NODE=M055

$\chi_{c1}(1P)$

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

See the Review on "$\psi(2S)$ and χ_c branching ratios" before the $\chi_{c0}(1P)$ Listings. NODE=M055

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

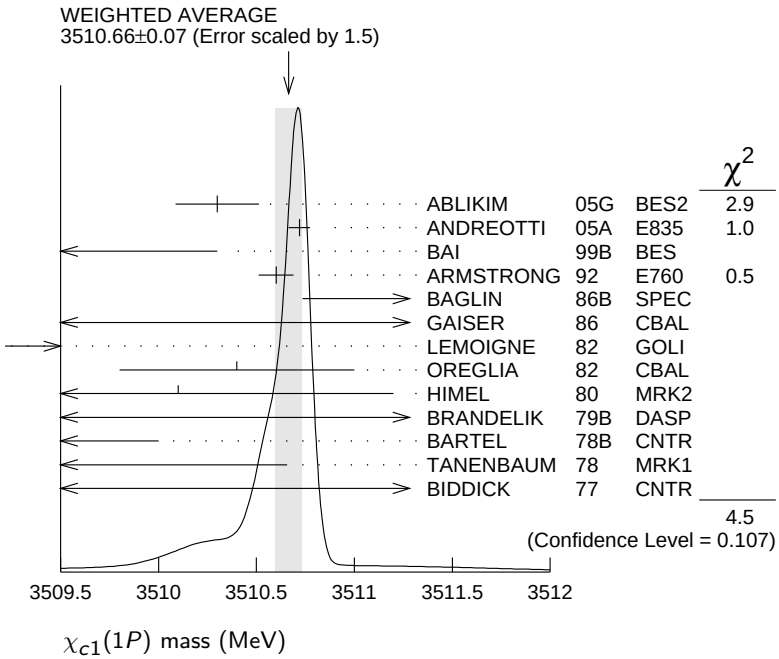
NODE=M055M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
3510.66 ± 0.07 OUR AVERAGE		Error includes scale factor of 1.5. See the ideogram below.			
3510.30 ± 0.14 ±0.16		ABLIKIM	05G	BES2	$\psi(2S) \to \gamma\chi_{c1}$
3510.719 ± 0.051 ± 0.019		ANDREOTTI	05A	E835	$p\overline{p} \to e^+e^-\gamma$
3509.4 ± 0.9		BAI	99B	BES	$\psi(2S) \to \gamma X$
3510.60 ± 0.087 ± 0.019	513	[1] ARMSTRONG	92	E760	$\overline{p}p \to e^+e^-\gamma$
3511.3 ± 0.4 ±0.4	30	BAGLIN	86B	SPEC	$\overline{p}p \to e^+e^-X$
3512.3 ± 0.3 ±4.0		[2] GAISER	86	CBAL	$\psi(2S) \to \gamma X$
3507.4 ± 1.7	91	[3] LEMOIGNE	82	GOLI	185 π^- Be $\to \gamma\mu^+\mu^-$ A
3510.4 ± 0.6		OREGLIA	82	CBAL	$e^+e^- \to J/\psi 2\gamma$
3510.1 ± 1.1	254	[4] HIMEL	80	MRK2	$e^+e^- \to J/\psi 2\gamma$
3509 ±11	21	BRANDELIK	79B	DASP	$e^+e^- \to J/\psi 2\gamma$
3507 ± 3		[4] BARTEL	78B	CNTR	$e^+e^- \to J/\psi 2\gamma$
3505.0 ± 4 ±4		[4,5] TANENBAUM	78	MRK1	e^+e^-
3513 ± 7	367	[4] BIDDICK	77	CNTR	$\psi(2S) \to \gamma X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3500 ±10	40	TANENBAUM	75	MRK1	Hadrons γ

NODE=M055M

OCCUR=2

[1] Recalculated by ANDREOTTI 05A, using the value of $\psi(2S)$ mass from AULCHENKO 03. NODE=M055M;LINKAGE=NW
[2] Using mass of $\psi(2S) = 3686.0$ MeV. NODE=M055M;LINKAGE=C
[3] $J/\psi(1S)$ mass constrained to 3097 MeV. NODE=M055M;LINKAGE=P
[4] Mass value shifted by us by amount appropriate for $\psi(2S)$ mass = 3686 MeV and $J/\psi(1S)$ mass = 3097 MeV. NODE=M055M;LINKAGE=D
[5] From a simultaneous fit to radiative and hadronic decay channels. NODE=M055M;LINKAGE=M



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

NODE=M055W

VALUE (MeV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.86 ±0.05 OUR FIT						
0.88 ±0.05 OUR AVERAGE						
$1.39 \; {}^{+0.40}_{-0.38} \; {}^{+0.26}_{-0.77}$			ABLIKIM	05G	BES2	$\psi(2S) \to \gamma\chi_{c1}$
0.876 ± 0.045 ± 0.026			ANDREOTTI	05A	E835	$p\overline{p} \to e^+e^-\gamma$
0.87 ±0.11 ±0.08		513	[6] ARMSTRONG	92	E760	$\overline{p}p \to e^+e^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •						

NODE=M055W

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

[6] Recalculated by ANDREOTTI 05A.

