0.60 ± 0.06 OUR AVERAGE

$0.58 \pm 0.06 \pm 0.02$		692	¹ ABLIKIM	220 BES3	$\psi(2S) \rightarrow \gamma \Xi^- \Xi^+$
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$0.80 \pm 0.21 \pm 0.02$	16.4 ± 4.3		² NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Xi^+ \Xi^-$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 3.4	90		³ ABLIKIM	06D BES2	$\psi(2S) \rightarrow \gamma \chi_{c1}$
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¹ ABLIKIM 220 reports $(0.58 \pm 0.04 \pm 0.05) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Xi^- \Xi^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.24) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $(0.86 \pm 0.22 \pm 0.08) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \Xi^- \Xi^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

³ Using $B(\psi(2S) \rightarrow \chi_{c1} \gamma) (9.1 \pm 0.6)\%$.

$\Gamma(\Omega^- \bar{\Omega}^+)/\Gamma_{\text{total}}$ Γ_{98}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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$1.49 \pm 0.23 \pm 0.10$		277	ABLIKIM	23T BES3	$\chi_{cJ} \rightarrow \Omega^- \bar{\Omega}^+$
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$[\Gamma(\pi^+ \pi^-) + \Gamma(K^+ K^-)]/\Gamma_{\text{total}}$ Γ_{99}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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$< 21 \times 10^{-4}$		¹ FELDMAN	77 MRK1	$\psi(2S) \rightarrow \gamma \chi_{c1}$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 38 \times 10^{-4}$	90	¹ BRANDELIK	79B DASP	$\psi(2S) \rightarrow \gamma \chi_{c1}$
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¹ Estimated using $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 0.087$. The errors do not contain the uncertainty in the $\psi(2S)$ decay.

$\Gamma(K_S^0 K_S^0)/\Gamma_{\text{total}}$					Γ_{100}/Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<6 \times 10^{-5}$	90	¹ ABLIKIM	050	BES2	$\psi(2S) \rightarrow \chi_{c1} \gamma$
¹ ABLIKIM 050 reports $[\Gamma(\chi_{c1}(1P) \rightarrow K_S^0 K_S^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ $< 0.6 \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = 9.75 \times 10^{-2}$.					

$\Gamma(\eta_c \pi^+ \pi^-)/\Gamma_{\text{total}}$					Γ_{101}/Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<3.2 \times 10^{-3}$	90	^{1,2} ABLIKIM	13B	BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c1}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<4.4 \times 10^{-3}$	90	^{1,3} ABLIKIM	13B	BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c1}$
¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c1} \gamma) = (9.2 \pm 0.4)\%$.					
² Using the $\eta_c \rightarrow K_S^0 K^\pm \pi^\mp$ decays.					
³ Using the $\eta_c \rightarrow K^+ K^- \pi^0$ decays.					

RADIATIVE DECAYS

$\Gamma(\gamma \rho^0)/\Gamma_{\text{total}}$					Γ_{103}/Γ
VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT	
216 ± 17 OUR AVERAGE					
215 ± 22 ± 6	432 ± 25	¹ ABLIKIM	11E	BES3	$\psi(2S) \rightarrow \gamma \gamma \rho^0$
217 ± 24 ± 6	186 ± 15	² BENNETT	08A	CLEO	$\psi(2S) \rightarrow \gamma \gamma \rho^0$
¹ ABLIKIM 11E reports $(228 \pm 13 \pm 22) \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \gamma \rho^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $[\Gamma(\chi_{c1}(1P) \rightarrow \gamma \rho^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.					

$\Gamma(\gamma \omega)/\Gamma_{\text{total}}$					Γ_{104}/Γ
VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT	
68 ± 8 OUR AVERAGE					
66 ± 9 ± 2	136 ± 14	¹ ABLIKIM	11E	BES3	$\psi(2S) \rightarrow \gamma \gamma \omega$
74 ± 17 ± 2	39 ± 7	² BENNETT	08A	CLEO	$\psi(2S) \rightarrow \gamma \gamma \omega$
¹ ABLIKIM 11E reports $(69.7 \pm 7.2 \pm 6.6) \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \gamma \omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $[\Gamma(\chi_{c1}(1P) \rightarrow \gamma \omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.					

