NODE=M026

$\eta_c(1S)$

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

$\eta_c(1S)$ MASS

NODE=M026M

NODE=M026M

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT	
2984.1 ± 0.4 OUR AVERAGE		Error includes scale factor of 1.2.			
2985.01 ± 0.17 ± 0.89	35k	AAIJ 23AH	LHCB	$B^+ \to K^+(K^0_S K\pi)$	
2983.9 ± 0.7 ± 0.1		[1] AAIJ 20H	LHCB	$pp \to bX \to p\overline{p}X$	
2985.9 ± 0.7 ± 2.1	1705	ABLIKIM 19AV	BES3	$J/\psi \to \gamma\omega\omega$	
2984.6 ± 0.7 ± 2.2	2673	XU 18	BELL	$e^+e^- \to e^+e^-\eta'\pi^+\pi^-$	
2986.7 ± 0.5 ± 0.9	11k	[2] AAIJ 17AD	LHCB	$pp \to B^+X \to p\overline{p}K^+X$	
2982.8 ± 1.0 ± 0.5	6.4k	[3] AAIJ 17BB	LHCB	$pp \to b\overline{b}X \to 2(K^+K^-)X$	
2982.2 ± 1.5 ± 0.1	2.0k	[4] AAIJ 15BI	LHCB	$pp \to \eta_c(1S)X$	
2983.5 ± 1.4 $^{+1.6}_{-3.6}$		[5] ANASHIN 14	KEDR	$J/\psi \to \gamma\eta_c$	
2979.8 ± 0.8 ± 3.5	4.5k	[6,7] LEES 14E	BABR	$\gamma\gamma \to K^+K^-\pi^0$	
2984.1 ± 1.1 ± 2.1	900	[6,7,8] LEES 14E	BABR	$\gamma\gamma \to K^+K^-\eta$	OCCUR=2
2984.3 ± 0.6 ± 0.6		[9,10] ABLIKIM 12F	BES3	$\psi(2S) \to \gamma\eta_c$	
2984.49 ± 1.16 ± 0.52	832	[6] ABLIKIM 12N	BES3	$\psi(2S) \to \pi^0\gamma$ hadrons	
2982.7 ± 1.8 ± 2.2	486	ZHANG 12A	BELL	$e^+e^- \to e^+e^-\eta'\pi^+\pi^-$	
2984.5 ± 0.8 ± 3.1	11k	DEL-AMO-SA...11M	BABR	$\gamma\gamma \to K^+K^-\pi^+\pi^-\pi^0$	
2985.4 ± 1.5 $^{+0.5}_{-2.0}$	920	[10] VINOKUROVA 11	BELL	$B^\pm \to K^\pm(K^0_S K^\pm\pi^\mp)$	
2982.2 ± 0.4 ± 1.6	14k	[11] LEES 10	BABR	$10.6\ e^+e^- \to e^+e^-K^0_S K^\pm\pi^\mp$	
2985.8 ± 1.5 ± 3.1	0.9k	AUBERT 08AB	BABR	$B \to \eta_c(1S)K^{(*)} \to K\overline{K}\pi K^{(*)}$	
2986.1 ± 1.0 ± 2.5	7.5k	UEHARA 08	BELL	$\gamma\gamma \to \eta_c \to$ hadrons	
2970 ± 5 ± 6	501	[12] ABE 07	BELL	$e^+e^- \to J/\psi(c\overline{c})$	
2971 ± 3 $^{+2}_{-1}$	195	WU 06	BELL	$B^+ \to p\overline{p}K^+$	
2974 ± 7 $^{+2}_{-1}$	20	WU 06	BELL	$B^+ \to \Lambda\overline{\Lambda}K^+$	OCCUR=2
2981.8 ± 1.3 ± 1.5	592	ASNER 04	CLEO	$\gamma\gamma \to \eta'_c \to K^0_S K^\pm\pi^\mp$	
2984.1 ± 2.1 ± 1.0	190	[13] AMBROGIANI 03	E835	$\overline{p}p \to \eta_c \to \gamma\gamma$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2982.5 ± 0.4 ± 1.4	12k	[14] DEL-AMO-SA...11M	BABR	$\gamma\gamma \to K^0_S K^\pm\pi^\mp$	OCCUR=2
2982.2 ± 0.6		[15] MITCHELL 09	CLEO	$e^+e^- \to \gamma X$	
2982 ± 5	270	[16] AUBERT 06E	BABR	$B^\pm \to K^\pm X_{c\overline{c}}$	
2982.5 ± 1.1 ± 0.9	2.5k	[17] AUBERT 04D	BABR	$\gamma\gamma \to \eta_c(1S) \to K\overline{K}\pi$	
2977.5 ± 1.0 ± 1.2		[15,18] BAI 03	BES	$J/\psi \to \gamma\eta_c$	
2979.6 ± 2.3 ± 1.6	180	[19] FANG 03	BELL	$B \to \eta_c K$	
2976.3 ± 2.3 ± 1.2		[15,20] BAI 00F	BES	$J/\psi,\ \psi(2S) \to \gamma\eta_c$	
2976.6 ± 2.9 ± 1.3	140	[15,21] BAI 00F	BES	$J/\psi \to \gamma\eta_c$	OCCUR=2
2980.4 ± 2.3 ± 0.6		[22] BRANDENB... 00B	CLE2	$\gamma\gamma \to \eta_c \to K^\pm K^0_S\pi^\mp$	
2975.8 ± 3.9 ± 1.2		[21] BAI 99B	BES	Sup. by BAI 00F	
2999 ± 8	25	ABREU 98O	DLPH	$e^+e^- \to e^+e^-$ +hadrons	
2988.3 $^{+3.3}_{-3.1}$		ARMSTRONG 95F	E760	$\overline{p}p \to \gamma\gamma$	
2974.4 ± 1.9		[15,23] BISELLO 91	DM2	$J/\psi \to \eta_c\gamma$	
2969 ± 4 ± 4	80	[15] BAI 90B	MRK3	$J/\psi \to \gamma K^+K^-K^+K^-$	
2956 ± 12 ± 12		[15] BAI 90B	MRK3	$J/\psi \to \gamma K^+K^-K^0_S K^0_L$	OCCUR=3
2982.6 $^{+2.7}_{-2.3}$	12	BAGLIN 87B	SPEC	$\overline{p}p \to \gamma\gamma$	
2980.2 ± 1.6		[15,23] BALTRUSAIT...86	MRK3	$J/\psi \to \eta_c\gamma$	
2984 ± 2.3 ± 4.0		[15] GAISER 86	CBAL	$J/\psi \to \gamma X$, $\psi(2S) \to \gamma X$	
2976 ± 8		[15,24] BALTRUSAIT...84	MRK3	$J/\psi \to 2\phi\gamma$	
2982 ± 8	18	[25] HIMEL 80B	MRK2	e^+e^-	
2980 ± 9		[25] PARTRIDGE 80B	CBAL	e^+e^-	

[1] AAIJ 20H report $m_{J/\psi} - m_{\eta_c(1S)} = 113.0 \pm 0.7 \pm 0.1$ MeV. We use the current value $m_{J/\psi} = 3096.900 \pm 0.006$ MeV to obtain the quoted mass. NODE=M026M;LINKAGE=H

[2] AAIJ 17AD report $m_{J/\psi} - m_{\eta_c(1S)} = 110.2 \pm 0.5 \pm 0.9$ MeV. We use the current value $m_{J/\psi} = 3096.900 \pm 0.006$ MeV to obtain the quoted mass. NODE=M026M;LINKAGE=F

[3] From a fit of the $\phi\phi$ invariant mass with the mass and width of $\eta_c(1S)$ as free parameters. NODE=M026M;LINKAGE=G

[4] AAIJ 15BI reports $m_{J/\psi} - m_{\eta_c(1S)} = 114.7 \pm 1.5 \pm 0.1$ MeV from a sample of $\eta_c(1S)$ and J/ψ produced in b-hadron decays. We have used current value of $m_{J/\psi} = 3096.900 \pm 0.006$ MeV to arrive at the quoted $m_{\eta_c(1S)}$ result. NODE=M026M;LINKAGE=D

[5] Taking into account an asymmetric photon lineshape. NODE=M026M;LINKAGE=E

[6] With floating width. NODE=M026M;LINKAGE=AL

[7] Ignoring possible interference with the non-resonant 0^- amplitude. NODE=M026M;LINKAGE=LS

[8] Using both, $\eta \to \gamma\gamma$ and $\eta \to \pi^+\pi^-\pi^0$ decays. NODE=M026M;LINKAGE=EL

[9] From a simultaneous fit to six decay modes of the η_c. NODE=M026M;LINKAGE=BL

[10] Accounts for interference with non-resonant continuum. NODE=M026M;LINKAGE=VA

[11] Taking into account interference with the non-resonant $J^P = 0^-$ amplitude. NODE=M026M;LINKAGE=LE

[12] From a fit of the J/ψ recoil mass spectrum. Supersedes ABE,K 02 and ABE 04G. NODE=M026M;LINKAGE=EB

[13] Using mass of $\psi(2S) = 3686.00$ MeV. NODE=M026M;LINKAGE=BG

[14] Not independent from the measurements reported by LEES 10. NODE=M026M;LINKAGE=DE

[15] MITCHELL 09 observes a significant asymmetry in the lineshapes of $\psi(2S) \to \gamma\eta_c$ and $J/\psi \to \gamma\eta_c$ transitions. If ignored, this asymmetry could lead to significant bias whenever the mass and width are measured in $\psi(2S)$ or J/ψ radiative decays. NODE=M026M;LINKAGE=MI

[16] From the fit of the kaon momentum spectrum. Systematic errors not evaluated. NODE=M026M;LINKAGE=AU

[17] Superseded by LEES 10. NODE=M026M;LINKAGE=UB

[18] From a simultaneous fit of five decay modes of the η_c. NODE=M026M;LINKAGE=AK

[19] Superseded by VINOKUROVA 11. NODE=M026M;LINKAGE=FA

[20] Weighted average of the $\psi(2S)$ and $J/\psi(1S)$ samples. Using an η_c width of 13.2 MeV. NODE=M026M;LINKAGE=KZ

[21] Average of several decay modes. Using an η_c width of 13.2 MeV. NODE=M026M;LINKAGE=C1

[22] Superseded by ASNER 04. NODE=M026M;LINKAGE=NN

[23] Average of several decay modes. NODE=M026M;LINKAGE=A

[24] $\eta_c \to \phi\phi$. NODE=M026M;LINKAGE=B

[25] Mass adjusted by us to correspond to $J/\psi(1S)$ mass = 3097 MeV. NODE=M026M;LINKAGE=M

$\eta_c(1S)$ WIDTH

NODE=M026W

NODE=M026W

VALUE (MeV)	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*	
30.5± 0.5 OUR FIT Error includes scale factor of 1.2.					
30.5± 0.5 OUR AVERAGE Error includes scale factor of 1.1.					
$29.7 \pm 0.5 \pm 0.2$	35k	AAIJ	23AH LHCB	$B^+ \to K^+(K^0_S K\pi)$	
$33.8 \pm 1.6 \pm 4.1$	1705	ABLIKIM	19AV BES3	$J/\psi \to \gamma\omega\omega$	
$30.8^{+2.3}_{-2.2} \pm 2.9$	2673	XU	18 BELL	$e^+e^- \to e^+e^-\eta'\pi^+\pi^-$	
$34.0 \pm 1.9 \pm 1.3$	11k	AAIJ	17AD LHCB	$pp \to B^+X \to p\overline{p}K^+X$	
$31.4 \pm 3.5 \pm 2.0$	6.4k	[1] AAIJ	17BB LHCB	$pp \to b\overline{b}X \to 2(K^+K^-)X$	
$27.2 \pm 3.1^{+5.4}_{-2.6}$		[2] ANASHIN	14 KEDR	$J/\psi \to \gamma\eta_c$	
$25.2 \pm 2.6 \pm 2.4$	4.5k	[3,4] LEES	14E BABR	$\gamma\gamma \to K^+K^-\pi^0$	
$34.8 \pm 3.1 \pm 4.0$	900	[3,4,5] LEES	14E BABR	$\gamma\gamma \to K^+K^-\eta$	OCCUR=2
$32.0 \pm 1.2 \pm 1.0$		[6,7] ABLIKIM	12F BES3	$\psi(2S) \to \gamma\eta_c$	
$36.4 \pm 3.2 \pm 1.7$	832	[3] ABLIKIM	12N BES3	$\psi(2S) \to \pi^0\gamma$ hadrons	
$37.8^{+5.8}_{-5.3} \pm 3.1$	486	ZHANG	12A BELL	$e^+e^- \to e^+e^-\eta'\pi^+\pi^-$	
$36.2 \pm 2.8 \pm 3.0$	11k	DEL-AMO-SA...	11M BABR	$\gamma\gamma \to K^+K^-\pi^+\pi^-\pi^0$	
$35.1 \pm 3.1^{+1.0}_{-1.6}$	920	[7] VINOKUROVA	11 BELL	$B^\pm \to K^\pm(K^0_S K^\pm\pi^\mp)$	
$31.7 \pm 1.2 \pm 0.8$	14k	[8] LEES	10 BABR	$10.6\ e^+e^- \to e^+e^-K^0_S K^\pm\pi^\mp$	
$36.3^{+3.7}_{-3.6} \pm 4.4$	0.9k	AUBERT	08AB BABR	$B \to \eta_c(1S)K^{(*)} \to K\overline{K}\pi K^{(*)}$	
$28.1 \pm 3.2 \pm 2.2$	7.5k	UEHARA	08 BELL	$\gamma\gamma \to \eta_c \to$ hadrons	
$48\ ^{+8}_{-7} \pm 5$	195	WU	06 BELL	$B^+ \to p\overline{p}K^+$	
$40\ \pm 19\ \pm 5$	20	WU	06 BELL	$B^+ \to \Lambda\overline{\Lambda}K^+$	OCCUR=2
$24.8 \pm 3.4 \pm 3.5$	592	ASNER	04 CLEO	$\gamma\gamma \to \eta'_c \to K^0_S K^\pm\pi^\mp$	
$20.4^{+7.7}_{-6.7} \pm 2.0$	190	AMBROGIANI	03 E835	$\overline{p}p \to \eta_c \to \gamma\gamma$	
$23.9^{+12.6}_{-7.1}$		ARMSTRONG	95F E760	$\overline{p}p \to \gamma\gamma$	