NODE=M055W;LINKAGE=AN

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

NODE=M055215;NODE=M055

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	
	Hadronic decays			NODE=M055;CLUMP=A
Γ_1	$3(\pi^+\pi^-)$	$(5.8 \pm 1.4) \times 10^{-3}$	S=1.2	DESIG=6
Γ_2	$2(\pi^+\pi^-)$	$(7.6 \pm 2.6) \times 10^{-3}$		DESIG=5
Γ_3	$\pi^+\pi^-\pi^0\pi^0$	(1.25 ± 0.17) %		DESIG=51
Γ_4	$\rho^+\pi^-\pi^0 +$ c.c.	(1.53 ± 0.26) %		DESIG=52
Γ_5	$\rho^0\pi^+\pi^-$	$(3.9 \pm 3.5) \times 10^{-3}$		DESIG=9
Γ_6	$4\pi^0$	$(5.7 \pm 0.8) \times 10^{-4}$		DESIG=60
Γ_7	$\pi^+\pi^-K^+K^-$	$(4.5 \pm 1.0) \times 10^{-3}$		DESIG=7
Γ_8	$K^+K^-\pi^0\pi^0$	$(1.17 \pm 0.29) \times 10^{-3}$		DESIG=53
Γ_9	$K^+\pi^-K^0\pi^0 +$ c.c.	$(9.0 \pm 1.4) \times 10^{-3}$		DESIG=55
Γ_{10}	$\rho^+K^-K^0 +$ c.c.	$(5.3 \pm 1.3) \times 10^{-3}$		DESIG=56
Γ_{11}	$K^*(892)^0K^0\pi^0 \rightarrow K^+\pi^-K^0\pi^0 +$ c.c.	$(2.4 \pm 0.7) \times 10^{-3}$		DESIG=57
Γ_{12}	$K^+K^-\eta\pi^0$	$(1.2 \pm 0.4) \times 10^{-3}$		DESIG=58
Γ_{13}	$\pi^+\pi^-K^0_SK^0_S$	$(7.2 \pm 3.1) \times 10^{-4}$		DESIG=28
Γ_{14}	$K^+K^-\eta$	$(3.3 \pm 1.0) \times 10^{-4}$		DESIG=42
Γ_{15}	$K^0K^+\pi^- +$ c.c.	$(7.3 \pm 0.6) \times 10^{-3}$		DESIG=17
Γ_{16}	$K^*(892)^0\overline{K}^0 +$ c.c.	$(1.0 \pm 0.4) \times 10^{-3}$		DESIG=32
Γ_{17}	$K^*(892)^+K^- +$ c.c.	$(1.5 \pm 0.7) \times 10^{-3}$		DESIG=33
Γ_{18}	$K^*_J(1430)^0\overline{K}^0 +$ c.c. $\rightarrow K^0_SK^+\pi^- +$ c.c.	$< 8 \times 10^{-4}$	CL=90%	DESIG=34
Γ_{19}	$K^*_J(1430)^+K^- +$ c.c. $\rightarrow K^0_SK^+\pi^- +$ c.c.	$< 2.3 \times 10^{-3}$	CL=90%	DESIG=35
Γ_{20}	$K^+K^-\pi^0$	$(1.91 \pm 0.26) \times 10^{-3}$		DESIG=38
Γ_{21}	$\eta\pi^+\pi^-$	$(5.0 \pm 0.5) \times 10^{-3}$		DESIG=31
Γ_{22}	$a_0(980)^+\pi^- +$ c.c. $\rightarrow \eta\pi^+\pi^-$	$(1.9 \pm 0.7) \times 10^{-3}$		DESIG=36
Γ_{23}	$f_2(1270)\eta$	$(2.8 \pm 0.8) \times 10^{-3}$		DESIG=37
Γ_{24}	$\pi^+\pi^-\eta'$	$(2.3 \pm 0.5) \times 10^{-3}$		DESIG=44
Γ_{25}	$\pi^0f_0(980) \rightarrow \pi^0\pi^+\pi^-$	$< 6 \times 10^{-6}$	CL=90%	DESIG=61
Γ_{26}	$K^+\overline{K}^*(892)^0\pi^- +$ c.c.	$(3.2 \pm 2.1) \times 10^{-3}$		DESIG=10
Γ_{27}	$K^*(892)^0\overline{K}^*(892)^0$	$(1.5 \pm 0.4) \times 10^{-3}$		DESIG=21
Γ_{28}	$K^+K^-K^0_SK^0_S$	$< 5 \times 10^{-4}$	CL=90%	DESIG=29
Γ_{29}	$K^+K^-K^+K^-$	$(5.6 \pm 1.2) \times 10^{-4}$		DESIG=14
Γ_{30}	$K^+K^-\phi$	$(4.3 \pm 1.6) \times 10^{-4}$		DESIG=30
Γ_{31}	$\omega\omega$	$(6.0 \pm 0.7) \times 10^{-4}$		DESIG=66
Γ_{32}	$\omega\phi$	$(2.2 \pm 0.6) \times 10^{-5}$		DESIG=67
Γ_{33}	$\phi\phi$	$(4.4 \pm 0.6) \times 10^{-4}$		DESIG=68
Γ_{34}	$p\overline{p}$	$(7.3 \pm 0.4) \times 10^{-5}$		DESIG=11
Γ_{35}	$p\overline{p}\pi^0$	$(1.63 \pm 0.20) \times 10^{-4}$		DESIG=39
Γ_{36}	$p\overline{p}\eta$	$(1.53 \pm 0.26) \times 10^{-4}$		DESIG=43
Γ_{37}	$p\overline{p}\omega$	$(2.23 \pm 0.33) \times 10^{-4}$		DESIG=59
Γ_{38}	$p\overline{p}\phi$	$< 1.8 \times 10^{-5}$	CL=90%	DESIG=65
Γ_{39}	$p\overline{p}\pi^+\pi^-$	$(5.0 \pm 1.9) \times 10^{-4}$		DESIG=8
Γ_{40}	$p\overline{p}\pi^0\pi^0$			DESIG=54
Γ_{41}	$p\overline{p}K^+K^-$ (non-resonant)	$(1.34 \pm 0.24) \times 10^{-4}$		DESIG=62
Γ_{42}	$p\overline{p}K^0_SK^0_S$	$< 4.5 \times 10^{-4}$	CL=90%	DESIG=25
Γ_{43}	$\Lambda\overline{\Lambda}$	$(1.18 \pm 0.19) \times 10^{-4}$		DESIG=19
Γ_{44}	$\Lambda\overline{\Lambda}\pi^+\pi^-$	$< 1.5 \times 10^{-3}$	CL=90%	DESIG=24
Γ_{45}	$K^+\overline{p}\Lambda$	$(4.3 \pm 0.4) \times 10^{-4}$	S=1.1	DESIG=40
Γ_{46}	$K^+p\Lambda(1520) +$ c.c.	$(1.8 \pm 0.5) \times 10^{-4}$		DESIG=63
Γ_{47}	$\Lambda(1520)\overline{\Lambda}(1520)$	$< 1.0 \times 10^{-4}$	CL=90%	DESIG=64
Γ_{48}	$\Sigma^0\overline{\Sigma}^0$	$< 4 \times 10^{-5}$	CL=90%	DESIG=48
Γ_{49}	$\Sigma^+\overline{\Sigma}^-$	$< 6 \times 10^{-5}$	CL=90%	DESIG=49
Γ_{50}	$\Xi^0\overline{\Xi}^0$	$< 6 \times 10^{-5}$	CL=90%	DESIG=50
Γ_{51}	$\Xi^-\overline{\Xi}^+$	$(8.4 \pm 2.3) \times 10^{-5}$		DESIG=26
Γ_{52}	$\pi^+\pi^- + K^+K^-$	$< 2.1 \times 10^{-3}$		DESIG=23
Γ_{53}	$K^0_SK^0_S$	$< 6 \times 10^{-5}$	CL=90%	DESIG=27

Radiative decays

NODE=M055;CLUMP=B

Γ_{54}	$\gamma J/\psi(1S)$	(34.8 ±1.5) %	DESIG=1
Γ_{55}	$\gamma \rho^0$	(2.27±0.19) × 10^{-4}	DESIG=45
Γ_{56}	$\gamma \omega$	(7.1 ±0.9) × 10^{-5}	DESIG=46
Γ_{57}	$\gamma \phi$	(2.6 ±0.6) × 10^{-5}	DESIG=47
Γ_{58}	$\gamma \gamma$		DESIG=4

CONSTRAINED FIT INFORMATION

A multiparticle fit to $\chi_{c1}(1P)$, $\chi_{c0}(1P)$, $\chi_{c2}(1P)$, and $\psi(2S)$ with 4 total widths, a partial width, 25 combinations of partial widths obtained from integrated cross section, and 84 branching ratios uses 227 measurements to determine 49 parameters. The overall fit has a χ^2 = 325.4 for 178 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, $x_i \equiv \Gamma_i/\Gamma_{total}$.

x_{29}	8				
x_{34}	−9	−4			
x_{43}	11	5	−5		
x_{54}	38	16	−31	21	
Γ	−13	−5	−60	−7	−29
	x_{15}	x_{29}	x_{34}	x_{43}	x_{54}

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

NODE=M055220

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

NODE=M055223

$\Gamma(p\overline{p}) \times \Gamma(\gamma J/\psi(1S))/\Gamma_{total}$ — $\Gamma_{34}\Gamma_{54}/\Gamma$

NODE=M055G1
NODE=M055G1

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
21.7±0.8 OUR FIT				
21.4±0.9 OUR AVERAGE				
21.5±0.5±0.8	[7] ANDREOTTI	05A	E835	$p\overline{p} \to e^+e^-\gamma$
21.4±1.5±2.2	[7,8] ARMSTRONG	92	E760	$\overline{p}p \to e^+e^-\gamma$
$19.9^{+4.4}_{-4.0}$	[7] BAGLIN	86B	SPEC	$\overline{p}p \to e^+e^-X$

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

NODE=M055G;LINKAGE=7A
NODE=M055G;LINKAGE=AN

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

NODE=M055225

HADRONIC DECAYS

NODE=M055305

$\Gamma(3(\pi^+\pi^-))/\Gamma_{total}$ — Γ_1/Γ

NODE=M055R6
NODE=M055R6

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
5.8±1.4 OUR EVALUATION Error includes scale factor of 1.2. Treating systematic error as correlated.				
5.8±1.1 OUR AVERAGE				
5.4±0.7±0.9	[9] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c1}$
16.0±5.9±0.8	[9] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c1}$

→ UNCHECKED ←

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

NODE=M055R;LINKAGE=X2

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

NODE=M055R4
NODE=M055R4

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
7.6±2.6 OUR EVALUATION Treating systematic error as correlated.				
8 ±4 OUR AVERAGE Error includes scale factor of 1.5.				
4.6±2.1±2.6	[10] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c1}$
12.5±4.2±0.6	[10] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c1}$

→ UNCHECKED ←

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

NODE=M055R4;LINKAGE=X2

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

NODE=M055R35
NODE=M055R35

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.25±0.17 OUR AVERAGE	[(1.26 ± 0.17)% OUR 2012 AVERAGE]				
1.25±0.16±0.05	604.7	[11] HE	08B	CLEO	$e^+e^- \to \gamma h^+h^-h^0h^0$

NEW

[11] HE 08B reports 1.28 ± 0.06 ± 0.15 ± 0.08 % from a measurement of $[\Gamma(\chi_{c1}(1P) \to \pi^+\pi^-\pi^0\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R35;LINKAGE=HE

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

NODE=M055R36
NODE=M055R36

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.53±0.25±0.06	712.3	[12,13] HE	08B	CLEO	$e^+e^- \to \gamma h^+h^-h^0h^0$

[12] HE 08B reports 1.56 ± 0.13 ± 0.22 ± 0.10 % from a measurement of $[\Gamma(\chi_{c1}(1P) \to \rho^+\pi^-\pi^0 + c.c.)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R36;LINKAGE=HE