$\Gamma(\gamma\phi)/\Gamma_{\text{total}}$ Γ_{105}/Γ

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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$24 \pm 5 \pm 1$		43 ± 9	¹ ABLIKIM	11E BES3	$\psi(2S) \rightarrow \gamma\gamma\phi$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 23	90	5.2 ± 3.1	² BENNETT	08A CLEO	$\psi(2S) \rightarrow \gamma\gamma\phi$
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¹ ABLIKIM 11E reports $(25.8 \pm 5.2 \pm 2.3) \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow \gamma\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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 $[\Gamma(\chi_{c1}(1P) \rightarrow \gamma\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = 9.75 \times 10^{-2}$.

 $\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ Γ_{106}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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$< 6.3 \times 10^{-6}$	90	ABLIKIM	17AE BES3	$\psi(2S) \rightarrow \gamma\chi_{c1} \rightarrow 3\gamma$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

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

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

 $\Gamma(e^+e^- J/\psi(1S))/\Gamma_{\text{total}}$ Γ_{107}/Γ

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

$3.65 \pm 0.23 \pm 0.10$	1.9k	^{1,2} ABLIKIM	17I BES3	$\psi(2S) \rightarrow \gamma e^+e^- J/\psi$
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¹ ABLIKIM 17I reports $(3.73 \pm 0.09 \pm 0.25) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \rightarrow e^+e^- J/\psi(1S))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.55 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) = (9.75 \pm 0.27) \times 10^{-2}$. 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

 $\Gamma(e^+e^- J/\psi(1S))/\Gamma(\gamma J/\psi(1S))$ $\Gamma_{107}/\Gamma_{102}$

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
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$10.1 \pm 0.3 \pm 0.5$	1.9k	¹ ABLIKIM	17I BES3	$\psi(2S) \rightarrow e^+e^- \gamma J/\psi$
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¹ Uses $B(\psi(2S) \rightarrow \gamma\chi_{c1}(1P)) \times B(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S)) = (351.8 \pm 1.0 \pm 12.0) \times 10^{-4}$ from ABLIKIM 17N and accounts for common systematic errors.

 $\Gamma(\mu^+\mu^- J/\psi(1S))/\Gamma(e^+e^- J/\psi(1S))$ $\Gamma_{108}/\Gamma_{107}$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
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$6.73 \pm 0.51 \pm 0.50$	222	ABLIKIM	19Z BES3	$\psi(2S) \rightarrow \gamma\chi_c \rightarrow \gamma(\mu^+\mu^- J/\psi)$
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$\chi_{c1}(1P)$ CROSS-PARTICLE BRANCHING RATIOS

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow 2(\pi^+\pi^-))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma_{\text{total}}}{\Gamma_4/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma\psi(2S)}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
6.68±0.01±0.25	670	¹ ABLIKIM	24BT BES3	$\psi(2S) \rightarrow \gamma\chi_{c1}$

¹ Calculated by us. The value given here is derived from the value of $B(\chi_{c1} \rightarrow 2(\pi^+\pi^-))$ reported in ABLIKIM 24BT using $B(\psi(2S) \rightarrow \gamma\chi_{c1}) = (9.75 \pm 0.24)\%$ [PDG 22].