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

32.1± 1.1±1.3	12k	[9] DEL-AMO-SA...	11M	BABR	$\gamma\gamma \to K^0_S K^\pm \pi^\mp$
34.3± 2.3±0.9	2.5k	[10] AUBERT	04D	BABR	$\gamma\gamma \to \eta_c(1S) \to K\overline{K}\pi$
17.0± 3.7±7.4		[11] BAI	03	BES	$J/\psi \to \gamma\eta_c$
29 ± 8 ±6	180	[12] FANG	03	BELL	$B \to \eta_c K$
11.0± 8.1±4.1		[13] BAI	00F	BES	$J/\psi \to \gamma\eta_c$ and $\psi(2S) \to \gamma\eta_c$
27.0± 5.8±1.4		[14] BRANDENB...	00B	CLE2	$\gamma\gamma \to \eta_c \to K^\pm K^0_S \pi^\mp$
$7.0^{+7.5}_{-7.0}$	12	BAGLIN	87B	SPEC	$\overline{p}p \to \gamma\gamma$
$10.1^{+33.0}_{-8.2}$	23	[15] BALTRUSAIT...	86	MRK3	$J/\psi \to \gamma p\overline{p}$
11.5± 4.5		GAISER	86	CBAL	$J/\psi \to \gamma X$, $\psi(2S) \to \gamma X$
< 40 90% CL	18	HIMEL	80B	MRK2	e^+e^-
< 20 90% CL		PARTRIDGE	80B	CBAL	e^+e^-

OCCUR=2

[1] From a fit of the $\phi\phi$ invariant mass with the mass and width of $\eta_c(1S)$ as free parameters.
[2] Taking into account an asymmetric photon lineshape.
[3] With floating mass.
[4] Ignoring possible interference with the non-resonant 0^- amplitude.
[5] Using both, $\eta \to \gamma\gamma$ and $\eta \to \pi^+\pi^-\pi^0$ decays.
[6] From a simultaneous fit to six decay modes of the η_c.
[7] Accounts for interference with non-resonant continuum.
[8] Taking into account interference with the non-resonant $J^P = 0^-$ amplitude.
[9] Not independent from the measurements reported by LEES 10.
[10] Superseded by LEES 10.
[11] From a simultaneous fit of five decay modes of the η_c.
[12] Superseded by VINOKUROVA 11.
[13] From a fit to the 4-prong invariant mass in $\psi(2S) \to \gamma\eta_c$ and $J/\psi(1S) \to \gamma\eta_c$ decays.
[14] Superseded by ASNER 04.
[15] Positive and negative errors correspond to 90% confidence level.

NODE=M026W;LINKAGE=B
NODE=M026W;LINKAGE=A
NODE=M026W;LINKAGE=AL
NODE=M026W;LINKAGE=LS
NODE=M026W;LINKAGE=EL
NODE=M026W;LINKAGE=BL
NODE=M026W;LINKAGE=VA
NODE=M026W;LINKAGE=LE
NODE=M026W;LINKAGE=DE
NODE=M026W;LINKAGE=UB
NODE=M026W;LINKAGE=AK
NODE=M026W;LINKAGE=FA
NODE=M026W;LINKAGE=KZ
NODE=M026W;LINKAGE=NN
NODE=M026W;LINKAGE=L

$\eta_c(1S)$ DECAY MODES

NODE=M026215;NODE=M026

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	
	Decays involving hadronic resonances			NODE=M026;CLUMP=A
Γ_1	$\eta'(958)\pi\pi$	(2.0 ±0.4) %	S=1.4	DESIG=24
Γ_2	$\eta'(958)K\overline{K}$	(1.73±0.35) %		DESIG=85
Γ_3	$\eta'(958)\eta\eta$	(3.4 ±0.6) $\times 10^{-3}$		DESIG=93
Γ_4	$\rho\rho$	(1.8 ±0.4) %		DESIG=19
Γ_5	$K^*(892)^0 K^-\pi^+ +$ c.c.	(1.8 ±0.5) %		DESIG=26
Γ_6	$K^*(892)\overline{K}^*(892)$	(7.0 ±1.2) $\times 10^{-3}$		DESIG=18
Γ_7	$K^*(892)^0\overline{K}^*(892)^0\pi^+\pi^-$	(1.4 ±0.6) %		DESIG=57
Γ_8	ϕK^+K^-	($3.3^{+1.2}_{-1.1}$) $\times 10^{-3}$		DESIG=28
Γ_9	$\phi\phi$	(1.8 ±0.4) $\times 10^{-3}$	S=2.3	DESIG=17
Γ_{10}	$\phi 2(\pi^+\pi^-)$	< 4 $\times 10^{-3}$	CL=90%	DESIG=58
Γ_{11}	$a_0(980)\pi$	seen		DESIG=21
Γ_{12}	$a_2(1320)\pi$	seen		DESIG=22
Γ_{13}	$K^*(892)\overline{K}+$ c.c.	< 1.28 %	CL=90%	DESIG=40
Γ_{14}	$f_2(1270)\eta$	seen		DESIG=23
Γ_{15}	$f_2(1270)\eta'$	seen		DESIG=92
Γ_{16}	$\omega\omega$	(2.7 ±0.9) $\times 10^{-3}$	S=2.1	DESIG=20
Γ_{17}	$\omega\phi$	< 2.5 $\times 10^{-4}$	CL=90%	DESIG=47
Γ_{18}	$f_2(1270)f_2(1270)$	(1.08±0.27) %		DESIG=46
Γ_{19}	$f_2(1270)f'_2(1525)$	(9.7 ±3.2) $\times 10^{-3}$		DESIG=59
Γ_{20}	$f_0(500)\eta$	seen		DESIG=86
Γ_{21}	$f_0(500)\eta'$	seen		DESIG=87
Γ_{22}	$f_0(980)\eta$	seen		DESIG=70
Γ_{23}	$f_0(980)\eta'$	seen		DESIG=88
Γ_{24}	$f_0(1500)\eta$	seen		DESIG=71

Γ_{25}	$f_0(1710)\eta'$	seen		DESIG=90
Γ_{26}	$f_0(2100)\eta'$	seen		DESIG=91
Γ_{27}	$f_0(2200)\eta$	seen		DESIG=72
Γ_{28}	$a_0(1320)\pi$	seen		DESIG=74
Γ_{29}	$a_0(1450)\pi$	seen		DESIG=75
Γ_{30}	$a_2(1700)\pi$	seen		DESIG=94
Γ_{31}	$a_0(1710)\pi$	seen		DESIG=97
Γ_{32}	$a_0(1950)\pi$	seen		DESIG=79
Γ_{33}	$K_0^*(1430)\overline{K}+$ c.c.	seen		DESIG=76
Γ_{34}	$K_2^*(1430)\overline{K}+$ c.c.	seen		DESIG=77
Γ_{35}	$K_0^*(1950)\overline{K}+$ c.c.	seen		DESIG=78
Γ_{36}	$K_0^*(2600)\overline{K}+$ c.c.	seen		DESIG=95

Decays into stable hadrons

NODE=M026;CLUMP=B

Γ_{37}	$K\overline{K}\pi$	(7.1 ± 0.4) %	S=1.1	DESIG=14
Γ_{38}	$K\overline{K}\eta$	(1.32 ± 0.15) %		DESIG=25
Γ_{39}	$\eta\pi^+\pi^-$	(1.6 ± 0.4) %		DESIG=16
Γ_{40}	$\eta 2(\pi^+\pi^-)$	(4.3 ± 1.3) %		DESIG=61
Γ_{41}	$K^+K^-\pi^+\pi^-$	$(8.3 \pm 1.8) \times 10^{-3}$	S=1.9	DESIG=15
Γ_{42}	$K^+K^-\pi^+\pi^-\pi^0$	(3.4 ± 0.6) %		DESIG=60
Γ_{43}	$K^0K^-\pi^+\pi^-\pi^+ +$ c.c.	(5.4 ± 1.5) %		DESIG=62
Γ_{44}	$K^+K^-2(\pi^+\pi^-)$	$(8.4 \pm 2.4) \times 10^{-3}$		DESIG=55
Γ_{45}	$2(K^+K^-)$	$(1.4 \pm 0.4) \times 10^{-3}$	S=1.4	DESIG=27
Γ_{46}	$\pi^+\pi^-\pi^0$	$< 4 \times 10^{-4}$	CL=90%	DESIG=81
Γ_{47}	$\pi^+\pi^-\pi^0\pi^0$	(4.6 ± 1.0) %		DESIG=63
Γ_{48}	$2(\pi^+\pi^-)$	$(9.6 \pm 1.5) \times 10^{-3}$	S=1.4	DESIG=11
Γ_{49}	$2(\pi^+\pi^-\pi^0)$	(15.9 ± 2.0) %		DESIG=64
Γ_{50}	$3(\pi^+\pi^-)$	(1.89 ± 0.34) %		DESIG=56
Γ_{51}	$p\overline{p}$	$(1.33 \pm 0.11) \times 10^{-3}$	S=1.1	DESIG=12
Γ_{52}	$p\overline{p}\pi^0$	$(3.4 \pm 1.3) \times 10^{-3}$		DESIG=65
Γ_{53}	$p\overline{p}\pi^+\pi^-$	$(3.7 \pm 0.5) \times 10^{-3}$		DESIG=13
Γ_{54}	$\Lambda\overline{\Lambda}$	$(1.10 \pm 0.28) \times 10^{-3}$	S=1.5	DESIG=45
Γ_{55}	$K^+\overline{p}\Lambda+$ c.c.	$(2.5 \pm 0.4) \times 10^{-3}$		DESIG=82
Γ_{56}	$\overline{\Lambda}(1520)\Lambda+$ c.c.	$(3.0 \pm 1.3) \times 10^{-3}$		DESIG=83
Γ_{57}	$\Sigma^+\overline{\Sigma}^-$	$(2.6 \pm 0.5) \times 10^{-3}$		DESIG=66
Γ_{58}	$\Xi^-\overline{\Xi}^+$	$(1.07 \pm 0.24) \times 10^{-3}$		DESIG=67

Radiative decays

NODE=M026;CLUMP=C

Γ_{59}	$\gamma\gamma$	$(1.66 \pm 0.13) \times 10^{-4}$	S=1.2	DESIG=31

Charge conjugation (*C*), Parity (*P*), Lepton Family number (*LF*) violating modes

NODE=M026;CLUMP=D

Γ_{60}	$\pi^+\pi^-$	P,CP	$< 1.3 \times 10^{-4}$	CL=90%	DESIG=51
Γ_{61}	$\pi^0\pi^0$	P,CP	$< 4 \times 10^{-5}$	CL=90%	DESIG=52
Γ_{62}	K^+K^-	P,CP	$< 7 \times 10^{-4}$	CL=90%	DESIG=53
Γ_{63}	$K_S^0K_S^0$	P,CP	$< 4 \times 10^{-4}$	CL=90%	DESIG=54

FIT INFORMATION

A multiparticle fit to $\eta_c(1S)$, $J/\psi(1S)$, $\psi(2S)$, $h_c(1P)$, and $B^{\pm}$ with the total width, 10 combinations of partial widths obtained from integrated cross section, and 38 branching ratios uses 113 measurements to determine 19 parameters. The overall fit has a $\chi^2 = 184.6$ for 94 degrees of freedom.

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

	x_1	x_6	x_9	x_{16}	x_{18}	x_{37}	x_{38}	x_{41}	x_{45}	x_{48}
x_6	14									
x_9	11	13								
x_{16}	7	8	8							
x_{18}	9	11	11	7						
x_{37}	25	25	22	12	17					
x_{38}	13	13	11	6	9	51				
x_{41}	7	7	6	4	5	15	8			
x_{45}	5	5	5	2	3	12	6	4		
x_{48}	13	17	17	10	15	26	13	8	5	
x_{51}	19	20	20	11	16	39	20	11	11	24
x_{53}	7	7	8	4	5	22	11	5	10	8
x_{54}	5	7	7	4	6	12	6	3	4	10
x_{59}	−38	−35	−27	−16	−22	−63	−32	−17	−12	−31
Γ	−1	−1	−1	0	−1	−2	−1	0	0	−1

	x_{51}	x_{53}	x_{54}	x_{59}
x_{53}	21			
x_{54}	13	9		
x_{59}	−47	−17	−11	
Γ	1	0	0	−20

$\eta_c(1S)$ PARTIAL WIDTHS

NODE=M026217

$\Gamma(\gamma\gamma)$ Γ_{59}

NODE=M026W1
NODE=M026W1

VALUE (keV)	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
5.1± 0.4 OUR FIT		Error includes scale factor of 1.2.		
• • • We do not use the following data for averages, fits, limits, etc. • • •				
5.8± 1.1	486	[1] ZHANG	12A BELL	$e^+e^- \to e^+e^-\eta'\pi^+\pi^-$
5.2± 1.2	273 ± 43	[2,3] AUBERT	06E BABR	$B^{\pm} \to K^{\pm}X_{c\overline{c}}$
5.5± 1.2± 1.8	157 ± 33	[4] KUO	05 BELL	$\gamma\gamma \to p\overline{p}$
7.4± 0.4± 2.3		[5] ASNER	04 CLEO	$\gamma\gamma \to \eta'_c \to K^0_S K^{\pm}\pi^{\mp}$
13.9± 2.0± 3.0	41	[6] ABDALLAH	03J DLPH	$\gamma\gamma \to \eta_c$
$3.8^{+1.1+1.9}_{-1.0-1.0}$	190	[7] AMBROGIANI	03 E835	$\overline{p}p \to \eta_c \to \gamma\gamma$
7.6± 0.8± 2.3		[5,8] BRANDENB...	00B CLE2	$\gamma\gamma \to \eta_c \to K^{\pm}K^0_S\pi^{\mp}$
6.9± 1.7± 2.1	76	[9] ACCIARRI	99T L3	$e^+e^- \to e^+e^-\eta_c$
27 ±16 ±10	5	[5] SHIRAI	98 AMY	58 e^+e^-
$6.7^{+2.4}_{-1.7}\pm 2.3$		[4] ARMSTRONG	95F E760	$\overline{p}p \to \gamma\gamma$
11.3± 4.2		[10] ALBRECHT	94H ARG	$e^+e^- \to e^+e^-\eta_c$
8.0± 2.3± 2.4	17	[11] ADRIANI	93N L3	$e^+e^- \to e^+e^-\eta_c$
$5.9^{+2.1}_{-1.8}\pm 1.9$		[7] CHEN	90B CLEO	$e^+e^- \to e^+e^-\eta_c$
$6.4^{+5.0}_{-3.4}$		[12] AIHARA	88D TPC	$e^+e^- \to e^+e^-X$
$4.3^{+3.4}_{-3.7}\pm 2.4$		[4] BAGLIN	87B SPEC	$\overline{p}p \to \gamma\gamma$
28 ±15		[5,13] BERGER	86 PLUT	$\gamma\gamma \to K\overline{K}\pi$