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

NODE=M055R36;LINKAGE=OC

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

NODE=M055R8
NODE=M055R8

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
39±35	[14] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c1}$

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

NODE=M055R;LINKAGE=T

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

NODE=M055R44
NODE=M055R44

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
0.57±0.08±0.02	608	[15] ABLIKIM	11A	BES3	$e^+e^- \to \psi(2S) \to \gamma\chi_{c1}$

[15] ABLIKIM 11A reports $(0.57 \pm 0.03 \pm 0.08) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to 4\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R44;LINKAGE=AB

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

NODE=M055R5
NODE=M055R5

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	[16] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c1}$
7.3±3.0±0.4	[16] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c1}$

→ UNCHECKED ←

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

NODE=M055R5;LINKAGE=X2

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

NODE=M055R37
NODE=M055R37

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.117±0.029 OUR AVERAGE	[(0.118 ± 0.029)% OUR 2012 AVERAGE]				
0.117±0.028±0.005	45.1	[17] HE	08B	CLEO	$e^+e^- \to \gamma h^+h^-h^0h^0$

NEW

[17] HE 08B reports 0.12 ± 0.02 ± 0.02 ± 0.01 % from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+K^-\pi^0\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R37;LINKAGE=HE

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

NODE=M055R39
NODE=M055R39

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.90±0.14 OUR AVERAGE	[(0.90 ± 0.15)% OUR 2012 AVERAGE]				
0.90±0.14±0.03	141.3	[18] HE	08B	CLEO	$e^+e^- \to \gamma h^+h^-h^0h^0$

NEW

[18] HE 08B reports 0.92 ± 0.09 ± 0.11 ± 0.06 % from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+\pi^-K^0\pi^0 + c.c.)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R39;LINKAGE=HE

$\Gamma(\rho^+ K^- K^0 + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{10}/Γ

NODE=M055R40
NODE=M055R40

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.53±0.13±0.02	141.3	[19] HE	08B	CLEO	$e^+ e^- \to \gamma h^+ h^- h^0 h^0$

[19] HE 08B reports 0.54 ± 0.11 ± 0.07 ± 0.03 % from a measurement of $[\Gamma(\chi_{c1}(1P) \to \rho^+ K^- K^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R40;LINKAGE=HE

$\Gamma(K^*(892)^0 K^0 \pi^0 \to K^+ \pi^- K^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{11}/Γ

NODE=M055R41
NODE=M055R41

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.24±0.07 OUR AVERAGE	[(0.25 ± 0.07)% OUR 2012 AVERAGE]				
0.24±0.07±0.01	141.3	[20] HE	08B	CLEO	$e^+ e^- \to \gamma h^+ h^- h^0 h^0$

NEW

[20] HE 08B reports 0.25 ± 0.06 ± 0.03 ± 0.02 % from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^*(892)^0 K^0 \pi^0 \to K^+ \pi^- K^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R41;LINKAGE=HE

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

NODE=M055R42
NODE=M055R42

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.117±0.036±0.005	141.3	[21] HE	08B	CLEO	$e^+ e^- \to \gamma h^+ h^- h^0 h^0$

[21] HE 08B reports 0.12 ± 0.03 ± 0.02 ± 0.01 % from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+ K^- \eta\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R42;LINKAGE=HE

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

NODE=M055R05
NODE=M055R05

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
7.2±3.0±0.3	19.8 ± 7.7	[22] ABLIKIM	05O	BES2	$\psi(2S) \to \chi_{c1}\gamma$

[22] ABLIKIM 05O reports $[\Gamma(\chi_{c1}(1P) \to \pi^+ \pi^- K^0_S K^0_S)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))] = (0.67 \pm 0.26 \pm 0.11) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R05;LINKAGE=AB

$\Gamma(K^+ K^- \eta)/\Gamma_{\text{total}}$ — Γ_{14}/Γ

NODE=M055R25
NODE=M055R25

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.33±0.10±0.01	[23] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[23] ATHAR 07 reports $(0.34 \pm 0.10 \pm 0.04) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+ K^- \eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 0.0907 \pm 0.0011 \pm 0.0054$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R25;LINKAGE=AT

$\Gamma(K^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{15}/Γ

NODE=M055R17
NODE=M055R17

VALUE (units 10^{-3})	DOCUMENT ID
7.3±0.6 OUR FIT	

$\Gamma(K^*(892)^0 \overline{K}^0 + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{16}/Γ

NODE=M055R09
NODE=M055R09

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.03±0.38±0.04	22	[24] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[24] ABLIKIM 06R reports $(1.1 \pm 0.4 \pm 0.1) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^*(892)^0 \overline{K}^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R09;LINKAGE=AB

$\Gamma(K^*(892)^+ K^- + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{17}/Γ

NODE=M055R10
NODE=M055R10

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.5±0.7±0.1	27	[25] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[25] ABLIKIM 06R reports $(1.6 \pm 0.7 \pm 0.2) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^*(892)^+ K^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R10;LINKAGE=AB

$\Gamma(K_J^*(1430)^0 \overline{K}^0 + \text{c.c.} \to K_S^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{18}/Γ

NODE=M055R12
NODE=M055R12

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<0.8	90	[26] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[26] ABLIKIM 06R reports $< 0.9 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K_J^*(1430)^0 \overline{K}^0 + \text{c.c.} \to K_S^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.3 \times 10^{-2}$. NODE=M055R12;LINKAGE=AB

$\Gamma(K_J^*(1430)^+ K^- + \text{c.c.} \to K_S^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{19}/Γ

NODE=M055R13
NODE=M055R13

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<2.3	90	[27] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[27] ABLIKIM 06R reports $< 2.4 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K_J^*(1430)^+ K^- + \text{c.c.} \to K_S^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.3 \times 10^{-2}$. NODE=M055R13;LINKAGE=AB

$\Gamma(K^+ K^- \pi^0)/\Gamma_{\text{total}}$ — Γ_{20}/Γ

NODE=M055R20
NODE=M055R20

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
1.91±0.25±0.07	[28] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[28] ATHAR 07 reports $(1.95 \pm 0.16 \pm 0.23) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+ K^- \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 0.0907 \pm 0.0011 \pm 0.0054$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R20;LINKAGE=AT

$\Gamma(\eta\pi^+\pi^-)/\Gamma_{\text{total}}$ — Γ_{21}/Γ

NODE=M055R08
NODE=M055R08

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
5.0±0.5 OUR AVERAGE					
4.9±0.5±0.2		[29] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$
5.5±1.0±0.2	222	[30] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[29] ATHAR 07 reports $(5.0 \pm 0.3 \pm 0.5) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 0.0907 \pm 0.0011 \pm 0.0054$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R08;LINKAGE=AT

[30] ABLIKIM 06R reports $(5.9 \pm 0.7 \pm 0.8) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R08;LINKAGE=AB

$\Gamma(a_0(980)^+ \pi^- + \text{c.c.} \to \eta\pi^+\pi^-)/\Gamma_{\text{total}}$ — Γ_{22}/Γ

NODE=M055R15
NODE=M055R15

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.9±0.7±0.1	58	[31] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[31] ABLIKIM 06R reports $(2.0 \pm 0.5 \pm 0.5) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to a_0(980)^+ \pi^- + \text{c.c.} \to \eta\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R15;LINKAGE=AB

$\Gamma(f_2(1270)\eta)/\Gamma_{\text{total}}$ — Γ_{23}/Γ

NODE=M055R16
NODE=M055R16

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
2.8±0.8±0.1	53	[32] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[32] ABLIKIM 06R reports $(3.0 \pm 0.7 \pm 0.5) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to f_2(1270)\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R16;LINKAGE=AB

$\Gamma(\pi^+\pi^-\eta')/\Gamma_{total}$ — Γ_{24}/Γ

NODE=M055R28
NODE=M055R28

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
2.3±0.5 OUR AVERAGE	[(2.4 ± 0.5) × 10^{-3} OUR 2012 AVERAGE]			NEW
2.3±0.5±0.1	[33] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[33] ATHAR 07 reports (2.4 ± 0.4 ± 0.3) × 10^{-3} from a measurement of [$\Gamma(\chi_{c1}(1P) \to \pi^+\pi^-\eta')/\Gamma_{total}$] × [$B(\psi(2S) \to \gamma\chi_{c1}(1P))$] assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P))$ = 0.0907 ± 0.0011 ± 0.0054, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P))$ = (9.3 ± 0.4) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R28;LINKAGE=AT