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma_{\text{total}}}{\Gamma_{19}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma\psi(2S)}$$

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 $\psi(2S) \rightarrow \gamma K_S^0 K^+ \pi^-$

7.0±0.5±0.9 ² ABLIKIM 06R BES2 $\psi(2S) \rightarrow \gamma\chi_{c1}$

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

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

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma_{\text{total}}}{\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \Gamma_{19}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}}$$

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	$\psi(2S) \rightarrow \gamma K_S^0 K^+ \pi^-$

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

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow K^+ K^- K^+ K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma_{\text{total}}}{\Gamma_{48}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma\psi(2S)}$$

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

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

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow K^+ K^- K^+ K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma_{\text{total}}}{\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \Gamma_{48}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}}$$

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

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

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow 3(K^+ K^-))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))/\Gamma_{\text{total}}}{\Gamma_{52}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma_{\psi(2S)}}$$

VALUE (units 10^{-7})	EVTS	DOCUMENT ID	TECN	COMMENT
$4.1 \pm 0.9 \pm 0.5$	24.9 ± 5.1	¹ ABLIKIM	24P	BES3 $e^+ e^- \rightarrow \psi(2S)$

¹ Systematic error derived by us, based on the text.

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow p \bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))/\Gamma_{\text{total}}}{\Gamma_{59}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma_{\psi(2S)}}$$

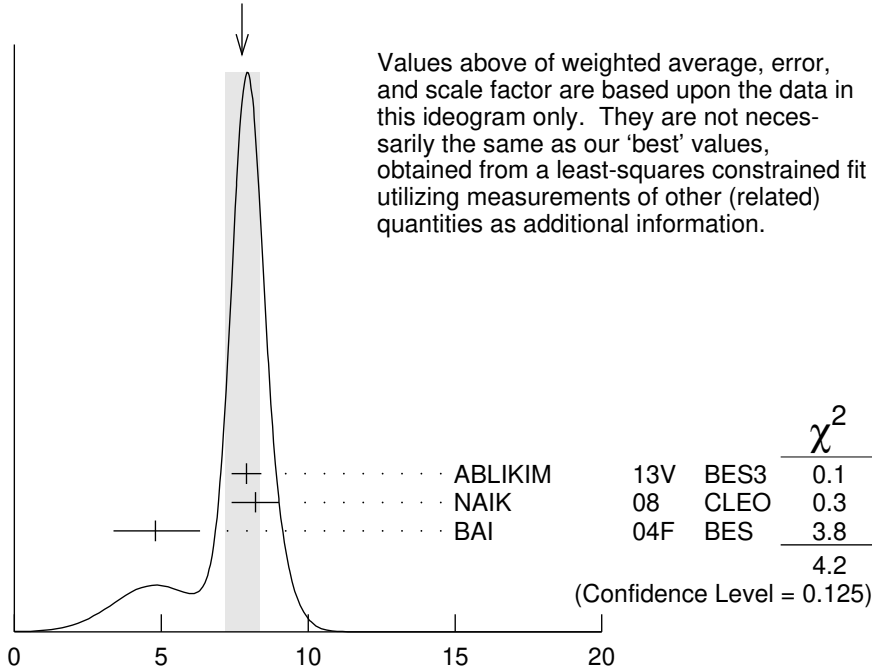
VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
7.4 ± 0.4 OUR FIT	Error includes scale factor of 1.3.			

7.8 ± 0.6 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.

$7.9 \pm 0.4 \pm 0.3$	453	ABLIKIM	13v	BES3	$\psi(2S) \rightarrow \gamma p \bar{p}$
$8.2 \pm 0.7 \pm 0.4$	141 ± 13	¹ NAIK	08	CLEO	$\psi(2S) \rightarrow \gamma p \bar{p}$
$4.8^{+1.4}_{-1.3} \pm 0.6$	$18.2^{+5.5}_{-4.9}$	BAI	04F	BES	$\psi(2S) \rightarrow \gamma \chi_{c1}(1P) \rightarrow \gamma \bar{p} p$

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

WEIGHTED AVERAGE
 7.8 ± 0.6 (Error scaled by 1.4)



$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow p \bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))/\Gamma_{\text{total}}}{\Gamma_{59}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma_{\psi(2S)}}$$