[1] Assuming there is no interference with the non-resonant background. NODE=M026W1;LINKAGE=ZH

[2] Calculated by us using $\Gamma(\eta_c \to K\overline{K}\pi) \times \Gamma(\eta_c \to \gamma\gamma) / \Gamma = 0.44 \pm 0.05$ keV from PDG 06 and $B(\eta_c \to K\overline{K}\pi) = (8.5 \pm 1.8)\%$ from AUBERT 06E. NODE=M026W1;LINKAGE=AU

[3] Systematic errors not evaluated. NODE=M026W1;LINKAGE=NS

[4] Normalized to $B(\eta_c \to p\overline{p}) = (1.3 \pm 0.4) \times 10^{-3}$. NODE=M026W1;LINKAGE=N3

[5] Normalized to $B(\eta_c \to K^\pm K^0_S \pi^\mp)$. NODE=M026W1;LINKAGE=N2

[6] Average of $K^0_S K^\pm \pi^\mp$, $\pi^+\pi^- K^+K^-$, and $2(K^+K^-)$ decay modes. NODE=M026W;LINKAGE=FF

[7] Normalized to the sum of $B(\eta_c \to K^\pm K^0_S \pi^\mp)$, $B(\eta_c \to K^+K^-\pi^+\pi^-)$, and $B(\eta_c \to 2\pi^+ 2\pi^-)$. NODE=M026W1;LINKAGE=N6

[8] Superseded by ASNER 04. NODE=M026W1;LINKAGE=NN

[9] Normalized to the sum of 9 branching ratios. NODE=M026W1;LINKAGE=N1

[10] Normalized to the sum of $B(\eta_c \to K^\pm K^0_S \pi^\mp)$, $B(\eta_c \to \phi\phi)$, $B(\eta_c \to K^+K^-\pi^+\pi^-)$, and $B(\eta_c \to 2\pi^+ 2\pi^-)$. NODE=M026W1;LINKAGE=N5

[11] Superseded by ACCIARRI 99T. NODE=M026W1;LINKAGE=WD

[12] Normalized to the sum of $B(\eta_c \to K^\pm K^0_S \pi^\mp)$, $B(\eta_c \to 2K^+ 2K^-)$, $B(\eta_c \to K^+K^-\pi^+\pi^-)$, and $B(\eta_c \to 2\pi^+ 2\pi^-)$. NODE=M026W1;LINKAGE=N4

[13] Re-evaluated by AIHARA 88D. NODE=M026W1;LINKAGE=A

$\eta_c(1S)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

NODE=M026220

$\Gamma(\eta'(958)\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_1\Gamma_{59}/\Gamma$

NODE=M026G10
NODE=M026G10

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
102 ±18 OUR FIT Error includes scale factor of 1.5.					
98.1± 3.9±11.7	2673	XU	18	BELL	$e^+e^- \to e^+e^-\eta'\pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$75.8^{+6.3}_{-6.2} \pm 8.4$	486	[1] ZHANG	12A	BELL	$e^+e^- \to e^+e^-\eta'\pi^+\pi^-$

[1] Superseded by XU 18. NODE=M026G10;LINKAGE=A

$\Gamma(\rho\rho) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_4\Gamma_{59}/\Gamma$

NODE=M026G09
NODE=M026G09

VALUE (eV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<39	90	< 1556	UEHARA	08	BELL	$\gamma\gamma \to 2(\pi^+\pi^-)$

$\Gamma(K^*(892)\overline{K}^*(892)) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_6\Gamma_{59}/\Gamma$

NODE=M026G08
NODE=M026G08

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
35 ±6 OUR FIT					
32.4±4.2±5.8	882 ± 115	UEHARA	08	BELL	$\gamma\gamma \to \pi^+\pi^-K^+K^-$

$\Gamma(\phi\phi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_9\Gamma_{59}/\Gamma$

NODE=M026G07
NODE=M026G07

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
9.2 ±2.2 OUR FIT Error includes scale factor of 2.7.					
7.75±0.66±0.62	386 ± 31	[1] LIU	12B	BELL	$\gamma\gamma \to 2(K^+K^-)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
6.8 ±1.2 ±1.3	132 ± 23	UEHARA	08	BELL	$\gamma\gamma \to 2(K^+K^-)$

[1] Supersedes UEHARA 08. Using $B(\phi \to K^+K^-) = (48.9 \pm 0.5)\%$. NODE=M026G07;LINKAGE=LI

$\Gamma(\omega\omega) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{16}\Gamma_{59}/\Gamma$

NODE=M026G03
NODE=M026G03

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
13 ±5 OUR FIT Error includes scale factor of 2.2.					
8.67±2.86±0.96	85 ± 29	[1] LIU	12B	BELL	$\gamma\gamma \to 2(\pi^+\pi^-\pi^0)$

[1] Using $B(\omega \to \pi^+\pi^-\pi^0) = (89.2 \pm 0.7)\%$. NODE=M026G03;LINKAGE=LI

$\Gamma(\omega\phi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{17}\Gamma_{59}/\Gamma$

NODE=M026G04
NODE=M026G04

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.49	90	[1] LIU	12B	BELL	$\gamma\gamma \to K^+K^-\pi^+\pi^-\pi^0$

[1] Using $B(\phi \to K^+K^-) = (48.9 \pm 0.5)\%$ and $B(\omega \to \pi^+\pi^-\pi^0) = (89.2 \pm 0.7)\%$. NODE=M026G04;LINKAGE=LI

$\Gamma(f_2(1270)f_2(1270)) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{18}\Gamma_{59}/\Gamma$

NODE=M026G19
NODE=M026G19

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
55±14 OUR FIT					
69±17±12	3182±766	UEHARA	08	BELL	$\gamma\gamma \to 2(\pi^+\pi^-)$

$\Gamma(f_2(1270) f'_2(1525)) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{19}\Gamma_{59}/\Gamma$

NODE=M026G20
NODE=M026G20

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
49±9±13	1128 ± 206	UEHARA	08	BELL	$\gamma\gamma \to \pi^+\pi^- K^+ K^-$

$\Gamma(K\overline{K}\pi) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{37}\Gamma_{59}/\Gamma$

NODE=M026G14
NODE=M026G14

VALUE (keV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.360±0.022 OUR FIT Error includes scale factor of 1.5.						
0.396±0.016 OUR AVERAGE						
0.386±0.008±0.021		12k	DEL-AMO-SA..	11M	BABR	$\gamma\gamma \to K^0_S K^\pm \pi^\mp$
0.374±0.009±0.031		14k	[1] LEES	10	BABR	10.6 $e^+e^- \to e^+e^- K^0_S K^\pm \pi^\mp$
0.407±0.022±0.028			[2,3] ASNER	04	CLEO	$\gamma\gamma \to \eta'_c \to K^0_S K^\pm \pi^\mp$
0.60 ±0.12 ±0.09		41	[3,4] ABDALLAH	03J	DLPH	$\gamma\gamma \to K^0_S K^\pm \pi^\mp$
1.47 ±0.87 ±0.27			[3] SHIRAI	98	AMY	$\gamma\gamma \to \eta_c \to K^\pm K^0_S \pi^\mp$
0.84 ±0.21			[3] ALBRECHT	94H	ARG	$\gamma\gamma \to K^\pm K^0_S \pi^\mp$
0.60 $^{+0.23}_{-0.20}$			[3] CHEN	90B	CLEO	$\gamma\gamma \to \eta_c K^\pm K^0_S \pi^\mp$
1.06 ±0.41 ±0.27		11	[3] BRAUNSCH...	89	TASS	$\gamma\gamma \to K\overline{K}\pi$
1.5 $^{+0.60}_{-0.45}$ ±0.3		7	[3] BERGER	86	PLUT	$\gamma\gamma \to K\overline{K}\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
0.418±0.044±0.022			[3,5] BRANDENB...	00B	CLE2	$\gamma\gamma \to \eta_c \to K^\pm K^0_S \pi^\mp$
<0.63	95		[3] BEHREND	89	CELL	$\gamma\gamma \to K^0_S K^\pm \pi^\mp$
<4.4	95		ALTHOFF	85B	TASS	$\gamma\gamma \to K\overline{K}\pi$

[1] From the corrected and unfolded mass spectrum. NODE=M026G14;LINKAGE=LE

[2] Calculated by us from the value reported in ASNER 04 that assumes B($\eta_c \to K\overline{K}\pi$) = 5.5 ± 1.7% NODE=M026G14;LINKAGE=AA

[3] We have multiplied $K^\pm K^0_S \pi^\mp$ measurement by 3 to obtain $K\overline{K}\pi$. NODE=M026G14;LINKAGE=C

[4] Calculated by us from the value reported in ABDALLAH 03J, which uses B($\eta_c \to K^0_S K^\pm \pi^\mp$) = (1.5 ± 0.4)%. NODE=M026G;LINKAGE=BB

[5] Superseded by ASNER 04. NODE=M026G14;LINKAGE=NN

$\Gamma(K^+K^-\pi^+\pi^-) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{41}\Gamma_{59}/\Gamma$

NODE=M026G15
NODE=M026G15

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
42 ± 9 OUR FIT Error includes scale factor of 2.1.					
27 ± 6 OUR AVERAGE					
25.7± 3.2± 4.9	2019 ± 248	UEHARA	08	BELL	$\gamma\gamma \to \pi^+\pi^- K^+ K^-$
280 ±100 ±60	42	[1] ABDALLAH	03J	DLPH	$\gamma\gamma \to \pi^+\pi^- K^+ K^-$
170 ± 80 ±20	13.9 ± 6.6	ALBRECHT	94H	ARG	$\gamma\gamma \to \pi^+\pi^- K^+ K^-$

[1] Calculated by us from the value reported in ABDALLAH 03J, which uses B($\eta_c \to \pi^+\pi^- K^+ K^-$) = (2.0 ± 0.7)%. NODE=M026G;LINKAGE=CC

$\Gamma(K^+K^-\pi^+\pi^-\pi^0) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{42}\Gamma_{59}/\Gamma$

NODE=M026G02
NODE=M026G02

VALUE (keV)	EVTS	DOCUMENT ID	TECN	COMMENT
0.190±0.006±0.028	11k	DEL-AMO-SA..11M	BABR	$\gamma\gamma \to K^+K^-\pi^+\pi^-\pi^0$

$\Gamma(2(K^+K^-)) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{45}\Gamma_{59}/\Gamma$

NODE=M026G27
NODE=M026G27

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
7.2± 2.1 OUR FIT Error includes scale factor of 1.5.					
5.8± 1.9 OUR AVERAGE					
5.6± 1.1± 1.6	216 ± 42	UEHARA	08	BELL	$\gamma\gamma \to 2(K^+K^-)$
350 ±90 ±60	46	[1] ABDALLAH	03J	DLPH	$\gamma\gamma \to 2(K^+K^-)$
231 ±90 ±23	9.1 ± 3.3	[2] ALBRECHT	94H	ARG	$\gamma\gamma \to 2(K^+K^-)$

[1] Calculated by us from the value reported in ABDALLAH 03J, which uses B($\eta_c \to$) $2(K^+K^-)$ = (2.1 ± 1.2)%. NODE=M026G;LINKAGE=DD

[2] Includes all topological modes except $\eta_c \to \phi\phi$. NODE=M026G;LINKAGE=EE

$\Gamma(2(\pi^+\pi^-)) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{48}\Gamma_{59}/\Gamma$

NODE=M026G11
NODE=M026G11

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
48 ± 7 OUR FIT Error includes scale factor of 1.5.					
42 ± 6 OUR AVERAGE					
40.7± 3.7± 5.3	5381 ± 492	UEHARA	08	BELL	$\gamma\gamma \to 2(\pi^+\pi^-)$
180 ±70 ±20	21.4 ± 8.6	ALBRECHT	94H	ARG	$\gamma\gamma \to 2(\pi^+\pi^-)$

$\Gamma(p\overline{p}) \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{51}\Gamma_{59}/\Gamma$

NODE=M026G01
NODE=M026G01

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
6.7 ±0.6 OUR FIT Error includes scale factor of 1.1.				
6.2 $^{+1.1}_{-1.0}$ OUR AVERAGE Error includes scale factor of 1.1.				
$7.20\pm1.53^{+0.67}_{-0.75}$	157 ± 33	[1] KUO 05	BELL	$\gamma\gamma \to p\overline{p}$
$4.6\ ^{+1.3}_{-1.1}\ \pm0.4$	190	AMBROGIANI 03	E835	$\overline{p}p \to \gamma\gamma$
$8.1\ ^{+2.9}_{-2.0}$		ARMSTRONG 95F	E760	$\overline{p}p \to \gamma\gamma$

[1] Not independent from the $\Gamma_{\gamma\gamma}$ reported by the same experiment.