$\Gamma(\pi^0 f_0(980) \to \pi^0\pi^+\pi^-)/\Gamma_{total}$ — Γ_{25}/Γ

NODE=M055R18
NODE=M055R18

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<6 × 10^{-6}	90	[34] ABLIKIM	11D	BES3	$\psi(2S) \to \gamma\pi^0\pi^+\pi^-$

[34] ABLIKIM 11D reports [$\Gamma(\chi_{c1}(1P) \to \pi^0 f_0(980) \to \pi^0\pi^+\pi^-)/\Gamma_{total}$] × [$B(\psi(2S) \to \gamma\chi_{c1}(1P))$] < 6.0 × 10^{-7} which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P))$ = 9.3 × 10^{-2}. NODE=M055R18;LINKAGE=BR

$\Gamma(K^+\overline{K}^*(892)^0\pi^- + c.c.)/\Gamma_{total}$ — Γ_{26}/Γ

NODE=M055R9
NODE=M055R9

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
32±21	[35] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c1}$

[35] Estimated using $B(\psi(2S) \to \gamma\chi_{c1}(1P))$ = 0.087. The errors do not contain the uncertainty in the $\psi(2S)$ decay. NODE=M055R9;LINKAGE=T

$\Gamma(K^*(892)^0\overline{K}^*(892)^0)/\Gamma_{total}$ — Γ_{27}/Γ

NODE=M055R26
NODE=M055R26

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.5±0.4±0.1	28.4 ± 5.5	[36,37] ABLIKIM	04H	BES	$\psi(2S) \to \gamma K^+K^-\pi^+\pi^-$

[36] ABLIKIM 04H reports [$\Gamma(\chi_{c1}(1P) \to K^*(892)^0\overline{K}^*(892)^0)/\Gamma_{total}$] × [$B(\psi(2S) \to \gamma\chi_{c1}(1P))$] = (1.40 ± 0.27 ± 0.22) × 10^{-4} which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P))$ = (9.3 ± 0.4) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R26;LINKAGE=AB

[37] Assumes $B(K^*(892)^0 \to K^-\pi^+)$ = 2/3. NODE=M055R26;LINKAGE=AL

$\Gamma(K^+K^-K^0_SK^0_S)/\Gamma_{total}$ — Γ_{28}/Γ

NODE=M055R06
NODE=M055R06

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<5	90	3.2 ± 2.4	[38] ABLIKIM	05O	BES2	$\psi(2S) \to \chi_{c1}\gamma$

[38] ABLIKIM 05O reports [$\Gamma(\chi_{c1}(1P) \to K^+K^-K^0_SK^0_S)/\Gamma_{total}$] × [$B(\psi(2S) \to \gamma\chi_{c1}(1P))$] < 4.2 × 10^{-5} which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P))$ = 9.3 × 10^{-2}. NODE=M055R06;LINKAGE=AB

$\Gamma(K^+K^-K^+K^-)/\Gamma_{total}$ — Γ_{29}/Γ

NODE=M055R14
NODE=M055R14

VALUE (units 10^{-3})	DOCUMENT ID
0.56±0.12 OUR FIT	

$\Gamma(K^+K^-\phi)/\Gamma_{total}$ — Γ_{30}/Γ

NODE=M055R07
NODE=M055R07

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
0.43±0.16±0.02	17	[39] ABLIKIM	06T	BES2	$\psi(2S) \to \gamma 2K^+2K^-$

[39] ABLIKIM 06T reports (0.46 ± 0.16 ± 0.06) × 10^{-3} from a measurement of [$\Gamma(\chi_{c1}(1P) \to K^+K^-\phi)/\Gamma_{total}$] × [$B(\psi(2S) \to \gamma\chi_{c1}(1P))$] assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P))$ = (8.7 ± 0.4) × 10^{-2}, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P))$ = (9.3 ± 0.4) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R07;LINKAGE=AB

$\Gamma(\omega\omega)/\Gamma_{total}$ — Γ_{31}/Γ

NODE=M055R49
NODE=M055R49

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
6.0±0.7±0.2	597	[40] ABLIKIM	11K	BES3	$\psi(2S) \to \gamma$ hadrons

[40] ABLIKIM 11K reports (6.0 ± 0.3 ± 0.7) × 10^{-4} from a measurement of [$\Gamma(\chi_{c1}(1P) \to \omega\omega)/\Gamma_{total}$] × [$B(\psi(2S) \to \gamma\chi_{c1}(1P))$] assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P))$ = (9.2 ± 0.4) × 10^{-2}, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P))$ = (9.3 ± 0.4) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R49;LINKAGE=AL

$\Gamma(\omega\phi)/\Gamma_{total}$ — Γ_{32}/Γ

NODE=M055R50
NODE=M055R50

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.22±0.06±0.01	15	[41] ABLIKIM	11K	BES3	$\psi(2S) \to \gamma$ hadrons

[41] ABLIKIM 11K reports $(0.22 \pm 0.06 \pm 0.02) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \omega\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R50;LINKAGE=AL

$\Gamma(\phi\phi)/\Gamma_{total}$ — Γ_{33}/Γ

NODE=M055R51
NODE=M055R51

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
4.4±0.5±0.2	366	[42] ABLIKIM	11K	BES3	$\psi(2S) \to \gamma$ hadrons

[42] ABLIKIM 11K reports $(4.4 \pm 0.3 \pm 0.5) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \phi\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R51;LINKAGE=AL

$\Gamma(p\overline{p})/\Gamma_{total}$ — Γ_{34}/Γ

NODE=M055R11
NODE=M055R11

VALUE (units 10^{-4})	DOCUMENT ID
0.73±0.04 OUR FIT	

$\Gamma(p\overline{p}\pi^0)/\Gamma_{total}$ — Γ_{35}/Γ

NODE=M055R21
NODE=M055R21

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.163±0.020 OUR AVERAGE				
$[(0.164 \pm 0.020) \times 10^{-3}$ OUR 2012 AVERAGE]				
0.171±0.020±0.007	[43] ONYISI	10	CLE3	$\psi(2S) \to \gamma p\overline{p}X$
0.117±0.049±0.005	[44] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

NEW

[43] ONYISI 10 reports $(1.75 \pm 0.16 \pm 0.13 \pm 0.11) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R21;LINKAGE=ON

[44] ATHAR 07 reports $(1.2 \pm 0.5 \pm 0.1) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R21;LINKAGE=AT

$\Gamma(p\overline{p}\eta)/\Gamma_{total}$ — Γ_{36}/Γ

NODE=M055R27
NODE=M055R27

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
0.153±0.026±0.006		[45] ONYISI	10	CLE3	$\psi(2S) \to \gamma p\overline{p}X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.16	90	[46] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+ h^- h^0$

[45] ONYISI 10 reports $(1.56 \pm 0.22 \pm 0.14 \pm 0.10) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\eta)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R27;LINKAGE=ON

[46] ATHAR 07 reports $< 0.16 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\eta)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.3 \times 10^{-2}$. NODE=M055R27;LINKAGE=AT

$\Gamma(p\overline{p}\omega)/\Gamma_{total}$ — Γ_{37}/Γ

NODE=M055R43
NODE=M055R43

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.223±0.033 OUR AVERAGE	$[(0.224 \pm 0.033) \times 10^{-3}$ OUR 2012 AVERAGE]			
0.223±0.032±0.009	[47] ONYISI	10	CLE3	$\psi(2S) \to \gamma p\overline{p}X$

NEW

[47] ONYISI 10 reports $(2.28 \pm 0.28 \pm 0.16 \pm 0.14) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\omega)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R43;LINKAGE=ON

$\Gamma(p\overline{p}\phi)/\Gamma_{total}$ — Γ_{38}/Γ

NODE=M055R48
NODE=M055R48

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<1.8	90	[48] ABLIKIM	11F	BES3	$\psi(2S) \to \gamma p\overline{p}K^+K^-$

[48] ABLIKIM 11F reports $< 1.82 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.3 \times 10^{-2}$.

NODE=M055R48;LINKAGE=AB

$\Gamma(p\overline{p}\pi^+\pi^-)/\Gamma_{total}$ — Γ_{39}/Γ

NODE=M055R7
NODE=M055R7

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
0.50±0.19 OUR EVALUATION	Treating systematic error as correlated.			
0.50±0.19 OUR AVERAGE				
0.46±0.12±0.15	[49] BAI	99B	BES	$\psi(2S) \to \gamma\chi_{c1}$
1.08±0.77±0.05	[49] TANENBAUM	78	MRK1	$\psi(2S) \to \gamma\chi_{c1}$

→ UNCHECKED ←

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

NODE=M055R7;LINKAGE=X2

$\Gamma(p\overline{p}\pi^0\pi^0)/\Gamma_{total}$ — Γ_{40}/Γ

NODE=M055R38
NODE=M055R38

VALUE (%)	CL%	DOCUMENT ID		TECN	COMMENT
<0.05	90	[50] HE	08B	CLEO	$e^+e^- \to \gamma h^+h^-h^0h^0$

[50] HE 08B reports < 0.05 % from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}\pi^0\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.3 \times 10^{-2}$.