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow p \bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))/\Gamma_{\text{total}}}{\Gamma_{59}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma_{\psi(2S)}}$$

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

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

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow p\bar{p}K_S^0 K^- \pi^+ + \text{c.c.})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))}{\Gamma_{\text{total}}} \times \frac{\Gamma_{68}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma\psi(2S)}$$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
4.05±0.24±0.39	396	ABLIKIM	24BX BES3	$\psi(2S) \rightarrow \gamma\chi_{c1}$

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow \Lambda\bar{\Lambda})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))}{\Gamma_{\text{total}}} \times \frac{\Gamma_{73}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma\psi(2S)}$$

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	$\psi(2S) \rightarrow \gamma p\pi^- \bar{p}\pi^+$
10.5±1.6±0.6	46	¹ NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
11.2±1.0±0.9	136	^{2,3} ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}$

¹ Calculated by us. NAIK 08 reports $B(\chi_{c1} \rightarrow \Lambda\bar{\Lambda}) = (11.6 \pm 1.8 \pm 0.7 \pm 0.7) \times 10^{-5}$ using $B(\psi(2S) \rightarrow \gamma\chi_{c1}) = (9.07 \pm 0.11 \pm 0.54)\%$.

² Superseded by ABLIKIM 21L

³ Calculated by us. ABLIKIM 13H reports $B(\chi_{c1} \rightarrow \Lambda\bar{\Lambda}) = (12.2 \pm 1.1 \pm 1.1) \times 10^{-5}$ from a measurement of $B(\chi_{c1} \rightarrow \Lambda\bar{\Lambda}) \times B(\psi(2S) \rightarrow \gamma\chi_{c1})$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c1}) = (9.2 \pm 0.4)\%$.

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow \Lambda\bar{\Lambda})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))}{\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)} \times \frac{\Gamma_{73}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}}$$

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	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}$

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

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow \Lambda\bar{\Lambda}\eta)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))}{\Gamma_{\text{total}}} \times \frac{\Gamma_{78}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma\psi(2S)}$$

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

$$\frac{\Gamma(\chi_{c1}(1P) \rightarrow \Lambda\bar{\Lambda}\omega)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))}{\Gamma_{\text{total}}} \times \frac{\Gamma_{79}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma\psi(2S)}$$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
9.8±1.0±1.1	202 ± 20	¹ ABLIKIM	24BE BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c1}$

¹ Calculated by us. The authors report $B(\chi_{c1} \rightarrow \Lambda\bar{\Lambda}\omega)$ obtained from a product using PDG 22 value of $B(\psi(2S) \rightarrow \gamma\chi_{c1})$.

$$\Gamma(\chi_{c1}(1P) \rightarrow \Lambda \bar{\Lambda} \phi) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) / \Gamma_{\text{total}} \\ \Gamma_{80} / \Gamma \times \Gamma_{182}^{\psi(2S)} / \Gamma^{\psi(2S)}$$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
$5.86 \pm 0.87 \pm 0.39$	51.6	ABLIKIM	24AC BES3	$\psi(2S) \rightarrow \gamma \chi_{c1}$

$$\Gamma(\chi_{c1}(1P) \rightarrow \bar{p} \Lambda(1520) K_S^0 \pi^+ + \text{c.c.}) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) / \Gamma_{\text{total}} \\ \Gamma_{83} / \Gamma \times \Gamma_{182}^{\psi(2S)} / \Gamma^{\psi(2S)}$$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
$3.96^{+0.77}_{-0.74} \pm 0.50$	88	ABLIKIM	24BX BES3	$\psi(2S) \rightarrow \gamma \chi_{c1}$

$$\Gamma(\chi_{c1}(1P) \rightarrow \Sigma^+ \bar{p} K_S^0 + \text{c.c.}) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) / \Gamma_{\text{total}} \\ \Gamma_{88} / \Gamma \times \Gamma_{182}^{\psi(2S)} / \Gamma^{\psi(2S)}$$