NODE=M026G01;LINKAGE=GG

$\eta_c(1S)$ BRANCHING RATIOS

NODE=M026225

——— HADRONIC DECAYS ———

NODE=M026305

$\Gamma(\eta'(958)K\overline{K})/\Gamma(\eta'(958)\pi\pi)$ — Γ_2/Γ_1

NODE=M026R55
NODE=M026R55

VALUE	DOCUMENT ID	TECN	COMMENT
0.859±0.052±0.043	[1] LEES 21A	BABR	$\gamma\gamma \to \eta' K^+ K^-$, $\eta' \pi^+\pi^-$

[1] Based on Dalitz-plot analysis of the $\eta_c \to \eta' K^+ K^-$, $\eta' \pi^+\pi^-$ final states where the fit fractions and relative phases are determined for numerous two-body intermediate states.

NODE=M026R55;LINKAGE=A

$\Gamma(\eta'(958)\eta\eta)/\Gamma_{total}$ — Γ_3/Γ

NODE=M026R63
NODE=M026R63

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
3.4±0.5±0.3	[1] ABLIKIM 21C	BES3	$J/\psi(1S) \to \gamma\eta\eta\eta'$

[1] ABLIKIM 21C reports $[\Gamma(\eta_c(1S) \to \eta'(958)\eta\eta)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (4.86 \pm 0.62 \pm 0.45) \times 10^{-5}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026R63;LINKAGE=A

$\Gamma(\rho\rho)/\Gamma_{total}$ — Γ_4/Γ

NODE=M026R9
NODE=M026R9

VALUE (units 10^{-2})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.1\pm0.5\pm0.1$		72	[1] ABLIKIM 05L	BES2	$J/\psi \to \pi^+\pi^-\pi^+\pi^-\gamma$
$2.3\pm0.5\pm0.2$		113	[2,3] BISELLO 91	DM2	$J/\psi \to \gamma\rho^0\rho^0$
$2.1\pm1.0\pm0.2$		32	[4,5] BISELLO 91	DM2	$J/\psi \to \gamma\rho^+\rho^-$
<14	90		[6] BALTRUSAIT...86	MRK3	$J/\psi \to \eta_c\gamma$

OCCUR=2

[1] ABLIKIM 05L reports $[\Gamma(\eta_c(1S) \to \rho\rho)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (1.6 \pm 0.6 \pm 0.4) \times 10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026R9;LINKAGE=F

[2] BISELLO 91 reports $[\Gamma(\eta_c(1S) \to \rho\rho)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (3.30 \pm 0.30 \pm 0.60) \times 10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026R9;LINKAGE=A

[3] The value reported by BISELLO 91 has been multiplied by 3 to account for isospin symmetry.

NODE=M026R9;LINKAGE=B

[4] BISELLO 91 reports $[\Gamma(\eta_c(1S) \to \rho\rho)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (3.0 \pm 1.3 \pm 0.6) \times 10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026R9;LINKAGE=C

[5] The value reported by BISELLO 91 has been multiplied by 3/2 to account for isospin symmetry.

NODE=M026R9;LINKAGE=D

[6] Using $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 0.0127 \pm 0.0036$.

NODE=M026R9;LINKAGE=G

$\Gamma(K^*(892)^0 K^- \pi^+ + \text{c.c.})/\Gamma_{total}$ — Γ_5/Γ

NODE=M026R16
NODE=M026R16

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.8\pm0.4\pm0.2$	63	[1] BALTRUSAIT...86	MRK3	$J/\psi \to \eta_c\gamma$

[1] BALTRUSAITIS 86 reports $[\Gamma(\eta_c(1S) \to K^*(892)^0 K^- \pi^+ + \text{c.c.})/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (2.6 \pm 0.6) \times 10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026R16;LINKAGE=A

$\Gamma\big(K^*(892)^0\overline{K}^*(892)^0\pi^+\pi^-\big)/\Gamma_{\text{total}}$ Γ_7/Γ

NODE=M026R25
NODE=M026R25

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$135\pm57\pm13$	45	[1] ABLIKIM	06A	BES2	$J/\psi \to K^{*0}\overline{K}^{*0}\pi^+\pi^-\gamma$

[1] ABLIKIM 06A reports $[\Gamma\big(\eta_c(1S) \to K^*(892)^0\overline{K}^*(892)^0\pi^+\pi^-\big)/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (1.91 \pm 0.64 \pm 0.48) \times 10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026R25;LINKAGE=AB

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

NODE=M026R21
NODE=M026R21

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2.9^{+0.9}_{-0.8}\pm1.1$	$14.1^{+4.4}_{-3.7}$	[1,2] HUANG	03	BELL	$B^+ \to (\phi K^+K^-)\,K^+$

[1] Using $B(B^+ \to \eta_c K^+) = (1.25 \pm 0.12^{+0.10}_{-0.12}) \times 10^{-3}$ from FANG 03 and $B(\eta_c \to K\overline{K}\pi) = (5.5 \pm 1.7) \times 10^{-2}$.

NODE=M026R;LINKAGE=BB

[2] Not used since the same experimental measurement has been used in another related quantity included elsewhere in the fit.

NODE=M026R21;LINKAGE=A

$\Gamma\big(\phi 2(\pi^+\pi^-)\big)/\Gamma_{\text{total}}$ Γ_{10}/Γ

NODE=M026R26
NODE=M026R26

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<40	90	[1] ABLIKIM	06A	BES2	$J/\psi \to \phi 2(\pi^+\pi^-)\gamma$

[1] ABLIKIM 06A reports $[\Gamma\big(\eta_c(1S) \to \phi 2(\pi^+\pi^-)\big)/\Gamma_{\text{total}}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] < 0.603 \times 10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 1.41 \times 10^{-2}$.

NODE=M026R26;LINKAGE=AB

$\Gamma\big(a_0(980)\pi\big)/\Gamma_{\text{total}}$ Γ_{11}/Γ

NODE=M026R11
NODE=M026R11

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
seen		AAIJ	23AH	LHCB	$B^+ \to K^+(K^0_S K\pi)$
seen		LEES	21A	BABR	Dalitz anal. of $\eta_c \to \pi^+\pi^-\eta$
seen		LEES	14E	BABR	Dalitz anal. of $\eta_c \to K^+K^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.02	90	[1,2] BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c\gamma$

[1] The quoted branching ratio uses $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 0.0127 \pm 0.0036$.

NODE=M026R11;LINKAGE=E

[2] We are assuming $B(a_0(980) \to \eta\pi) > 0.5$.

NODE=M026R11;LINKAGE=F

$\Gamma\big(a_2(1320)\pi\big)/\Gamma_{\text{total}}$ Γ_{12}/Γ

NODE=M026R12
NODE=M026R12

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
seen		LEES	21A	BABR	Dalitz anal. of $\eta_c \to \pi^+\pi^-\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.02	90	[1] BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c\gamma$

[1] The quoted branching ratio uses $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 0.0127 \pm 0.0036$.

NODE=M026R12;LINKAGE=E

$\Gamma\big(K^*(892)\overline{K} + \text{c.c.}\big)/\Gamma_{\text{total}}$ Γ_{13}/Γ

NODE=M026R17
NODE=M026R17

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0128	90	BISELLO	91	DM2	$J/\psi \to \gamma K^0_S K^\pm\pi^\mp$
<0.0132	90	[1] BISELLO	91	DM2	$J/\psi \to \gamma K^+K^-\pi^0$

OCCUR=2

[1] The quoted branching ratios use $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 0.0127 \pm 0.0036$.

NODE=M026R17;LINKAGE=E

$\Gamma\big(f_2(1270)\eta\big)/\Gamma_{\text{total}}$ Γ_{14}/Γ

NODE=M026R13
NODE=M026R13

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
seen		LEES	21A	BABR	Dalitz anal. of $\eta_c \to \pi^+\pi^-\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.011	90	[1] BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c\gamma$

[1] The quoted branching ratio uses $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 0.0127 \pm 0.0036$.

NODE=M026R13;LINKAGE=E

$\Gamma\big(f_2(1270)\eta'\big)/\Gamma_{\text{total}}$ Γ_{15}/Γ

NODE=M026R60
NODE=M026R60

VALUE	DOCUMENT ID		TECN	COMMENT
seen	LEES	21A	BABR	Dalitz anal. of $\eta_c \to \pi^+\pi^-\eta'$; $K^+K^-\eta'$

$\Gamma(\omega\phi)/\Gamma_{total}$ — Γ_{17}/Γ

NODE=M026R22

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.5 \times 10^{-4}$	90	[1] ABLIKIM	17P	BES3	$J/\psi \to \pi^+\pi^-\pi^0 K^+ K^- \gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<17 \times 10^{-4}$	90	[2] ABLIKIM	05L	BES2	$J/\psi \to \pi^+\pi^-\pi^0 K^+ K^- \gamma$

[1] Using $B(J/\psi \to \gamma\eta_c) = 0.017 \pm 0.004$. NODE=M026R22;LINKAGE=A

[2] The quoted branching ratio uses $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 0.0127 \pm 0.0036$. NODE=M026R22;LINKAGE=E

$\Gamma(f_0(500)\eta)/\Gamma_{total}$ — Γ_{20}/Γ

NODE=M026R57

VALUE	DOCUMENT ID		TECN	COMMENT
seen	LEES	21A	BABR	Dalitz anal. of $\eta_c \to \pi^+\pi^-\eta$

$\Gamma(f_0(500)\eta')/\Gamma_{total}$ — Γ_{21}/Γ

NODE=M026R58

VALUE	DOCUMENT ID		TECN	COMMENT
seen	LEES	21A	BABR	Dalitz anal. of $\eta_c(1S) \to \pi^+\pi^-\eta'$

$\Gamma(f_0(980)\eta)/\Gamma_{total}$ — Γ_{22}/Γ

NODE=M026R41

VALUE	DOCUMENT ID		TECN	COMMENT
seen	LEES	21A	BABR	Dalitz anal. of $\eta_c \to \pi^+\pi^-\eta$
seen	LEES	14E	BABR	Dalitz anal. of $\eta_c \to K^+K^-\eta$

$\Gamma(f_0(980)\eta')/\Gamma_{total}$ — Γ_{23}/Γ

NODE=M026R56

VALUE	DOCUMENT ID		TECN	COMMENT
seen	LEES	21A	BABR	Dalitz anal. of $\eta_c \to \pi^+\pi^-\eta'$, $K^+K^-\eta'$

$\Gamma(f_0(1500)\eta)/\Gamma_{total}$ — Γ_{24}/Γ

NODE=M026R42

VALUE	DOCUMENT ID		TECN	COMMENT
seen	LEES	21A	BABR	Dalitz anal. of $\eta_c \to \pi^+\pi^-\eta$
seen	LEES	14E	BABR	Dalitz anal. of $\eta_c \to K^+K^-\eta$

$\Gamma(f_0(1710)\eta')/\Gamma_{total}$ — Γ_{25}/Γ

NODE=M026R59

VALUE	DOCUMENT ID		TECN	COMMENT
seen	LEES	21A	BABR	Dalitz anal. of $\eta_c \to K^+K^-\eta'$

$\Gamma(f_0(2100)\eta')/\Gamma_{total}$ — Γ_{26}/Γ

NODE=M026R61

VALUE	DOCUMENT ID		TECN	COMMENT
seen	LEES	21A	BABR	Dalitz anal. of $\eta_c \to \pi^+\pi^-\eta$

$\Gamma(f_0(2200)\eta)/\Gamma_{total}$ — Γ_{27}/Γ

NODE=M026R43

VALUE	DOCUMENT ID		TECN	COMMENT
seen	LEES	14E	BABR	Dalitz anal. of $\eta_c \to K^+K^-\eta$

$\Gamma(a_0(1320)\pi)/\Gamma_{total}$ — Γ_{28}/Γ

NODE=M026R45

VALUE	DOCUMENT ID		TECN	COMMENT
seen	AAIJ	23AH	LHCB	$B^+ \to K^+(K^0_S K\pi)$
seen	LEES	14E	BABR	Dalitz anal. of $\eta_c \to K^+K^-\pi^0$

$\Gamma(a_0(1450)\pi)/\Gamma_{total}$ — Γ_{29}/Γ

NODE=M026R46

VALUE	DOCUMENT ID		TECN	COMMENT
seen	AAIJ	23AH	LHCB	$B^+ \to K^+(K^0_S K\pi)$
seen	LEES	21A	BABR	Dalitz anal. of $\eta_c \to \pi^+\pi^-\eta$
seen	LEES	14E	BABR	Dalitz anal. of $\eta_c \to K^+K^-\pi^0$

$\Gamma(a_2(1700)\pi)/\Gamma_{total}$ — Γ_{30}/Γ

NODE=M026P10

VALUE	DOCUMENT ID		TECN	COMMENT
seen	AAIJ	23AH	LHCB	$B^+ \to K^+(K^0_S K\pi)$

$\Gamma(a_0(1710)\pi)/\Gamma_{total}$ — Γ_{31}/Γ

NODE=M026P13

VALUE	DOCUMENT ID		TECN	COMMENT
seen	AAIJ	23AH	LHCB	$B^+ \to K^+(K^0_S K\pi)$
seen	LEES	21A	BABR	Dalitz anal. of $\eta_c \to \pi^+\pi^-\eta'$

$\Gamma(a_0(1950)\pi)/\Gamma_{total}$ — Γ_{32}/Γ

NODE=M026R00

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
seen		LEES	21A	BABR	Dalitz anal. of $\eta_c(1S) \to \pi^+\pi^-\eta'$
seen	12k	[1] LEES	16A	BABR	$\gamma\gamma \to \eta_c(1S) \to K\overline{K}\pi$

[1] From a model-independant partial wave analysis.

NODE=M026R00;LINKAGE=A

$\Gamma(K_0^*(1430)\overline{K}+\text{c.c.})/\Gamma_{total}$ — Γ_{33}/Γ

NODE=M026R47

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
seen	12k	[1] LEES	16A	BABR	$\gamma\gamma \to \eta_c(1S) \to K\overline{K}\pi$
seen		LEES	14E	BABR	Dalitz anal. of $\eta_c \to K^+K^-\eta/\pi^0$

[1] From a model-independant partial wave analysis.