NODE=M055R38;LINKAGE=HE

$\Gamma(p\overline{p}K^+K^-(\text{non-resonant}))/\Gamma_{total}$ — Γ_{41}/Γ

NODE=M055R45
NODE=M055R45

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.34±0.23±0.05	82 ± 9	[51] ABLIKIM	11F	BES3	$\psi(2S) \to \gamma p\overline{p}K^+K^-$

[51] ABLIKIM 11F reports $(1.35 \pm 0.15 \pm 0.19) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to p\overline{p}K^+K^-(\text{non-resonant}))/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R45;LINKAGE=AB

$\Gamma(p\overline{p}K^0_SK^0_S)/\Gamma_{total}$ — Γ_{42}/Γ

NODE=M055R02
NODE=M055R02

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<4.5	90	[52] ABLIKIM	06D	BES2	$\psi(2S) \to \gamma\chi_{c1}$

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

NODE=M055R;LINKAGE=AB

$\Gamma(\Lambda\overline{\Lambda})/\Gamma_{total}$ — Γ_{43}/Γ

NODE=M055R23
NODE=M055R23

VALUE (units 10^{-4})	DOCUMENT ID
1.18±0.19 OUR FIT	

$\Gamma(\Lambda\overline{\Lambda}\pi^+\pi^-)/\Gamma_{total}$ — Γ_{44}/Γ

NODE=M055R01
NODE=M055R01

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<1.5	90	[53] ABLIKIM	06D	BES2	$\psi(2S) \to \gamma\chi_{c1}$

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

NODE=M055R01;LINKAGE=AB

$\Gamma(K^+\overline{p}\Lambda)/\Gamma_{total}$ — Γ_{45}/Γ

NODE=M055R22
NODE=M055R22

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
4.3±0.4 OUR AVERAGE Error includes scale factor of 1.1. [$(0.32 \pm 0.10) \times 10^{-3}$ OUR 2012 AVERAGE]					
4.5±0.4±0.2	3k	[54,55] ABLIKIM	13D	BES3	$\psi(2S) \to \gamma\Lambda\overline{p}K^+$
3.2±0.9±0.1		[56] ATHAR	07	CLEO	$\psi(2S) \to \gamma h^+h^-h^0$

NEW

[54] ABLIKIM 13D reports $(4.5 \pm 0.2 \pm 0.4) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+\overline{p}\Lambda)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R22;LINKAGE=AB

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

NODE=M055R22;LINKAGE=LB

[56] ATHAR 07 reports $(3.3 \pm 0.9 \pm 0.4) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+\overline{p}\Lambda)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M055R22;LINKAGE=AT

$\Gamma(K^+ p\Lambda(1520)+\text{c.c.})/\Gamma_{\text{total}}$ — Γ_{46}/Γ

NODE=M055R46
NODE=M055R46

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.8±0.5±0.1	48 ± 10	[57] ABLIKIM	11F	BES3	$\psi(2S) \to \gamma p\overline{p}K^+K^-$

[57] ABLIKIM 11F reports $(1.81\pm0.38\pm0.28)\times10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to K^+ p\Lambda(1520)+\text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R46;LINKAGE=AB

$\Gamma(\Lambda(1520)\overline{\Lambda}(1520))/\Gamma_{\text{total}}$ — Γ_{47}/Γ

NODE=M055R47
NODE=M055R47

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<1.0	90	[58] ABLIKIM	11F	BES3	$\psi(2S) \to \gamma p\overline{p}K^+K^-$

[58] ABLIKIM 11F reports $< 1.00 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Lambda(1520)\overline{\Lambda}(1520))/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.3 \times 10^{-2}$. NODE=M055R47;LINKAGE=AB

$\Gamma(\Sigma^0\overline{\Sigma}^0)/\Gamma_{\text{total}}$ — Γ_{48}/Γ

NODE=M055R32
NODE=M055R32

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.4	90	3.8 ± 2.5	[59] NAIK	08	CLEO	$\psi(2S) \to \gamma\Sigma^0\overline{\Sigma}^0$

[59] NAIK 08 reports $< 0.44\times10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Sigma^0\overline{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07\pm0.11\pm0.54)\times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.3 \times 10^{-2}$. NODE=M055R32;LINKAGE=NA

$\Gamma(\Sigma^+\overline{\Sigma}^-)/\Gamma_{\text{total}}$ — Γ_{49}/Γ

NODE=M055R33
NODE=M055R33

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.6	90	4.3 ± 2.3	[60] NAIK	08	CLEO	$\psi(2S) \to \gamma\Sigma^+\overline{\Sigma}^-$

[60] NAIK 08 reports $< 0.65 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Sigma^+\overline{\Sigma}^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.3 \times 10^{-2}$. NODE=M055R33;LINKAGE=NA

$\Gamma(\Xi^0\overline{\Xi}^0)/\Gamma_{\text{total}}$ — Γ_{50}/Γ

NODE=M055R34
NODE=M055R34

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.6	90	1.7 ± 2.4	[61] NAIK	08	CLEO	$\psi(2S) \to \gamma\Xi^0\overline{\Xi}^0$

[61] NAIK 08 reports $< 0.60\times10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Xi^0\overline{\Xi}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07\pm0.11\pm0.54)\times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.3 \times 10^{-2}$. NODE=M055R34;LINKAGE=NA

$\Gamma(\Xi^-\overline{\Xi}^+)/\Gamma_{\text{total}}$ — Γ_{51}/Γ

NODE=M055R03
NODE=M055R03

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.84±0.22±0.03		16.4 ± 4.3	[62] NAIK	08	CLEO	$\psi(2S) \to \gamma\Xi^+\overline{\Xi}^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 3.4	90		[63] ABLIKIM	06D	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[62] NAIK 08 reports $(0.86 \pm 0.22 \pm 0.08) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \Xi^-\overline{\Xi}^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07\pm0.11\pm0.54)\times10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R03;LINKAGE=NA

[63] Using $B(\psi(2S) \to \chi_{c1}\gamma)$ (9.1 ± 0.6)%. NODE=M055R03;LINKAGE=AB

$[\Gamma(\pi^+\pi^-)+\Gamma(K^+K^-)]/\Gamma_{\text{total}}$ — Γ_{52}/Γ

NODE=M055R2
NODE=M055R2

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<21		[64] FELDMAN	77	MRK1	$\psi(2S) \to \gamma\chi_{c1}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<38	90	[64] BRANDELIK	79B	DASP	$\psi(2S) \to \gamma\chi_{c1}$

[64] Estimated using $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 0.087$. The errors do not contain the uncertainty in the $\psi(2S)$ decay. NODE=M055R2;LINKAGE=T

$\Gamma(K^0_S K^0_S)/\Gamma_{total}$ — Γ_{53}/Γ

NODE=M055R04
NODE=M055R04

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<0.6	90	[65] ABLIKIM	05O	BES2	$\psi(2S) \to \chi_{c1}\gamma$

[65] ABLIKIM 05O reports $[\Gamma(\chi_{c1}(1P) \to K^0_S K^0_S)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))] < 0.6\times10^{-5}$ which we divide by our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.3\times10^{-2}$. NODE=M055R04;LINKAGE=AB

RADIATIVE DECAYS

NODE=M055310

$\Gamma(\gamma J/\psi(1S))/\Gamma_{total}$ — Γ_{54}/Γ

NODE=M055R1
NODE=M055R1

VALUE	DOCUMENT ID	TECN	COMMENT
0.348±0.015 OUR FIT			
[0.344 ± 0.015 OUR 2012 FIT]			
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.379±0.008±0.021	[66] ADAM	05A CLEO	$e^+e^- \to \psi(2S) \to \gamma\chi_{c1}$

NEW

[66] Uses $B(\psi(2S) \to \gamma\chi_{c1} \to \gamma\gamma J/\psi)$ from ADAM 05A and $B(\psi(2S) \to \gamma\chi_{c1})$ from ATHAR 04. NODE=M055R1;LINKAGE=AD