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

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

$$\Gamma(\chi_{c1}(1P) \rightarrow \Sigma^0 \bar{p} K^+ + \text{c.c.}) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) / \Gamma_{\text{total}} \\ \Gamma_{89} / \Gamma \times \Gamma_{182}^{\psi(2S)} / \Gamma^{\psi(2S)}$$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
$1.42 \pm 0.07 \pm 0.06$	493	¹ ABLIKIM	20AE BES3	$\psi(2S) \rightarrow \gamma \Sigma^0 \bar{p} K^+ + \text{c.c.}$

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

$$\Gamma(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S)) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P)) / \Gamma_{\text{total}} \\ \Gamma_{102} / \Gamma \times \Gamma_{182}^{\psi(2S)} / \Gamma^{\psi(2S)}$$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
3.34 ± 0.10 OUR FIT	Error includes scale factor of 1.7.			

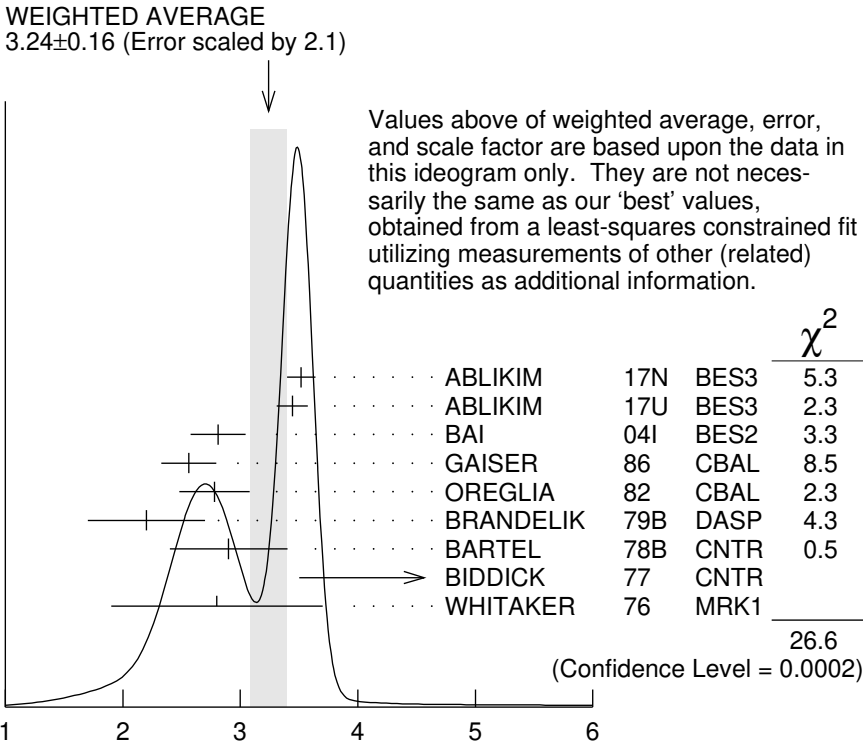
3.24 ± 0.16 OUR AVERAGE Error includes scale factor of 2.1. See the ideogram below.

$3.518 \pm 0.010 \pm 0.120$	143k	¹ ABLIKIM	17N BES3	$\psi(2S) \rightarrow \gamma \gamma J/\psi$
$3.442 \pm 0.010 \pm 0.132$	1.9M	ABLIKIM	17U BES3	$e^+ e^- \rightarrow \gamma X$
$2.81 \pm 0.05 \pm 0.23$	13k	BAI	04I BES2	$\psi(2S) \rightarrow J/\psi \gamma \gamma$
$2.56 \pm 0.12 \pm 0.20$		GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X$
2.78 ± 0.30		² OREGLIA	82 CBAL	$\psi(2S) \rightarrow \gamma \chi_{c1}$
2.2 ± 0.5		³ BRANDELIK	79B DASP	$\psi(2S) \rightarrow \gamma \chi_{c1}$
2.9 ± 0.5		³ BARTEL	78B CNTR	$\psi(2S) \rightarrow \gamma \chi_{c1}$
5.0 ± 1.5		⁴ BIDDICK	77 CNTR	$e^+ e^- \rightarrow \gamma X$
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	120 BES3	$\psi(2S) \rightarrow \gamma \chi_{c1}$
$3.56 \pm 0.03 \pm 0.12$	24.9k	⁶ MENDEZ	08 CLEO	$\psi(2S) \rightarrow \gamma \chi_{c1}$
$3.44 \pm 0.06 \pm 0.13$	3.7k	⁷ ADAM	05A CLEO	Repl. by MENDEZ 08