NODE=M026R47;LINKAGE=A

$\Gamma(K_2^*(1430)\overline{K}+\text{c.c.})/\Gamma_{total}$ — Γ_{34}/Γ

NODE=M026R48

VALUE	DOCUMENT ID		TECN	COMMENT
seen	AAIJ	23AH	LHCB	$B^+ \to K^+(K_S^0K\pi)$
seen	LEES	21A	BABR	Dalitz anal. of $\eta_c \to K^+K^-\eta'$
seen	LEES	14E	BABR	Dalitz anal. of $\eta_c \to K^+K^-\pi^0$

$\Gamma(K_0^*(1950)\overline{K}+\text{c.c.})/\Gamma_{total}$ — Γ_{35}/Γ

NODE=M026R49

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
seen		AAIJ	23AH	LHCB	$B^+ \to K^+(K_S^0K\pi)$
seen		LEES	21A	BABR	Dalitz anal. of $\eta_c \to K^+K^-\eta'$
seen	12k	[1] LEES	16A	BABR	$\gamma\gamma \to \eta_c(1S) \to K\overline{K}\pi$
seen		LEES	14E	BABR	Dalitz anal. of $\eta_c \to K^+K^-\eta/\pi^0$

[1] From a Dalitz plot analysis using an isobar model.

NODE=M026R49;LINKAGE=A

$\Gamma(K_0^*(2600)\overline{K}+\text{c.c.})/\Gamma_{total}$ — Γ_{36}/Γ

NODE=M026P11

VALUE	DOCUMENT ID		TECN	COMMENT
seen	AAIJ	23AH	LHCB	$B^+ \to K^+(K_S^0K\pi)$

$\Gamma(K\overline{K}\pi)/\Gamma_{total}$ — Γ_{37}/Γ

NODE=M026R4

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT	
7.1±0.4 OUR FIT Error includes scale factor of 1.1.						
7.4±0.6 OUR AVERAGE						
$6.9\pm0.7\pm0.6$	146	[1] ABLIKIM	19AP	BES3	$h_c \to \gamma\eta_c$	
$7.8\pm0.6\pm0.6$	267	[2] ABLIKIM	19AP	BES3	$h_c \to \gamma\eta_c$	OCCUR=2
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$6.1\pm1.2\pm0.6$	55	[3,4,5] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma K^+K^-\pi^0$	
$7.6\pm1.3\pm0.8$	107	[5,6,7] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma K_S^0K^\mp\pi^\pm$	OCCUR=2
8.5 ± 1.8		[5,8] AUBERT	06E	BABR	$B^\pm \to K^\pm X_{c\overline{c}}$	
$4.7\pm1.2\pm0.5$	0.6k	[5,9,10] BAI	04	BES	$J/\psi \to \gamma K^\pm\pi^\mp K_S^0$	
$6.2\pm1.7\pm0.6$	33	[5,11,12] BISELLO	91	DM2	$J/\psi \to \gamma K^+K^-\pi^0$	
$4.9\pm1.2\pm0.5$	68	[5,13,14] BISELLO	91	DM2	$J/\psi \to \gamma K^\pm\pi^\mp K_S^0$	OCCUR=2
4.8 ± 1.7	95	[5,15,16] BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c\gamma$	
$5.5\pm2.1\pm0.5$	32	[5,17,18] BALTRUSAIT...	86	MRK3	$J/\psi \to \gamma K^+K^-\pi^0$	OCCUR=2
$4.0\pm1.1\pm0.4$	63	[5,19,20] BALTRUSAIT...	86	MRK3	$J/\psi \to \gamma K^\pm\pi^\mp K_S^0$	OCCUR=3
$13\ ^{+7}_{-5}\ \pm2$		[5,21] HIMEL	80B	MRK2	$\psi(2S) \to \eta_c\gamma$	
<10.7	90% CL	[16] PARTRIDGE	80B	CBAL	$J/\psi \to \eta_c\gamma$	

[1] ABLIKIM 19AP quotes $B(\eta_c \to K^+K^-\pi^0) = (1.15 \pm 0.12 \pm 0.10) \times 10^{-2}$ which we multiply by 6 to account for isospin symmetry.

NODE=M026R4;LINKAGE=C

[2] ABLIKIM 19AP quotes $B(\eta_c \to K_S^0K^\pm\pi^\mp) = (2.60 \pm 0.21 \pm 0.20) \times 10^{-2}$ which we multiply by 3 to account for isospin symmetry.

NODE=M026R4;LINKAGE=F

[3] ABLIKIM 12N quotes $B(\psi(2S) \to \pi^0 h_c) \cdot B(h_c \to \gamma\eta_c) \cdot B(\eta_c \to K^+K^-\pi^0) = (4.54 \pm 0.76 \pm 0.48) \times 10^{-6}$ which we multiply by 6 to account for isospin symmetry.

NODE=M026R4;LINKAGE=BK

[4] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] \times [B(h_c(1P) \to \gamma\eta_c(1S))] = (27.24 \pm 4.56 \pm 2.88) \times 10^{-6}$ which we divide by our best values $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$, $B(h_c(1P) \to \gamma\eta_c(1S)) = (60 \pm 4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=M026R4;LINKAGE=CK

[5] Not used since the same experimental measurement has been used in another related quantity included elsewhere in the fit. NODE=M026R4;LINKAGE=U

[6] ABLIKIM 12N quotes $B(\psi(2S) \to \pi^0 h_c) \cdot B(h_c \to \gamma\eta_c) \cdot B(\eta_c \to K^0_S K^\pm \pi^\mp) = (11.35 \pm 1.25 \pm 1.50) \times 10^{-6}$ which we multiply by 3 to account for isospin symmetry. NODE=M026R4;LINKAGE=BL

[7] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] \times [B(h_c(1P) \to \gamma\eta_c(1S))] = (34.05 \pm 3.75 \pm 4.50) \times 10^{-6}$ which we divide by our best values $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$, $B(h_c(1P) \to \gamma\eta_c(1S)) = (60 \pm 4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=M026R4;LINKAGE=CL

[8] Determined from the ratio of $B(B^\pm \to K^\pm \eta_c)$ $B(\eta_c \to K\overline{K}\pi) = (7.4 \pm 0.5 \pm 0.7) \times 10^{-5}$ reported in AUBERT,B 04B and $B(B^\pm \to K^\pm \eta_c) = (8.7 \pm 1.5) \times 10^{-3}$ reported in AUBERT 06E. NODE=M026R4;LINKAGE=AB

[9] BAI 04 reports $B(J/\psi \to \gamma\eta_c) \cdot B(\eta_c \to K^\pm K^0_S \pi^\mp) = (2.2 \pm 0.3 \pm 0.5) \times 10^{-4}$ which we multiply by 3 to account for isospin symmetry. NODE=M026R4;LINKAGE=H

[10] BAI 04 reports $[\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (6.6 \pm 0.9 \pm 1.5) \times 10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R4;LINKAGE=I

[11] BISELLO 91 reports $[\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (8.76 \pm 1.80 \pm 1.68) \times 10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R4;LINKAGE=J

[12] BISELLO 91 reports $B(J/\psi \to \gamma\eta_c) \cdot B(\eta_c \to K^+ K^- \pi^0) = (1.46 \pm 0.30 \pm 0.28) \times 10^{-4}$ which we multiply by 6 to account for isospin symmetry. NODE=M026R4;LINKAGE=M

[13] BISELLO 91 reports $[\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (6.9 \pm 1.2 \pm 1.2) \times 10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R4;LINKAGE=L

[14] BISELLO 91 reports $B(J/\psi \to \gamma\eta_c) \cdot B(\eta_c \to K^\pm K^0_S \pi^\mp) = (2.3 \pm 0.4 \pm 0.4) \times 10^{-4}$ which we multiply by 3 to account for isospin symmetry. NODE=M026R4;LINKAGE=N

[15] Average from $K^+ K^- \pi^0$ and $K^\pm K^0_S \pi^\mp$ decay channels. NODE=M026R4;LINKAGE=D

[16] The quoted branching ratios use $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 0.0127 \pm 0.0036$. Where relevant, the error in this branching ratio is treated as a common systematic in computing averages. NODE=M026R4;LINKAGE=E

[17] BALTRUSAITIS 86 reports $[\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (7.8 \pm 3.0) \times 10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R4;LINKAGE=Q

[18] BALTRUSAITIS 86 reports $B(J/\psi \to \gamma\eta_c) \cdot B(\eta_c \to K^+ K^- \pi^0) = (1.3 \pm 0.5) \times 10^{-4}$ which we multiply by 6 to account for isospin symmetry. NODE=M026R4;LINKAGE=S

[19] BALTRUSAITIS 86 reports $[\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (5.7 \pm 1.5) \times 10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R4;LINKAGE=R

[20] BALTRUSAITIS 86 reports $B(J/\psi \to \gamma\eta_c) \cdot B(\eta_c \to K^\pm K^0_S \pi^\mp) = (1.9 \pm 0.5) \times 10^{-4}$ which we multiply by 3 to account for isospin symmetry. NODE=M026R4;LINKAGE=T

[21] HIMEL 80B reports $[\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\eta_c(1S))] = (4.5^{+2.4}_{-1.8}) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \to \gamma\eta_c(1S)) = (3.6 \pm 0.5) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R4;LINKAGE=G

$\Gamma(\phi K^+ K^-)/\Gamma(K\overline{K}\pi)$ Γ_8/Γ_{37}

NODE=M026R02
NODE=M026R02

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
$0.052^{+0.016}_{-0.014} \pm 0.014$	7	[1] HUANG 03	BELL	$B^\pm \to K^\pm \phi\phi$

[1] Using $B(B^+ \to \eta_c K^+) = (1.25 \pm 0.12^{+0.10}_{-0.12}) \times 10^{-3}$ from FANG 03 and $B(\eta_c \to K\overline{K}\pi) = (5.5 \pm 1.7) \times 10^{-2}$. NODE=M026R02;LINKAGE=BB

$\Gamma(K\overline{K}\eta)/\Gamma_{total}$ Γ_{38}/Γ

NODE=M026R15
NODE=M026R15

VALUE (units 10^{-2})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.9 \pm 0.5 \pm 0.1$		7	[1,2,3] ABLIKIM 12N	BES3	$\psi(2S) \to \pi^0 \gamma\eta K^+ K^-$
<3.1	90		[4] BALTRUSAIT..86	MRK3	$J/\psi \to \eta_c \gamma$

OCCUR=2

[1] Not used since the same experimental measurement has been used in another related quantity included elsewhere in the fit.

[2] ABLIKIM 12N quotes B($\psi(2S) \to \pi^0 h_c$) · B($h_c \to \gamma\eta_c$) · B($\eta_c \to K^+K^-\eta$) = $(2.11 \pm 1.01 \pm 0.32) \times 10^{-6}$ which we multiply by 2 to account for isospin symmetry.

[3] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to K\overline{K}\eta)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] \times [B(h_c(1P) \to \gamma\eta_c(1S))] = (4.22 \pm 2.02 \pm 0.64) \times 10^{-6}$ which we divide by our best values $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$, $B(h_c(1P) \to \gamma\eta_c(1S)) = (60 \pm 4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[4] The quoted branching ratios use $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 0.0127 \pm 0.0036$.

NODE=M026R15;LINKAGE=A

NODE=M026R15;LINKAGE=AK

NODE=M026R15;LINKAGE=AM

NODE=M026R15;LINKAGE=E

$\Gamma(K\overline{K}\eta)/\Gamma(K\overline{K}\pi)$ — Γ_{38}/Γ_{37}

NODE=M026R40
NODE=M026R40

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.186±0.018 OUR FIT					
0.190±0.008±0.017	5.4k	[1] LEES	14E	BABR	$\gamma\gamma \to K^+K^-\eta/\pi^0$

[1] LEES 14E reports $B(\eta_c(1S) \to K^+K^-\eta)/B(\eta_c(1S) \to K^+K^-\pi^0) = 0.571 \pm 0.025 \pm 0.051$, which we divide by 3 to account for isospin symmetry. It uses both $\eta \to \gamma\gamma$ and $\eta \to \pi^+\pi^-\pi^0$ decays.

NODE=M026R40;LINKAGE=LE

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

NODE=M026R6
NODE=M026R6

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.6±0.4±0.2	33	[1] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma\eta\pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
5.4±2.0	75	[2,3] BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c\gamma$
3.7±1.3±2.0	18	[2,3] PARTRIDGE	80B	CBAL	$J/\psi \to \eta\pi^+\pi^-\gamma$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to \eta\pi^+\pi^-)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] \times [B(h_c(1P) \to \gamma\eta_c(1S))] = (7.22 \pm 1.47 \pm 1.11) \times 10^{-6}$ which we divide by our best values $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$, $B(h_c(1P) \to \gamma\eta_c(1S)) = (60 \pm 4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[2] Not used since the same experimental measurement has been used in another related quantity.

[3] The quoted branching ratios use $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 0.0127 \pm 0.0036$. Where relevant, the error in this branching ratio is treated as a common systematic in computing averages.

NODE=M026R6;LINKAGE=AB

NODE=M026R6;LINKAGE=A

NODE=M026R6;LINKAGE=E

$\Gamma(\eta 2(\pi^+\pi^-))/\Gamma_{total}$ — Γ_{40}/Γ

NODE=M026R05
NODE=M026R05

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
4.3±1.2±0.4	39	[1] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma\eta 2(\pi^+\pi^-)$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to \eta 2(\pi^+\pi^-))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] \times [B(h_c(1P) \to \gamma\eta_c(1S))] = (19.17 \pm 3.77 \pm 3.72) \times 10^{-6}$ which we divide by our best values $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$, $B(h_c(1P) \to \gamma\eta_c(1S)) = (60 \pm 4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=M026R05;LINKAGE=AB

$\Gamma(K^+K^-\pi^+\pi^-\pi^0)/\Gamma(K\overline{K}\pi)$ — Γ_{42}/Γ_{37}

NODE=M026R01
NODE=M026R01

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.477±0.017±0.070	11k	[1] DEL-AMO-SA...	11M	BABR	$\gamma\gamma \to K^+K^-\pi^+\pi^-\pi^0$

[1] We have multiplied the value of $\Gamma(K^+K^-\pi^+\pi^-\pi^0)/\Gamma(K^0_S K^\pm\pi^\mp)$ reported in DEL-AMO-SANCHEZ 11M by a factor 1/3 to obtain $\Gamma(K^+K^-\pi^+\pi^-\pi^0)/\Gamma(K\overline{K}\pi)$. Not independent from other measurements reported in DEL-AMO-SANCHEZ 11M.