$\Gamma(\gamma\rho^0)/\Gamma_{total}$ — Γ_{55}/Γ

NODE=M055R29
NODE=M055R29

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
227±19 OUR AVERAGE					
[(228 ± 19) × 10^{-6} OUR 2012 AVERAGE]					
226±23±9	432 ± 25	[67] ABLIKIM	11E	BES3	$\psi(2S) \to \gamma\gamma\rho^0$
228±25±9	186 ± 15	[68] BENNETT	08A	CLEO	$\psi(2S) \to \gamma\gamma\rho^0$

NEW

[67] ABLIKIM 11E reports $(228 \pm 13 \pm 22)\times10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \gamma\rho^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4)\times10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3\pm0.4)\times10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R29;LINKAGE=AB

[68] BENNETT 08A reports $(243 \pm 19 \pm 22)\times10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \gamma\rho^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4)\times10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3\pm0.4)\times10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R29;LINKAGE=BE

$\Gamma(\gamma\omega)/\Gamma_{total}$ — Γ_{56}/Γ

NODE=M055R30
NODE=M055R30

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
71± 9 OUR AVERAGE					
69± 9±3	136 ± 14	[69] ABLIKIM	11E	BES3	$\psi(2S) \to \gamma\gamma\omega$
78±18±3	39 ± 7	[70] BENNETT	08A	CLEO	$\psi(2S) \to \gamma\gamma\omega$

[69] ABLIKIM 11E reports $(69.7 \pm 7.2 \pm 6.6)\times10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \gamma\omega)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4)\times10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3\pm0.4)\times10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R30;LINKAGE=AB

[70] BENNETT 08A reports $(83 \pm 15 \pm 12)\times10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \gamma\omega)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4)\times10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3\pm0.4)\times10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R30;LINKAGE=BE

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

NODE=M055R31
NODE=M055R31

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
26±6±1		43 ± 9	[71] ABLIKIM	11E	BES3	$\psi(2S) \to \gamma\gamma\phi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<24	90	5.2 ± 3.1	[72] BENNETT	08A	CLEO	$\psi(2S) \to \gamma\gamma\phi$

[71] ABLIKIM 11E reports $(25.8 \pm 5.2 \pm 2.3)\times10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \gamma\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.2 \pm 0.4)\times10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.3\pm0.4)\times10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M055R31;LINKAGE=AB

[72] BENNETT 08A reports $< 26\times10^{-6}$ from a measurement of $[\Gamma(\chi_{c1}(1P) \to \gamma\phi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\chi_{c1}(1P))]$ assuming $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.4)\times10^{-2}$, which we rescale to our best value $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 9.3\times10^{-2}$. NODE=M055R31;LINKAGE=BE

$\Gamma(\gamma\gamma)/\Gamma_{total}$ — Γ_{58}/Γ

NODE=M055R3
NODE=M055R3

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<$ 3.5	90	ECKLUND	08A	CLEO	$\psi(2S) \to \gamma\chi_{c1} \to 3\gamma$
$<$150	90	[73] YAMADA	77	DASP	$e^+e^- \to 3\gamma$

[73] Estimated using $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = 0.087$. The errors do not contain the uncertainty in the $\psi(2S)$ decay. NODE=M055R;LINKAGE=T1

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

NODE=M055230

$\Gamma(\chi_{c1}(1P) \to p\overline{p})/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c1}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ — $\Gamma_{34}/\Gamma \times \Gamma_{119}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

NODE=M055B1
NODE=M055B1

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.98±0.16 OUR FIT				NEW
$[(2.02 \pm 0.16) \times 10^{-5}$ OUR 2012 FIT]				
1.1 ±1.0	[74] BAI	98I	BES	$\psi(2S) \to \gamma\chi_{c1} \to \gamma\overline{p}p$

[74] Calculated by us. The value for $B(\chi_{c1} \to p\overline{p})$ reported in BAI 98I is derived using $B(\psi(2S) \to \gamma\chi_{c1}) = (8.7 \pm 0.8)\%$ and $B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D]. NODE=M055B;LINKAGE=J2

$\Gamma(\chi_{c1}(1P) \to \Lambda\overline{\Lambda})/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c1}(1P))/\Gamma_{total}$ — $\Gamma_{43}/\Gamma \times \Gamma_{119}^{\psi(2S)}/\Gamma^{\psi(2S)}$

NODE=M055B10
NODE=M055B10

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
10.9±1.7 OUR FIT					
10.5±1.6±0.6	46 ± 7	[75] NAIK	08	CLEO	$\psi(2S) \to \gamma\Lambda\overline{\Lambda}$

[75] Calculated by us. NAIK 08 reports $B(\chi_{c1} \to \Lambda\overline{\Lambda}) = (11.6 \pm 1.8 \pm 0.7 \pm 0.7) \times 10^{-5}$ using $B(\psi(2S) \to \gamma\chi_{c1}) = (9.07 \pm 0.11 \pm 0.54)\%$. NODE=M055B10;LINKAGE=NA

$\Gamma(\chi_{c1}(1P) \to \Lambda\overline{\Lambda})/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c1}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ — $\Gamma_{43}/\Gamma \times \Gamma_{119}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

NODE=M055B11
NODE=M055B11

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
3.2±0.5 OUR FIT					NEW
$[(3.3 \pm 0.5) \times 10^{-5}$ OUR 2012 FIT]					
$\mathbf{7.1^{+2.8}_{-2.4} \pm 1.3}$	$9.0^{+3.5}_{-3.1}$	[76] BAI	03E	BES	$\psi(2S) \to \gamma\Lambda\overline{\Lambda}$

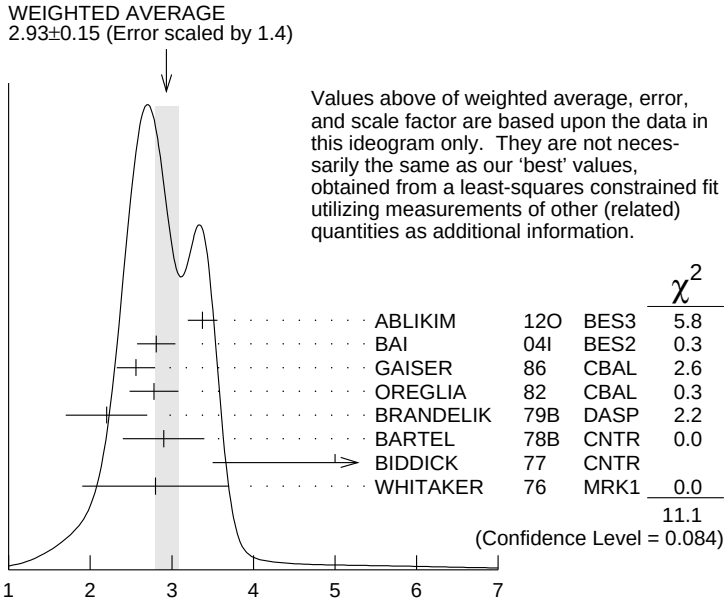
[76] BAI 03E reports $[\, B(\chi_{c1} \to \Lambda\overline{\Lambda})\, B(\psi(2S) \to \gamma\chi_{c1}) \,/\, B(\psi(2S) \to J/\psi\pi^+\pi^-)\,] \times [B^2(\Lambda \to \pi^- p) \,/\, B(J/\psi \to p\overline{p})\,] = (1.33^{+0.52}_{-0.46} \pm 0.25)\%$. We calculate from this measurement the presented value using $B(\Lambda \to \pi^- p) = (63.9 \pm 0.5)\%$ and $B(J/\psi \to p\overline{p}) = (2.17 \pm 0.07) \times 10^{-3}$. NODE=M055B11;LINKAGE=BA

$\Gamma(\chi_{c1}(1P) \to \gamma J/\psi(1S))/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\chi_{c1}(1P))/\Gamma_{total}$ — $\Gamma_{54}/\Gamma \times \Gamma_{119}^{\psi(2S)}/\Gamma^{\psi(2S)}$

NODE=M055B2
NODE=M055B2

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
3.23 ±0.07 OUR FIT					NEW
$[(3.18 \pm 0.08) \times 10^{-2}$ OUR 2012 FIT]					
2.93 ±0.15 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.					NEW
$[(2.70 \pm 0.13) \times 10^{-2}$ OUR 2012 AVERAGE]					
3.377±0.009±0.183	142k	ABLIKIM	12O	BES3	$\psi(2S) \to \gamma\chi_{c1}$
2.81 ±0.05 ±0.23	13k	BAI	04I	BES2	$\psi(2S) \to J/\psi\gamma\gamma$
2.56 ±0.12 ±0.20		GAISER	86	CBAL	$\psi(2S) \to \gamma X$
2.78 ±0.30		[77] OREGLIA	82	CBAL	$\psi(2S) \to \gamma\chi_{c1}$
2.2 ±0.5		[78] BRANDELIK	79B	DASP	$\psi(2S) \to \gamma\chi_{c1}$
2.9 ±0.5		[78] BARTEL	78B	CNTR	$\psi(2S) \to \gamma\chi_{c1}$
5.0 ±1.5		[79] BIDDICK	77	CNTR	$e^+e^- \to \gamma X$
2.8 ±0.9		[77] WHITAKER	76	MRK1	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3.56 ±0.03 ±0.12	24.9k	[80] MENDEZ	08	CLEO	$\psi(2S) \to \gamma\chi_{c1}$
3.44 ±0.06 ±0.13	3.7k	[81] ADAM	05A	CLEO	Repl. by MENDEZ 08