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



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

$\Gamma(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c1}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)$
 $\Gamma_{102}/\Gamma \times \Gamma_{182}^{\psi(2S)}/\Gamma_{12}^{\psi(2S)}$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
9.62±0.29 OUR FIT	Error includes scale factor of 1.7.			
10.15±0.28 OUR AVERAGE				
10.17±0.07±0.27	24.9k	MENDEZ 08	CLEO	$\psi(2S) \rightarrow \gamma \chi_{c1}$
12.6 ±0.3 ±3.8	3k	¹ ABLIKIM 04B	BES	$\psi(2S) \rightarrow J/\psi X$
8.5 ±2.1		² HIMEL 80	MRK2	$\psi(2S) \rightarrow \gamma \chi_{c1}$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
10.24±0.17±0.23	3.7k	³ ADAM 05A	CLEO	Repl. by MENDEZ 08

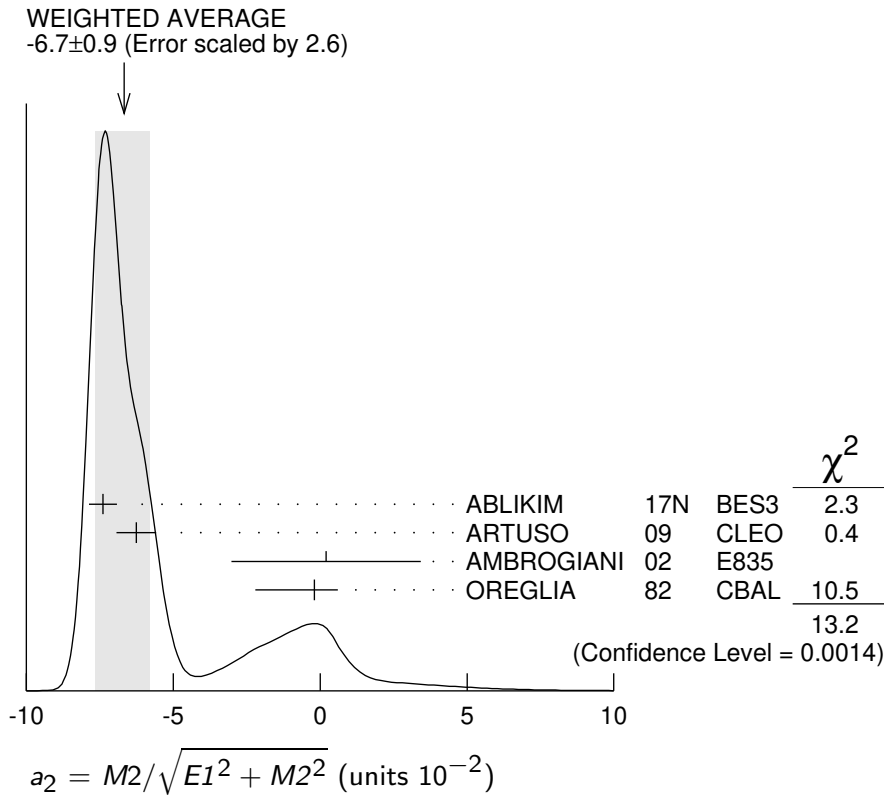
¹ From a fit to the J/ψ recoil mass spectra.
² The value for $B(\psi(2S) \rightarrow \gamma \chi_{c1}) \times B(\chi_{c1} \rightarrow \gamma J/\psi(1S))$ quoted in HIMEL 80 is derived using $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (33 \pm 3)\%$ and $B(J/\psi(1S) \rightarrow \ell^+\ell^-) = 0.138 \pm 0.018$. Calculated by us using $B(J/\psi(1S) \rightarrow \ell^+\ell^-) = 0.1181 \pm 0.0020$.
³ Not independent from other values reported by ADAM 05A.