NODE=M026R01;LINKAGE=DE

$\Gamma(K^0K^-\pi^+\pi^-\pi^+ + \text{c.c.})/\Gamma_{total}$ — Γ_{43}/Γ

NODE=M026R06
NODE=M026R06

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
5.4±1.4±0.5	43	[1,2] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma K^0_S K^\mp\pi^\mp 2\pi^\pm$

[1] ABLIKIM 12N quotes B($\psi(2S) \to \pi^0 h_c$) · B($h_c \to \gamma\eta_c$) · B($\eta_c \to K^0_S K^-\pi^- 2\pi^+$) = $(12.01 \pm 2.22 \pm 2.04) \times 10^{-6}$ which we multiply by 2 to take c.c. into account.

[2] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to K^0K^-\pi^+\pi^-\pi^+ + \text{c.c.})/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] \times [B(h_c(1P) \to \gamma\eta_c(1S))] = (24.02 \pm 4.44 \pm 4.08) \times 10^{-6}$ which we divide by our best values $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$, $B(h_c(1P) \to \gamma\eta_c(1S)) = (60 \pm 4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=M026R06;LINKAGE=AA

NODE=M026R06;LINKAGE=AB

$\Gamma(K^+K^-2(\pi^+\pi^-))/\Gamma_{total}$ Γ_{44}/Γ

NODE=M026R23
NODE=M026R23

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
8.4±2.4 OUR AVERAGE				
8 ±4 ±1	10	[1] ABLIKIM 12N	BES3	$\psi(2S) \to \pi^0\gamma K^+K^-2(\pi^+\pi^-)$
8.6±2.8±0.8	100	[2] ABLIKIM 06A	BES2	$J/\psi \to K^+K^-2(\pi^+\pi^-)\gamma$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to K^+K^-2(\pi^+\pi^-))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] \times [B(h_c(1P) \to \gamma\eta_c(1S))] = (3.60 \pm 1.71 \pm 0.64) \times 10^{-6}$ which we divide by our best values $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$, $B(h_c(1P) \to \gamma\eta_c(1S)) = (60 \pm 4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=M026R23;LINKAGE=AL

[2] ABLIKIM 06A reports $[\Gamma(\eta_c(1S) \to K^+K^-2(\pi^+\pi^-))/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (1.21\pm0.32\pm0.24)\times10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026R23;LINKAGE=AB

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{total}$ Γ_{46}/Γ

NODE=M026R51
NODE=M026R51

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<4 \times 10^{-4}$	90	[1] ABLIKIM 17AJ	BES3	$\psi(2S) \to \gamma\pi^+\pi^-\pi^0$

[1] ABLIKIM 17AJ reports $[\Gamma(\eta_c(1S) \to \pi^+\pi^-\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\eta_c(1S))] < 1.6 \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to \gamma\eta_c(1S)) = 3.6 \times 10^{-3}$.

NODE=M026R51;LINKAGE=A

$\Gamma(\pi^+\pi^-\pi^0\pi^0)/\Gamma_{total}$ Γ_{47}/Γ

NODE=M026R07
NODE=M026R07

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
4.6±0.9±0.5	118	[1] ABLIKIM 12N	BES3	$\psi(2S) \to \pi^0\gamma\pi^+\pi^-2\pi^0$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to \pi^+\pi^-\pi^0\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] \times [B(h_c(1P) \to \gamma\eta_c(1S))] = (20.31 \pm 2.20 \pm 3.33) \times 10^{-6}$ which we divide by our best values $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$, $B(h_c(1P) \to \gamma\eta_c(1S)) = (60 \pm 4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=M026R07;LINKAGE=AB

$\Gamma(2(\pi^+\pi^-\pi^0))/\Gamma_{total}$ Γ_{49}/Γ

NODE=M026R08
NODE=M026R08

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
15.9±2.0 OUR AVERAGE				
15.3±1.8±1.8	333	ABLIKIM 19AP	BES3	$h_c \to \gamma\eta_c$
16.8±2.8±1.7	175	[1] ABLIKIM 12N	BES3	$\psi(2S) \to \pi^0\gamma2(\pi^+\pi^-\pi^0)$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to 2(\pi^+\pi^-\pi^0))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] \times [B(h_c(1P) \to \gamma\eta_c(1S))] = (75.13 \pm 7.42 \pm 9.99) \times 10^{-6}$ which we divide by our best values $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$, $B(h_c(1P) \to \gamma\eta_c(1S)) = (60 \pm 4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=M026R08;LINKAGE=AB

$\Gamma(3(\pi^+\pi^-))/\Gamma_{total}$ Γ_{50}/Γ

NODE=M026R24
NODE=M026R24

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
18.9±3.4 OUR AVERAGE				
20 ±5 ±2	51	[1] ABLIKIM 12N	BES3	$\psi(2S) \to \pi^0\gamma3(\pi^+\pi^-)$
18 ±4 ±2	479	[2] ABLIKIM 06A	BES2	$J/\psi \to 3(\pi^+\pi^-)\gamma$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to 3(\pi^+\pi^-))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] \times [B(h_c(1P) \to \gamma\eta_c(1S))] = (8.82 \pm 1.57 \pm 1.59) \times 10^{-6}$ which we divide by our best values $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$, $B(h_c(1P) \to \gamma\eta_c(1S)) = (60 \pm 4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

NODE=M026R24;LINKAGE=AL

[2] ABLIKIM 06A reports $[\Gamma(\eta_c(1S) \to 3(\pi^+\pi^-))/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (2.59 \pm 0.32 \pm 0.47) \times 10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026R24;LINKAGE=AB

$\Gamma(p\overline{p})/\Gamma_{total}$ Γ_{51}/Γ

NODE=M026R2
NODE=M026R2

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
13.3± 1.1 OUR FIT	Error includes scale factor of 1.1.			
12.0± 2.6±1.5	34	ABLIKIM 19AP	BES3	$h_c \to \gamma\eta_c$

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

$15 \pm 5 \pm 1$	15	[1,2] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0 \gamma p\overline{p}$
$12.9^{+1.8}_{-2.1} \pm 0.8$	195	[2,3] WU	06	BELL	$B^+ \to p\overline{p} K^+$
$13.5 \pm 3.0 \pm 1.3$	213	[2,4] BAI	04	BES	$J/\psi \to \gamma p\overline{p}$
$9.2 \pm 3.5 \pm 0.9$	18	[2,5] BISELLO	91	DM2	$J/\psi \to \gamma p\overline{p}$
$10 \pm 5 \pm 1$	23	[2,6] BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c \gamma$
$22^{+22}_{-11} \pm 3$		[2,7] HIMEL	80B	MRK2	$\psi(2S) \to \eta_c \gamma$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to p\overline{p})/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] \times [B(h_c(1P) \to \gamma\eta_c(1S))] = (0.65 \pm 0.19 \pm 0.10) \times 10^{-6}$ which we divide by our best values $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$, $B(h_c(1P) \to \gamma\eta_c(1S)) = (60 \pm 4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=M026R2;LINKAGE=AB

[2] Not used since the same experimental measurement has been used in another related quantity included elsewhere in the fit. NODE=M026R2;LINKAGE=H

[3] WU 06 reports $[\Gamma(\eta_c(1S) \to p\overline{p})/\Gamma_{total}] \times [B(B^+ \to \eta_c K^+)] = (1.42 \pm 0.11^{+0.16}_{-0.20}) \times 10^{-6}$ which we divide by our best value $B(B^+ \to \eta_c K^+) = (1.10 \pm 0.07) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R2;LINKAGE=WU

[4] BAI 04 reports $[\Gamma(\eta_c(1S) \to p\overline{p})/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (1.9 \pm 0.3 \pm 0.3) \times 10^{-5}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R2;LINKAGE=C

[5] BISELLO 91 reports $[\Gamma(\eta_c(1S) \to p\overline{p})/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (0.13 \pm 0.04 \pm 0.03) \times 10^{-4}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R2;LINKAGE=D

[6] BALTRUSAITIS 86 reports $[\Gamma(\eta_c(1S) \to p\overline{p})/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (1.4 \pm 0.7) \times 10^{-5}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R2;LINKAGE=F

[7] HIMEL 80B reports $[\Gamma(\eta_c(1S) \to p\overline{p})/\Gamma_{total}] \times [B(\psi(2S) \to \gamma\eta_c(1S))] = (8^{+8}_{-4}) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to \gamma\eta_c(1S)) = (3.6 \pm 0.5) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R2;LINKAGE=G

$\Gamma(p\overline{p})/\Gamma_{total} \times \Gamma(\phi\phi)/\Gamma_{total}$ — $\Gamma_{51}/\Gamma \times \Gamma_9/\Gamma$

NODE=M026R33
NODE=M026R33

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
0.24±0.07 OUR FIT Error includes scale factor of 1.9.				
$4.0^{+3.5}_{-3.2}$	BAGLIN	89	SPEC	$\overline{p}p \to K^+K^-K^+K^-$

$\Gamma(p\overline{p}\pi^0)/\Gamma_{total}$ — Γ_{52}/Γ

NODE=M026R09
NODE=M026R09

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.34 \pm 0.12 \pm 0.03$	14	[1] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0 \gamma p\overline{p}\pi^0$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to p\overline{p}\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] \times [B(h_c(1P) \to \gamma\eta_c(1S))] = (1.53 \pm 0.49 \pm 0.23) \times 10^{-6}$ which we divide by our best values $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$, $B(h_c(1P) \to \gamma\eta_c(1S)) = (60 \pm 4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values. NODE=M026R09;LINKAGE=AB

$\Gamma(K^+\overline{p}\Lambda + \text{c.c.})/\Gamma_{total}$ — Γ_{55}/Γ

NODE=M026R53
NODE=M026R53

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
$2.46^{+0.33}_{-0.32} \pm 0.16$	157	[1] LU	19	BELL	$B^+ \to \overline{p}\Lambda K^+K^+$

[1] LU 19 reports $(2.83^{+0.36}_{-0.34} \pm 0.35) \times 10^{-3}$ from a measurement of $[\Gamma(\eta_c(1S) \to K^+\overline{p}\Lambda + \text{c.c.})/\Gamma_{total}] \times [B(B^+ \to \eta_c K^+)]$ assuming $B(B^+ \to \eta_c K^+) = (9.6 \pm 1.1) \times 10^{-4}$, which we rescale to our best value $B(B^+ \to \eta_c K^+) = (1.10 \pm 0.07) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R53;LINKAGE=A

$\Gamma(\overline{\Lambda}(1520)\Lambda + \text{c.c.})/\Gamma_{total}$ Γ_{56}/Γ

NODE=M026R54

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
3.0±1.3±0.2	43	[1] LU	19	BELL	$B^+ \to \overline{p}\Lambda K^+ K^+$

[1] LU 19 reports $(3.48 \pm 1.48 \pm 0.46) \times 10^{-3}$ from a measurement of $[\Gamma(\eta_c(1S) \to \overline{\Lambda}(1520)\Lambda + \text{c.c.})/\Gamma_{total}] \times [B(B^+ \to \eta_c K^+)]$ assuming $B(B^+ \to \eta_c K^+) = (9.6 \pm 1.1) \times 10^{-4}$, which we rescale to our best value $B(B^+ \to \eta_c K^+) = (1.10 \pm 0.07) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R54;LINKAGE=A

$\Gamma(\Sigma^+\overline{\Sigma}^-)/\Gamma_{total}$ Γ_{57}/Γ

NODE=M026R28

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.6±0.4±0.2	112	[1] ABLIKIM	13C	BES3	$J/\psi \to \gamma p \overline{p} \pi^0 \pi^0$

[1] ABLIKIM 13C reports $[\Gamma(\eta_c(1S) \to \Sigma^+\overline{\Sigma}^-)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (3.60 \pm 0.48 \pm 0.31) \times 10^{-5}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R28;LINKAGE=AB

$\Gamma(\Xi^-\overline{\Xi}^+)/\Gamma_{total}$ Γ_{58}/Γ

NODE=M026R29

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.07±0.22±0.10	78	[1] ABLIKIM	13C	BES3	$J/\psi \to \gamma \Lambda \overline{\Lambda} \pi^+ \pi^-$

[1] ABLIKIM 13C reports $[\Gamma(\eta_c(1S) \to \Xi^-\overline{\Xi}^+)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (1.51 \pm 0.27 \pm 0.14) \times 10^{-5}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R29;LINKAGE=AB

RADIATIVE DECAYS

NODE=M026310

$\Gamma(\gamma\gamma)/\Gamma_{total}$ Γ_{59}/Γ

NODE=M026R31

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.66±0.13 OUR FIT Error includes scale factor of 1.2.						
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$3.2 \pm 1.0 \pm 0.3$			[1,2] ABLIKIM	13I	BES3	
$0.9\ ^{+1.9}_{-0.8} \pm 0.1$		$1.2^{+2.8}_{-1.1}$	[1,3] ADAMS	08	CLEO	$\psi(2S) \to \pi^+\pi^- J/\psi$
$2.0\ ^{+0.9}_{-0.7} \pm 0.1$		13	[1,4] WICHT	08	BELL	$B^\pm \to K^\pm \gamma\gamma$
$1.87 \pm 0.32^{+0.95}_{-0.50}$			[1] AMBROGIANI	03	E835	$\overline{p}p \to \gamma\gamma$
$2.80^{+0.67}_{-0.58} \pm 1.0$			[1] ARMSTRONG	95F	E760	$\overline{p}p \to \gamma\gamma$
< 9	90		[1,5] BISELLO	91	DM2	$J/\psi \to \gamma\gamma\gamma$
$6\ ^{+4}_{-3} \pm 4$			[1] BAGLIN	87B	SPEC	$\overline{p}p \to \gamma\gamma$
< 18	90		[6] BLOOM	83	CBAL	$J/\psi \to \eta_c\gamma$