[77] Recalculated by us using B($J/\psi(1S) \rightarrow \ell^+\ell^-$) = 0.1181 ± 0.0020. NODE=M055B;LINKAGE=3Q
[78] Recalculated by us using B($J/\psi(1S) \rightarrow \mu^+\mu^-$) = 0.0588 ± 0.0010. NODE=M055B;LINKAGE=2Q
[79] Assumes isotropic gamma distribution. NODE=M055B;LINKAGE=EA
[80] Not independent from other measurements of MENDEZ 08. NODE=M055B2;LINKAGE=ME
[81] Not independent from other values reported by ADAM 05A. NODE=M055B;LINKAGE=AD



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

$\Gamma(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S))/\Gamma_{\rm total} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\,{\rm anything})$ $\Gamma_{54}/\Gamma \times \Gamma^{\psi(2S)}_{119}/\Gamma^{\psi(2S)}_{9}$ NODE=M055B7

$\Gamma_{54}/\Gamma \times \Gamma^{\psi(2S)}_{119}/\Gamma^{\psi(2S)}_{9} = \Gamma_{54}/\Gamma \times \Gamma^{\psi(2S)}_{119}/(\Gamma^{\psi(2S)}_{11}+\Gamma^{\psi(2S)}_{12}+\Gamma^{\psi(2S)}_{13}+0.348\Gamma^{\psi(2S)}_{119}+0.198\Gamma^{\psi(2S)}_{120})$ NODE=M055B7

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
5.36±0.12 OUR FIT					
[(5.34 ± 0.12) × 10^{-2} OUR 2012 FIT]					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
5.70±0.04±0.15	24.9k	[82] MENDEZ	08	CLEO	$\psi(2S) \rightarrow \gamma\chi_{c1}$
5.77±0.10±0.12	3.7k	ADAM	05A	CLEO	Repl. by MENDEZ 08

NODE=M055B7 NODE=M055B7 NEW

[82] Not independent from other measurements of MENDEZ 08. NODE=M055B7;LINKAGE=ME

$\Gamma(\chi_{c1}(1P) \rightarrow \gamma J/\psi(1S))/\Gamma_{\rm total} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c1}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{54}/\Gamma \times \Gamma^{\psi(2S)}_{119}/\Gamma^{\psi(2S)}_{11}$ NODE=M055B3

NODE=M055B3

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
9.49±0.21 OUR FIT					
[(9.46 ± 0.23) × 10^{-2} OUR 2012 FIT]					
10.15±0.28 OUR AVERAGE					
10.17±0.07±0.27	24.9k	MENDEZ	08	CLEO	$\psi(2S) \rightarrow \gamma\chi_{c1}$
12.6 ±0.3 ±3.8	3k	[83] ABLIKIM	04B	BES	$\psi(2S) \rightarrow J/\psi X$
8.5 ±2.1		[84] 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	[85] ADAM	05A	CLEO	Repl. by MENDEZ 08

NEW

[83] From a fit to the J/ψ recoil mass spectra. NODE=M055B;LINKAGE=AB
[84] The value for B($\psi(2S) \rightarrow \gamma\chi_{c1}$)×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 ± 3)% and B($J/\psi(1S) \rightarrow \ell^+\ell^-$) = 0.138 ± 0.018. Calculated by us using B($J/\psi(1S) \rightarrow \ell^+\ell^-$) = 0.1181 ± 0.0020. NODE=M055B;LINKAGE=J3
[85] Not independent from other values reported by ADAM 05A. NODE=M055B3;LINKAGE=AD

$\Gamma(\chi_{c1}(1P) \to K^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c1}(1P))/\Gamma_{\text{total}}$ $\Gamma_{15}/\Gamma \times \Gamma_{119}^{\psi(2S)}/\Gamma^{\psi(2S)}$

NODE=M055B16
NODE=M055B16

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
6.8±0.5 OUR FIT				
7.2±0.6 OUR AVERAGE				
7.3±0.5±0.5	[86] ATHAR	07	CLEO	$\psi(2S) \to \gamma K^0_S K^+ \pi^-$
7.0±0.5±0.9	[87] ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\chi_{c1}$

[86] Calculated by us. The value of $B(\chi_{c1} \to K^0 K^+ \pi^- + \text{c.c.})$ reported by ATHAR 07 was derived using $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (9.07 \pm 0.11 \pm 0.54)\%$. NODE=M055B16;LINKAGE=AT

[87] Calculated by us. ABLIKIM 06R reports $B(\chi_{c1} \to K^0_S K^+ \pi^-) = (4.0 \pm 0.3 \pm 0.5) \times 10^{-3}$. We use $B(\psi(2S) \to \gamma\chi_{c1}) = (8.7 \pm 0.4) \times 10^{-2}$. NODE=M055B16;LINKAGE=AB

$\Gamma(\chi_{c1}(1P) \to K^0 K^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c1}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{15}/\Gamma \times \Gamma_{119}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

NODE=M055B17
NODE=M055B17

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
19.9±1.6 OUR FIT				
[$(20.1 \pm 1.6) \times 10^{-4}$ OUR 2012 FIT]				
13.2±2.4±3.2	[88] BAI	99B	BES	$\psi(2S) \to \gamma K^0_S K^+ \pi^-$

NEW

[88] Calculated by us. The value of $B(\chi_{c1} \to K^0_S K^+ \pi^-)$ reported by BAI 99B was derived using $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.8)\%$ and $B(\psi(2S) \to J/\psi\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D]. NODE=M055B17;LINKAGE=BA

$\Gamma(\chi_{c1}(1P) \to K^+ K^- K^+ K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c1}(1P))/\Gamma_{\text{total}}$ $\Gamma_{29}/\Gamma \times \Gamma_{119}^{\psi(2S)}/\Gamma^{\psi(2S)}$

NODE=M055B14
NODE=M055B14

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.52±0.11 OUR FIT					
0.61±0.11±0.08	54	[89] ABLIKIM	06T	BES2	$\psi(2S) \to \gamma K^+ K^+ K^- K^-$

[89] Calculated by us. The value of $B(\chi_{c1} \to 2K^+ 2K^-)$ reported by ABLIKIM 06T was derived using $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.8)\%$. NODE=M055B14;LINKAGE=AB

$\Gamma(\chi_{c1}(1P) \to K^+ K^- K^+ K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c1}(1P))/\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)$ $\Gamma_{29}/\Gamma \times \Gamma_{119}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$

NODE=M055B15
NODE=M055B15

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
1.53±0.31 OUR FIT				
[$(1.54 \pm 0.31) \times 10^{-4}$ OUR 2012 FIT]				
1.13±0.40±0.29	[90] BAI	99B	BES	$\psi(2S) \to \gamma K^+ K^+ K^- K^-$

NEW

[90] Calculated by us. The value of $B(\chi_{c1} \to 2K^+ 2K^-)$ reported by BAI 99B was derived using $B(\psi(2S) \to \gamma\chi_{c1}(1P)) = (8.7 \pm 0.8)\%$ and $B(\psi(2S) \to J/\psi\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D]. NODE=M055B15;LINKAGE=BA

$\Gamma(\chi_{c1}(1P) \to p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \to \gamma\chi_{c1}(1P))/\Gamma_{\text{total}}$ $\Gamma_{34}/\Gamma \times \Gamma_{119}^{\psi(2S)}/\Gamma^{\psi(2S)}$

NODE=M055B6
NODE=M055B6

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
6.7±0.5 OUR FIT					
[$(6.8 \pm 0.5) \times 10^{-6}$ OUR 2012 FIT]					
7.5±1.4 OUR AVERAGE	Error includes scale factor of 2.0.				
8.2±0.7±0.4	141 ± 13	[91] NAIK	08	CLEO	$\psi(2S) \to \gamma p\bar{p}$
$4.8^{+1.4}_{-1.3}\pm0.6$	$18.2^{+5.5}_{-4.9}$	BAI	04F	BES	$\psi(2S) \to \gamma\chi_{c1}(1P) \to \gamma\bar{p}p$