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

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

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

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



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

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

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

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

MULTIPOLE AMPLITUDE RATIOS IN RADIATIVE DECAYS

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

 a_2/b_2 Magnetic quadrupole transition amplitude ratio

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

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

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

ABLIKIM	24AC	PR D110 032016	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	24BE	PR D110 032022	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	24BT	PR D110 072009	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	24BW	PR D110 092003	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	24BX	PR D110 112009	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	24CA	PR D110 112013	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	24P	PR D109 072016	M. Ablikim <i>et al.</i>	(BESIII Collab.)
AAIJ	23AH	PR D108 032010	R. Aaij <i>et al.</i>	(LHCb Collab.)
ABLIKIM	23N	JHEP 2305 069	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	23T	PR D107 092004	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	22AF	PRL 129 122001	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	22AO	PR D106 072004	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	22O	JHEP 2206 074	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	22Q	PR D106 032014	M. Ablikim <i>et al.</i>	(BESIII Collab.)
PDG	22	PTEP 2022 083C01	R.L. Workman <i>et al.</i>	(PDG Collab.)
ABLIKIM	21AV	JHEP 2111 217	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	21L	PR D103 112004	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	20AE	PR D102 092006	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	20B	PR D101 012012	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	20I	PR D101 092002	M. Ablikim <i>et al.</i>	(BESIII Collab.)
PDG	20	PTEP 2020 083C01	P.A. Zyla <i>et al.</i>	(PDG Collab.)
ABLIKIM	19AA	PR D99 052008	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	19AU	PR D100 052010	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	19BB	PR D100 092006	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	19J	PR D99 012015	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	19Z	PR D99 051101	M. Ablikim <i>et al.</i>	(BESIII Collab.)
LU	19	PR D99 032003	P.-C. Lu <i>et al.</i>	(BELLE Collab.)
ABLIKIM	18D	PRL 121 022001	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	18V	PR D97 052011	M. Ablikim <i>et al.</i>	(BESIII Collab.)
PDG	18	PR D98 030001	M. Tanabashi <i>et al.</i>	(PDG Collab.)
AAIJ	17BB	EPJ C77 609	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	17BI	PRL 119 221801	R. Aaij <i>et al.</i>	(LHCb Collab.)
ABLIKIM	17AE	PR D96 092007	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	17I	PRL 118 221802	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	17K	PR D95 032002	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	17N	PR D95 072004	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	17U	PR D96 032001	M. Ablikim <i>et al.</i>	(BESIII Collab.)
PDG	16	CP C40 100001	C. Patrignani <i>et al.</i>	(PDG Collab.)
ABLIKIM	15I	PR D91 092006	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	15M	PR D91 112008	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	14J	PR D89 074030	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	13B	PR D87 012002	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	13D	PR D87 012007	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	13H	PR D87 032007	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	13V	PR D88 112001	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	12I	PR D86 052004	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	12J	PR D86 052011	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	12O	PRL 109 172002	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	11A	PR D83 012006	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	11D	PR D83 032003	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	11E	PR D83 112005	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	11F	PR D83 112009	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	11K	PRL 107 092001	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ONYISI	10	PR D82 011103	P.U.E. Onyisi <i>et al.</i>	(CLEO Collab.)