[1] Not used since the same experimental measurement has been used in another related quantity included elsewhere in the fit. NODE=M026R31;LINKAGE=A

[2] ABLIKIM 13I reports $[\Gamma(\eta_c(1S) \to \gamma\gamma)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (4.5 \pm 1.2 \pm 0.6) \times 10^{-6}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R31;LINKAGE=AL

[3] ADAMS 08 reports $[\Gamma(\eta_c(1S) \to \gamma\gamma)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] = (1.2^{+2.7}_{-1.1} \pm 0.3) \times 10^{-6}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = (1.41 \pm 0.14) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R31;LINKAGE=AD

[4] WICHT 08 reports $[\Gamma(\eta_c(1S) \to \gamma\gamma)/\Gamma_{total}] \times [B(B^+ \to \eta_c K^+)] = (2.2^{+0.9}_{-0.7}{}^{+0.4}_{-0.2}) \times 10^{-7}$ which we divide by our best value $B(B^+ \to \eta_c K^+) = (1.10 \pm 0.07) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R31;LINKAGE=WI

[5] The quoted branching ratios use $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 0.0127 \pm 0.0036$. NODE=M026R31;LINKAGE=E

[6] Using $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 0.0127 \pm 0.0036$. NODE=M026R31;LINKAGE=C

$\Gamma(p\overline{p})/\Gamma_{total} \times \Gamma(\gamma\gamma)/\Gamma_{total}$ — $\Gamma_{51}/\Gamma \times \Gamma_{59}/\Gamma$

NODE=M026R32
NODE=M026R32

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
0.221±0.019 OUR FIT Error includes scale factor of 1.2.					
0.26 ±0.05 OUR AVERAGE Error includes scale factor of 1.4.					
$0.224^{+0.038}_{-0.037}\pm0.020$	190	AMBROGIANI	03	E835	$\overline{p}p \to \eta_c \to \gamma\gamma$
$0.336^{+0.080}_{-0.070}$		ARMSTRONG	95F	E760	$\overline{p}p \to \gamma\gamma$
$0.68\ ^{+0.42}_{-0.31}$	12	BAGLIN	87B	SPEC	$\overline{p}p \to \gamma\gamma$

Charge conjugation (C), Parity (P), Lepton family number (LF) violating modes

NODE=M026320

$\Gamma(\pi^+\pi^-)/\Gamma_{total}$ — Γ_{60}/Γ

NODE=M026R34
NODE=M026R34

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<13	90	[1] ABLIKIM	11G	BES3	$J/\psi \to \gamma\pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<80	90	[2] ABLIKIM	06B	BES2	$J/\psi \to \pi^+\pi^-\gamma$

[1] ABLIKIM 11G reports $[\Gamma(\eta_c(1S) \to \pi^+\pi^-)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] < 1.82\times10^{-6}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 1.41\times10^{-2}$. NODE=M026R34;LINKAGE=AL

[2] ABLIKIM 06B reports $[\Gamma(\eta_c(1S) \to \pi^+\pi^-)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] < 1.1\times10^{-5}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 1.41\times10^{-2}$. NODE=M026R34;LINKAGE=AB

$\Gamma(\pi^0\pi^0)/\Gamma_{total}$ — Γ_{61}/Γ

NODE=M026R35
NODE=M026R35

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
< 4	90	[1] ABLIKIM	11G	BES3	$J/\psi \to \gamma\pi^0\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<50	90	[2] ABLIKIM	06B	BES2	$J/\psi \to \pi^0\pi^0\gamma$

[1] ABLIKIM 11G reports $[\Gamma(\eta_c(1S) \to \pi^0\pi^0)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] < 6.0\times10^{-7}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 1.41\times10^{-2}$. NODE=M026R35;LINKAGE=AL

[2] ABLIKIM 06B reports $[\Gamma(\eta_c(1S) \to \pi^0\pi^0)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] < 0.71\times10^{-5}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 1.41\times10^{-2}$. NODE=M026R35;LINKAGE=AB

$\Gamma(K^+K^-)/\Gamma_{total}$ — Γ_{62}/Γ

NODE=M026R36
NODE=M026R36

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<70	90	[1] ABLIKIM	06B	BES2	$J/\psi \to K^+K^-\gamma$

[1] ABLIKIM 06B reports $[\Gamma(\eta_c(1S) \to K^+K^-)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] < 0.96\times10^{-5}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 1.41\times10^{-2}$. NODE=M026R36;LINKAGE=AB

$\Gamma(K^0_S K^0_S)/\Gamma_{total}$ — Γ_{63}/Γ

NODE=M026R37
NODE=M026R37

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<40	90	[1] ABLIKIM	06B	BES2	$J/\psi \to K^0_S K^0_S\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<32	90	[2,3] UEHARA	13	BELL	$\gamma\gamma \to K^0_S K^0_S$
< 5.6	90	[4,5] UEHARA	13	BELL	$\gamma\gamma \to K^0_S K^0_S$

OCCUR=2

[1] ABLIKIM 06B reports $[\Gamma(\eta_c(1S) \to K^0_S K^0_S)/\Gamma_{total}] \times [B(J/\psi(1S) \to \gamma\eta_c(1S))] < 0.53\times10^{-5}$ which we divide by our best value $B(J/\psi(1S) \to \gamma\eta_c(1S)) = 1.41\times10^{-2}$. NODE=M026R37;LINKAGE=AB

[2] Using $\Gamma(\gamma\gamma)(\eta_c) = 5.3 \pm 0.5$ keV. UEHARA 13 reports $\Gamma(\gamma\gamma)\times B(K^0_S K^0_S) < 1.6$ eV. NODE=M026R37;LINKAGE=A

[3] Taking into account interference with the non-resonant continuum. NODE=M026R37;LINKAGE=U1

[4] Using $\Gamma(\gamma\gamma)(\eta_c) = 5.3 \pm 0.5$ keV. UEHARA 13 reports $\Gamma(\gamma\gamma)\times B(K^0_S K^0_S) < 0.29$ eV. NODE=M026R37;LINKAGE=B

[5] Neglecting interference with the non-resonant continuum. NODE=M026R37;LINKAGE=U2

$\eta_c(1S)$ CROSS-PARTICLE BRANCHING RATIOS

NODE=M026230

$\Gamma(\eta_c(1S) \to \eta'(958)\pi\pi)/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ — $\Gamma_1/\Gamma \times \Gamma^{J/\psi(1S)}_{245}/\Gamma^{J/\psi(1S)}$

NODE=M026R64
NODE=M026R64

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.8 ±0.5 OUR FIT Error includes scale factor of 1.4.					
5.25±1.65	14	[1] BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c\gamma$

[1] The value reported by BALTRUSAITIS 86 has been multiplied by 3/2 to account for isospin symmetry. NODE=M026R64;LINKAGE=A

$\Gamma(\eta_c(1S) \to \rho\rho)/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_4/\Gamma \times \Gamma^{J/\psi(1S)}_{245}/\Gamma^{J/\psi(1S)}$

NODE=M026R65
NODE=M026R65

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.6 ±0.6 OUR AVERAGE Error includes scale factor of 1.2.					
1.6 ±0.6 ±0.4	72	ABLIKIM	05L	BES2	$J/\psi \to \pi^+\pi^-\pi^+\pi^-\gamma$
3.30±0.30±0.60	113	[1] BISELLO	91	DM2	$J/\psi \to \gamma\rho^0\rho^0$
3.0 ±1.3 ±0.6	32	[2] BISELLO	91	DM2	$J/\psi \to \gamma\rho^+\rho^-$

OCCUR=2

[1] The value reported by BISELLO 91 has been multiplied by 3 to account for isospin symmetry. NODE=M026R65;LINKAGE=A

[2] The value reported by BISELLO 91 has been multiplied by 3/2 to account for isospin symmetry. NODE=M026R65;LINKAGE=B

$\Gamma(\eta_c(1S) \to K^*(892)^0 K^-\pi^+ + \text{c.c.})/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_5/\Gamma \times \Gamma^{J/\psi(1S)}_{245}/\Gamma^{J/\psi(1S)}$

NODE=M026R66
NODE=M026R66

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.6±0.6	63	BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c\gamma$

$\Gamma(\eta_c(1S) \to K^*(892)\overline{K}^*(892))/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_6/\Gamma \times \Gamma^{J/\psi(1S)}_{245}/\Gamma^{J/\psi(1S)}$

NODE=M026R67
NODE=M026R67

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.99±0.17 OUR FIT					
1.17±0.29 OUR AVERAGE					
1.4 ±0.3 ±0.5	60	ABLIKIM	05L	BES2	$J/\psi \to K^+K^-\pi^+\pi^-\gamma$
1.04±0.36±0.18	14	[1] BISELLO	91	DM2	$e^+e^- \to \gamma K^+K^-\pi^+\pi^-$
1.2 ±0.6	9	[1] BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c\gamma$

[1] The reported value has been multiplied by 2 to account for isospin symmetry. NODE=M026R67;LINKAGE=A

$\Gamma(\eta_c(1S) \to K^*(892)^0\overline{K}^*(892)^0\pi^+\pi^-)/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_7/\Gamma \times \Gamma^{J/\psi(1S)}_{245}/\Gamma^{J/\psi(1S)}$

NODE=M026R68
NODE=M026R68

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.91±0.64±0.48	45	ABLIKIM	06A	BES2	$J/\psi \to K^{*0}\overline{K}^{*0}\pi^+\pi^-\gamma$

$\Gamma(\eta_c(1S) \to \phi K^+K^-)/\Gamma_{total} \times \Gamma(B^+ \to \eta_c K^+)/\Gamma_{total}$ $\Gamma_8/\Gamma \times \Gamma^{B^\pm}_{270}/\Gamma^{B^\pm}$

NODE=M026R69
NODE=M026R69

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
$3.6^{+1.1}_{-0.9}$±0.8	$14.1^{+4.4}_{-3.7}$	HUANG	03	BELL	$B^+ \to (\phi K^+K^-) K^+$

$\Gamma(\eta_c(1S) \to \phi\phi)/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_9/\Gamma \times \Gamma^{J/\psi(1S)}_{245}/\Gamma^{J/\psi(1S)}$

NODE=M026R80
NODE=M026R80

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
2.6±0.6 OUR FIT Error includes scale factor of 2.2.					
4.1±0.6 OUR AVERAGE Error includes scale factor of 1.2.					
$4.3\pm0.5^{+0.5}_{-1.2}$	1.2k	ABLIKIM	17P	BES3	$J/\psi \to \gamma K^+K^-K^+K^-$
3.3±0.6±0.6	72	ABLIKIM	05L	BES2	$J/\psi \to \gamma K^+K^-K^+K^-$
3.9±0.9±0.7	19	BISELLO	91	DM2	$J/\psi \to \gamma K^+K^-K^+K^-$
$3.8^{+2.3}_{-1.5}\pm0.7$	5	BISELLO	91	DM2	$J/\psi \to \gamma K^+K^-K^0_S K^0_L$
9.3±2.0±1.6	80	BAI	90B	MRK3	$J/\psi \to \gamma K^+K^-K^+K^-$
8.5±2.7±1.8		BAI	90B	MRK3	$J/\psi \to \gamma K^+K^-K^0_S K^0_L$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3.3±0.6±0.6	357	[1] BAI	04	BES	$J/\psi \to \gamma K^+K^-K^+K^-$

OCCUR=2
OCCUR=3

[1] Superseded by ABLIKIM 05L. NODE=M026R80;LINKAGE=E

$\Gamma(\eta_c(1S) \to \phi\phi)/\Gamma_{total} \times \Gamma(B^+ \to \eta_c K^+)/\Gamma_{total}$ $\Gamma_9/\Gamma \times \Gamma^{B^\pm}_{270}/\Gamma^{B^\pm}$

NODE=M026R70
NODE=M026R70

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
2.0±0.5 OUR FIT Error includes scale factor of 2.2.					
$3.3^{+1.2}_{-1.0}$ OUR AVERAGE Error includes scale factor of 1.5.					
4.7±1.2±0.5		AUBERT,B	04B	BABR	$B^\pm \to K^\pm\eta_c$
$2.2^{+1.0}_{-0.7}\pm0.5$	7	HUANG	03	BELL	$B^\pm \to K^\pm\phi\phi$

$\Gamma(\eta_c(1S) \to \omega\omega)/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{16}/\Gamma \times \Gamma^{J/\psi(1S)}_{245}/\Gamma^{J/\psi(1S)}$

NODE=M026R71
NODE=M026R71

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
3.7 ±1.2 OUR FIT Error includes scale factor of 2.1.				
4.90±0.17±0.77	1705	ABLIKIM 19AV	BES3	$J/\psi \to \gamma\omega\omega$

$\Gamma(\eta_c(1S) \to f_2(1270) f_2(1270))/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{18}/\Gamma \times \Gamma^{J/\psi(1S)}_{245}/\Gamma^{J/\psi(1S)}$

NODE=M026R72
NODE=M026R72

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
1.5±0.4 OUR FIT				
$1.3\pm0.3^{+0.3}_{-0.4}$	91.2 ± 19.8	ABLIKIM 04M	BES	$J/\psi \to \gamma 2\pi^+ 2\pi^-$

$\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{37}/\Gamma \times \Gamma^{J/\psi(1S)}_{245}/\Gamma^{J/\psi(1S)}$

NODE=M026R73
NODE=M026R73

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
10.1 ±0.9 OUR FIT Error includes scale factor of 1.5.				
6.7 ±0.8 OUR AVERAGE				
6.6 ±0.9 ±1.5	0.6k	[1] BAI 04	BES	$J/\psi \to \gamma K^\pm \pi^\mp K^0_S$
8.76±1.80±1.68	33	[2] BISELLO 91	DM2	$J/\psi \to \gamma K^+ K^- \pi^0$
6.9 ±1.2 ±1.2	68	[3] BISELLO 91	DM2	$J/\psi \to \gamma K^\pm \pi^\mp K^0_S$
7.8 ±3.0	32	[4] BALTRUSAIT...86	MRK3	$J/\psi \to \gamma K^+ K^- \pi^0$
5.7 ±1.5	63	[5] BALTRUSAIT...86	MRK3	$J/\psi \to \gamma K^\pm \pi^\mp K^0_S$