NEW

[91] Calculated by us. NAIK 08 reports $B(\chi_{c1} \to p\bar{p}) = (9.0 \pm 0.8 \pm 0.4 \pm 0.5) \times 10^{-5}$ using $B(\psi(2S) \to \gamma\chi_{c1}) = (9.07 \pm 0.11 \pm 0.54)\%$. NODE=M055B6;LINKAGE=NA

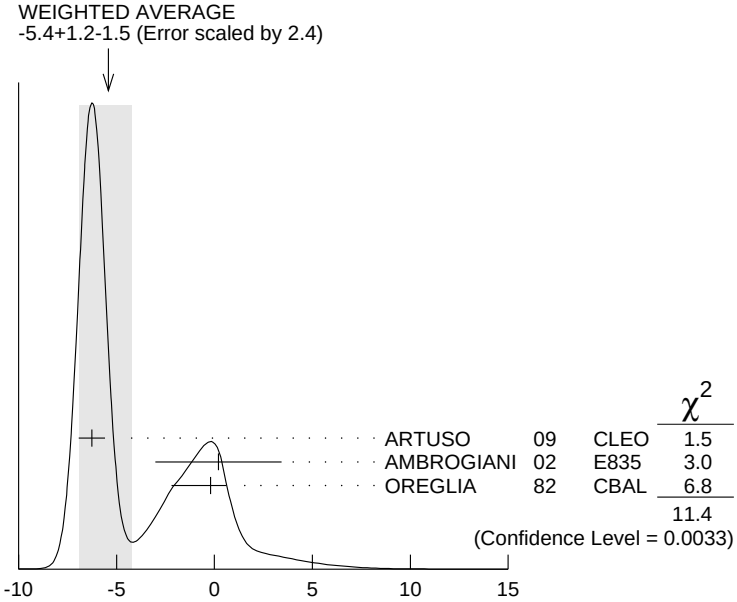
MULTIPOLE AMPLITUDES IN $\chi_{c1}(1P) \to \gamma J/\psi(1S)$

NODE=M055240

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

NODE=M055A1
NODE=M055A1

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



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

NODE=M055250

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

NODE=M055QB2
NODE=M055QB2

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

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

NODE=M055260

a_2/b_2 Magnetic quadrupole transition amplitude ratio

NODE=M055QAR
NODE=M055QAR

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{-2.27^{+0.57}_{-0.99}}$	39k	[92] ARTUSO	09	CLEO	$\psi(2S) \rightarrow \gamma\gamma\ell^+\ell^-$

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

NODE=M055QAR;LINKAGE=AR

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

NODE=M055

ABLIKIM	13D	PR D87 012007	M. Ablikim *et al.*	(BES III Collab.)	REFID=54879
ABLIKIM	12O	PRL 109 172002	M. Ablikim *et al.*	(BES III Collab.)	REFID=54742
ABLIKIM	11A	PR D83 012006	M. Ablikim *et al.*	(BES III Collab.)	REFID=53647
ABLIKIM	11D	PR D83 032003	M. Ablikim *et al.*	(BES III Collab.)	REFID=16715
ABLIKIM	11E	PR D83 112005	M. Ablikim *et al.*	(BES III Collab.)	REFID=16717
ABLIKIM	11F	PR D83 112009	M. Ablikim *et al.*	(BES III Collab.)	REFID=16719
ABLIKIM	11K	PRL 107 092001	M. Ablikim *et al.*	(BES III Collab.)	REFID=53940
ONYISI	10	PR D82 011103	P.U.E. Onyisi *et al.*	(CLEO Collab.)	REFID=53360
ARTUSO	09	PR D80 112003	M. Artuso *et al.*	(CLEO Collab.)	REFID=53206
BENNETT	08A	PRL 101 151801	J.V. Bennett *et al.*	(CLEO Collab.)	REFID=52575
ECKLUND	08A	PR D78 091501	K.M. Ecklund *et al.*	(CLEO Collab.)	REFID=52583
HE	08B	PR D78 092004	Q. He *et al.*	(CLEO Collab.)	REFID=52588
MENDEZ	08	PR D78 011102	H. Mendez *et al.*	(CLEO Collab.)	REFID=52684
NAIK	08	PR D78 031101	P. Naik *et al.*	(CLEO Collab.)	REFID=52301
ATHAR	07	PR D75 032002	S.B. Athar *et al.*	(CLEO Collab.)	REFID=51618
ABLIKIM	06D	PR D73 052006	M. Ablikim *et al.*	(BES Collab.)	REFID=51049
ABLIKIM	06R	PR D74 072001	M. Ablikim *et al.*	(BES Collab.)	REFID=51447
ABLIKIM	06T	PL B642 197	M. Ablikim *et al.*	(BES Collab.)	REFID=51453
ABLIKIM	05G	PR D71 092002	M. Ablikim *et al.*	(BES Collab.)	REFID=50756
ABLIKIM	05O	PL B630 21	M. Ablikim *et al.*	(BES Collab.)	REFID=50846
ADAM	05A	PRL 94 232002	N.E. Adam *et al.*	(CLEO Collab.)	REFID=50763
ANDREOTTI	05A	NP B717 34	M. Andreotti *et al.*	(FNAL E835 Collab.)	REFID=50769
ABLIKIM	04B	PR D70 012003	M. Ablikim *et al.*	(BES Collab.)	REFID=49741
ABLIKIM	04H	PR D70 092003	M. Ablikim *et al.*	(BES Collab.)	REFID=50188
ATHAR	04	PR D70 112002	S.B. Athar *et al.*	(CLEO Collab.)	REFID=50331
BAI	04F	PR D69 092001	J.Z. Bai *et al.*	(BES Collab.)	REFID=49752
BAI	04I	PR D70 012006	J.Z. Bai *et al.*	(BES Collab.)	REFID=49755
AULCHENKO	03	PL B573 63	V.M. Aulchenko *et al.*	(KEDR Collab.)	REFID=49579

BAI	03E	PR D67 112001	J.Z. Bai *et al.*	(BES Collab.)	REFID=49416
AMBROGIANI	02	PR D65 052002	M. Ambrogiani *et al.*	(FNAL E835 Collab.)	REFID=48552
BAI	99B	PR D60 072001	J.Z. Bai *et al.*	(BES Collab.)	REFID=47385
BAI	98D	PR D58 092006	J.Z. Bai *et al.*	(BES Collab.)	REFID=46338
BAI	98I	PRL 81 3091	J.Z. Bai *et al.*	(BES Collab.)	REFID=46343
ARMSTRONG	92	NP B373 35	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)	REFID=41865
Also		PRL 68 1468	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)	REFID=41907
BAGLIN	86B	PL B172 455	C. Baglin	(LAPP, CERN, GENO, LYON, OSLO+)	REFID=22145
GAISER	86	PR D34 711	J. Gaiser *et al.*	(Crystal Ball Collab.)	REFID=22012
LEMOIGNE	82	PL 113B 509	Y. Lemoigne *et al.*	(SACL, LOIC, SHMP+)	REFID=22084
OREGLIA	82	PR D25 2259	M.J. Oreglia *et al.*	(SLAC, CIT, HARV+)	REFID=22120
Also		Private Comm.	M.J. Oreglia	(EFI)	REFID=22143
HIMEL	80	PRL 44 920	T. Himel *et al.*	(LBL, SLAC)	REFID=22119
Also		Private Comm.	G. Trilling	(LBL, UCB)	REFID=22113
BRANDELIK	79B	NP B160 426	R. Brandelik *et al.*	(DASP Collab.)	REFID=22115
BARTEL	78B	PL 79B 492	W. Bartel *et al.*	(DESY, HEIDP)	REFID=22111
TANENBAUM	78	PR D17 1731	W.M. Tanenbaum *et al.*	(SLAC, LBL)	REFID=22112
Also		Private Comm.	G. Trilling	(LBL, UCB)	REFID=22113
BIDDICK	77	PRL 38 1324	C.J. Biddick *et al.*	(UCSD, UMD, PAVI+)	REFID=22059
FELDMAN	77	PRPL 33C 285	G.J. Feldman, M.L. Perl	(LBL, SLAC)	REFID=22062
YAMADA	77	Hamburg Conf. 69	S. Yamada	(DASP Collab.)	REFID=22064
WHITAKER	76	PRL 37 1596	J.S. Whitaker *et al.*	(SLAC, LBL)	REFID=22151
TANENBAUM	75	PRL 35 1323	W.M. Tanenbaum *et al.*	(LBL, SLAC)	REFID=22106