ARTUSO	09	PR D80 112003	M. Artuso <i>et al.</i>	(CLEO Collab.)
BENNETT	08A	PRL 101 151801	J.V. Bennett <i>et al.</i>	(CLEO Collab.)
ECKLUND	08A	PR D78 091501	K.M. Ecklund <i>et al.</i>	(CLEO Collab.)
HE	08B	PR D78 092004	Q. He <i>et al.</i>	(CLEO Collab.)
MENDEZ	08	PR D78 011102	H. Mendez <i>et al.</i>	(CLEO Collab.)
NAIK	08	PR D78 031101	P. Naik <i>et al.</i>	(CLEO Collab.)
ATHAR	07	PR D75 032002	S.B. Athar <i>et al.</i>	(CLEO Collab.)
ABLIKIM	06D	PR D73 052006	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06R	PR D74 072001	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	06T	PL B642 197	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	05G	PR D71 092002	M. Ablikim <i>et al.</i>	(BES Collab.)
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ANDREOTTI	05A	NP B717 34	M. Andreotti <i>et al.</i>	(FNAL E835 Collab.)
ABLIKIM	04B	PR D70 012003	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	04H	PR D70 092003	M. Ablikim <i>et al.</i>	(BES Collab.)
BAI	04F	PR D69 092001	J.Z. Bai <i>et al.</i>	(BES Collab.)
BAI	04I	PR D70 012006	J.Z. Bai <i>et al.</i>	(BES Collab.)
AULCHENKO	03	PL B573 63	V.M. Aulchenko <i>et al.</i>	(KEDR Collab.)
BAI	03E	PR D67 112001	J.Z. Bai <i>et al.</i>	(BES Collab.)
AMBROGIANI	02	PR D65 052002	M. Ambrogiani <i>et al.</i>	(FNAL E835 Collab.)
BAI	99B	PR D60 072001	J.Z. Bai <i>et al.</i>	(BES Collab.)
BAI	98D	PR D58 092006	J.Z. Bai <i>et al.</i>	(BES Collab.)
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ARMSTRONG	92	NP B373 35	T.A. Armstrong <i>et al.</i>	(FNAL, FERR, GENO+)
Also		PRL 68 1468	T.A. Armstrong <i>et al.</i>	(FNAL, FERR, GENO+)
BAGLIN	86B	PL B172 455	C. Baglin	(LAPP, CERN, GENO, LYON, OSLO+)
GAISER	86	PR D34 711	J. Gaiser <i>et al.</i>	(Crystal Ball Collab.)
LEMOIGNE	82	PL 113B 509	Y. Lemoigne <i>et al.</i>	(SACL, LOIC, SHMP+)
OREGLIA	82	PR D25 2259	M.J. Oreglia <i>et al.</i>	(SLAC, CIT, HARV+)
Also		Private Comm.	M.J. Oreglia	(EFI)
HIMEL	80	PRL 44 920	T. Himel <i>et al.</i>	(LBL, SLAC)
Also		Private Comm.	G. Trilling	(LBL, UCB)
BRANDELIK	79B	NP B160 426	R. Brandelik <i>et al.</i>	(DASP Collab.)
BARTEL	78B	PL 79B 492	W. Bartel <i>et al.</i>	(DESY, HEIDP)
TANENBAUM	78	PR D17 1731	W.M. Tanenbaum <i>et al.</i>	(SLAC, LBL)
Also		Private Comm.	G. Trilling	(LBL, UCB)
BIDDICK	77	PRL 38 1324	C.J. Biddick <i>et al.</i>	(UCSD, UMD, PAVI+)
FELDMAN	77	PRPL 33C 285	G.J. Feldman, M.L. Perl	(LBL, SLAC)
YAMADA	77	Hamburg Conf. 69	S. Yamada	(DASP Collab.)
WHITAKER	76	PRL 37 1596	J.S. Whitaker <i>et al.</i>	(SLAC, LBL)
TANENBAUM	75	PRL 35 1323	W.M. Tanenbaum <i>et al.</i>	(LBL, SLAC)