OCCUR=2
OCCUR=2

[1] BAI 04 reports $B(J/\psi \to \gamma\eta_c) \cdot B(\eta_c \to K^\pm K^0_S \pi^\mp) = (2.2 \pm 0.3 \pm 0.5) \times 10^{-4}$ which we multiply by 3 to account for isospin symmetry. NODE=M026R73;LINKAGE=A

[2] BISELLO 91 reports $B(J/\psi \to \gamma\eta_c) \cdot B(\eta_c \to K^+ K^- \pi^0) = (1.46 \pm 0.30 \pm 0.28) \times 10^{-4}$ which we multiply by 6 to account for isospin symmetry. NODE=M026R73;LINKAGE=B

[3] BISELLO 91 reports $B(J/\psi \to \gamma\eta_c) \cdot B(\eta_c \to K^\pm K^0_S \pi^\mp) = (2.3 \pm 0.4 \pm 0.4) \times 10^{-4}$ which we multiply by 3 to account for isospin symmetry. NODE=M026R73;LINKAGE=C

[4] BALTRUSAITIS 86 reports $B(J/\psi \to \gamma\eta_c) \cdot B(\eta_c \to K^+ K^- \pi^0) = (1.3 \pm 0.5) \times 10^{-4}$ which we multiply by 6 to account for isospin symmetry. NODE=M026R73;LINKAGE=D

[5] BALTRUSAITIS 86 reports $B(J/\psi \to \gamma\eta_c) \cdot B(\eta_c \to K^\pm K^0_S \pi^\mp) = (1.9 \pm 0.5) \times 10^{-4}$ which we multiply by 3 to account for isospin symmetry. NODE=M026R73;LINKAGE=E

$\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total} \times \Gamma(B^+ \to \eta_c K^+)/\Gamma_{total}$ $\Gamma_{37}/\Gamma \times \Gamma^{B^\pm}_{270}/\Gamma^{B^\pm}$

NODE=M026R74
NODE=M026R74

VALUE (units 10^{-5})	DOCUMENT ID	TECN	COMMENT
7.9 ±0.5 OUR FIT Error includes scale factor of 1.1.			
7.5 ±0.8 OUR AVERAGE			
$8.01\pm0.42^{+1.71}_{-1.65}$	[1] VINOKUROVA 11	BELL	$e^+e^- \to \Upsilon(4S)$
7.4 ±0.5 ±0.7	AUBERT,B 04B	BABR	$B^\pm \to K^\pm \eta_c$

[1] VINOKUROVA 11 reports $B(B^+ \to \eta_c K^+,\ \eta_c \to K^0_S K^\pm \pi^\mp) = (26.7 \pm 1.4^{+2.9}_{-2.6} \pm 4.9) \times 10^{-6}$, where the first uncertainty is statistical, the second is due to systematics, and the third comes from interference of $\eta_c(1S) \to K^0_S K^\pm \pi^\mp$ with nonresonant $K^0_S K^\pm \pi^\mp$. We combined both systematic uncertainties to single values. We multiply the reported result by 3 to account for isospin symmetry. NODE=M026R74;LINKAGE=D

$\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{37}/\Gamma \times \Gamma^{\psi(2S)}_{184}/\Gamma^{\psi(2S)}$

NODE=M026R75
NODE=M026R75

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
2.6±0.4 OUR FIT Error includes scale factor of 1.3.			
$4.5^{+2.4}_{-1.8}$	HIMEL 80B	MRK2	$\psi(2S) \to \eta_c \gamma$

$\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{37}/\Gamma \times \Gamma^{h_c(1P)}_{30}/\Gamma^{h_c(1P)}$

NODE=M026R76
NODE=M026R76

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
4.28±0.34 OUR FIT				
4.1 ±0.6 OUR AVERAGE				
3.7 ±0.7 ±0.3	55	[1,2] ABLIKIM 12N	BES3	$\psi(2S) \to \pi^0 \gamma K^+ K^- \pi^0$
4.6 ±0.8 ±0.3	107	[3,4] ABLIKIM 12N	BES3	$\psi(2S) \to \pi^0 \gamma K^0_S K^\mp \pi^\pm$

OCCUR=2

[1] ABLIKIM 12N quotes $B(\psi(2S) \to \pi^0 h_c) \cdot B(h_c \to \gamma\eta_c) \cdot B(\eta_c \to K^+K^-\pi^0) = (4.54 \pm 0.76 \pm 0.48) \times 10^{-6}$ which we multiply by 6 to account for isospin symmetry. NODE=M026R76;LINKAGE=A
[2] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (27.24 \pm 4.56 \pm 2.88) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R76;LINKAGE=B
[3] ABLIKIM 12N quotes $B(\psi(2S) \to \pi^0 h_c) \cdot B(h_c \to \gamma\eta_c) \cdot B(\eta_c \to K^0_S K^\pm\pi^\mp) = (11.35 \pm 1.25 \pm 1.50) \times 10^{-6}$ which we multiply by 3 to account for isospin symmetry. NODE=M026R76;LINKAGE=C
[4] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to K\overline{K}\pi)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (34.05 \pm 3.75 \pm 4.50) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R76;LINKAGE=D

$\Gamma(\eta_c(1S) \to K\overline{K}\eta)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}$

$\Gamma_{38}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026R77
NODE=M026R77

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
7.9±1.0 OUR FIT					
5.7±2.9±0.4	7	[1,2] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma\eta K^+K^-$

[1] ABLIKIM 12N quotes $B(\psi(2S) \to \pi^0 h_c) \cdot B(h_c \to \gamma\eta_c) \cdot B(\eta_c \to K^+K^-\eta) = (2.11 \pm 1.01 \pm 0.32) \times 10^{-6}$ which we multiply by 2 to account for isospin symmetry. NODE=M026R77;LINKAGE=A
[2] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to K\overline{K}\eta)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (4.22 \pm 2.02 \pm 0.64) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R77;LINKAGE=B

$\Gamma(\eta_c(1S) \to \eta\pi^+\pi^-)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}$

$\Gamma_{39}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026R78
NODE=M026R78

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
9.7±2.5±0.7	33	[1] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma\eta\pi^+\pi^-$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to \eta\pi^+\pi^-)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (7.22 \pm 1.47 \pm 1.11) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R78;LINKAGE=A

$\Gamma(\eta_c(1S) \to \eta\pi^+\pi^-)/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$

$\Gamma_{39}/\Gamma \times \Gamma_{245}^{J/\psi(1S)}/\Gamma^{J/\psi(1S)}$

NODE=M026R79
NODE=M026R79

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
4.2±0.9 OUR AVERAGE					
4.6±1.1	75	BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c\gamma$
3.1±1.1±1.5	18	PARTRIDGE	80B	CBAL	$J/\psi \to \eta\pi^+\pi^-\gamma$

$\Gamma(\eta_c(1S) \to \eta 2(\pi^+\pi^-))/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}$

$\Gamma_{40}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026R81
NODE=M026R81

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
2.6±0.7±0.2	39	[1] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma\eta 2(\pi^+\pi^-)$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to \eta 2(\pi^+\pi^-))/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (19.17 \pm 3.77 \pm 3.72) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R81;LINKAGE=A

$\Gamma(\eta_c(1S) \to K^+K^-\pi^+\pi^-)/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$

$\Gamma_{41}/\Gamma \times \Gamma_{245}^{J/\psi(1S)}/\Gamma^{J/\psi(1S)}$

NODE=M026R84
NODE=M026R84

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.17±0.26 OUR FIT Error includes scale factor of 2.0.					
1.9 ±0.6 OUR AVERAGE Error includes scale factor of 2.4.					
1.5 ±0.2 ±0.2	0.4k	BAI	04	BES	$J/\psi \to \gamma K^+K^-\pi^+\pi^-$
2.7 ±0.4	110	BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c\gamma$

$\Gamma(\eta_c(1S) \to K^+K^-\pi^+\pi^-)/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\eta_c(1S))/\Gamma_{total}$

$\Gamma_{41}/\Gamma \times \Gamma_{184}^{\psi(2S)}/\Gamma^{\psi(2S)}$

NODE=M026R85
NODE=M026R85

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
3.0±0.8 OUR FIT Error includes scale factor of 1.7.				
$4.0^{+6.0}_{-2.5}$	HIMEL	80B	MRK2	$\psi(2S) \to \eta_c\gamma$

$\Gamma(\eta_c(1S) \to K^+ K^- \pi^+ \pi^-)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma \eta_c(1S))/\Gamma_{total}$ $\Gamma_{41}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026R83
NODE=M026R83

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
5.0±1.0 OUR FIT	Error includes scale factor of 1.7.			
5.6±1.3±0.4	38	[1] ABLIKIM 12N	BES3	$\psi(2S) \to \pi^0 \gamma K^+ K^- \pi^+ \pi^-$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to K^+ K^- \pi^+ \pi^-)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma \eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (4.16 \pm 0.76 \pm 0.59) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R83;LINKAGE=A

$\Gamma(\eta_c(1S) \to K^0 K^- \pi^+ \pi^- \pi^+ + \text{c.c.})/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma \eta_c(1S))/\Gamma_{total}$ $\Gamma_{43}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026R86
NODE=M026R86

VALUE (units 10^{-2})	DOCUMENT ID	TECN	COMMENT
3.2±0.8±0.2	[1,2] ABLIKIM 12N	BES3	$\psi(2S) \to \pi^0 \gamma K_S^0 K^\mp \pi^\mp 2\pi^\pm$

[1] ABLIKIM 12N quotes $B(\psi(2S) \to \pi^0 h_c) \cdot B(h_c \to \gamma \eta_c) \cdot B(\eta_c \to K_S^0 K^- \pi^- 2\pi^+) = (12.01 \pm 2.22 \pm 2.04) \times 10^{-6}$ which we multiply by 2 to take c.c. into account. NODE=M026R86;LINKAGE=A

[2] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to K^0 K^- \pi^+ \pi^- \pi^+ + \text{c.c.})/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma \eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (24.02 \pm 4.44 \pm 4.08) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R86;LINKAGE=B

$\Gamma(\eta_c(1S) \to K^+ K^- 2(\pi^+ \pi^-))/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma \eta_c(1S))/\Gamma_{total}$ $\Gamma_{44}/\Gamma \times \Gamma_{245}^{J/\psi(1S)}/\Gamma^{J/\psi(1S)}$

NODE=M026R88
NODE=M026R88

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
1.21±0.32±0.24	100	ABLIKIM 06A	BES2	$J/\psi \to K^+ K^- 2(\pi^+ \pi^-)\gamma$

$\Gamma(\eta_c(1S) \to K^+ K^- 2(\pi^+ \pi^-))/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma \eta_c(1S))/\Gamma_{total}$ $\Gamma_{44}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026R87
NODE=M026R87

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
4.8±2.5±0.3	10	[1] ABLIKIM 12N	BES3	$\psi(2S) \to \pi^0 \gamma K^+ K^- 2(\pi^+ \pi^-)$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to K^+ K^- 2(\pi^+ \pi^-))/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma \eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (3.60 \pm 1.71 \pm 0.64) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R87;LINKAGE=A

$\Gamma(\eta_c(1S) \to 2(K^+ K^-))/\Gamma_{total} \times \Gamma(B^+ \to \eta_c K^+)/\Gamma_{total}$ $\Gamma_{45}/\Gamma \times \Gamma_{270}^{B^\pm}/\Gamma^{B^\pm}$

NODE=M026R90
NODE=M026R90

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
1.6±0.4 OUR FIT	Error includes scale factor of 1.4.			
$\mathbf{1.8^{+0.6}_{-0.5}}$	$14.5^{+4.6}_{-3.0}$	HUANG 03	BELL	$B^+ \to 2(K^+ K^-) K^+$

$\Gamma(\eta_c(1S) \to 2(K^+ K^-))/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma \eta_c(1S))/\Gamma_{total}$ $\Gamma_{45}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026R89
NODE=M026R89

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
0.85±0.24 OUR FIT	Error includes scale factor of 1.3.			
1.3 ±0.5 ±0.1	7	[1] ABLIKIM 12N	BES3	$\psi(2S) \to \pi^0 \gamma 2(K^+ K^-)$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to 2(K^+ K^-))/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma \eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (0.94 \pm 0.37 \pm 0.14) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R89;LINKAGE=A

$\Gamma(\eta_c(1S) \to \pi^+ \pi^- \pi^0 \pi^0)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma \eta_c(1S))/\Gamma_{total}$ $\Gamma_{47}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026R91
NODE=M026R91

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
2.7±0.5±0.2	118	[1] ABLIKIM 12N	BES3	$\psi(2S) \to \pi^0 \gamma \pi^+ \pi^- 2\pi^0$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to \pi^+ \pi^- \pi^0 \pi^0)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma \eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (20.31 \pm 2.20 \pm 3.33) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=M026R91;LINKAGE=A

$\Gamma(\eta_c(1S) \to 2(\pi^+\pi^-))/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{48}/\Gamma \times \Gamma_{245}^{J/\psi(1S)}/\Gamma^{J/\psi(1S)}$

NODE=M026R93
NODE=M026R93

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.35±0.19 OUR FIT Error includes scale factor of 1.3.					
1.36±0.23 OUR AVERAGE					
1.3 ±0.2 ±0.4	0.5k	BAI	04	BES	$J/\psi \to \gamma 2(\pi^+\pi^-)$
1.33±0.22±0.20	137	BISELLO	91	DM2	$J/\psi \to \gamma 2(\pi^+\pi^-)$
1.6 ±0.6	25	BALTRUSAIT...	86	MRK3	$J/\psi \to \gamma\eta_c$

$\Gamma(\eta_c(1S) \to 2(\pi^+\pi^-))/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{48}/\Gamma \times \Gamma_{184}^{\psi(2S)}/\Gamma^{\psi(2S)}$

NODE=M026R94
NODE=M026R94

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
3.4±0.7 OUR FIT Error includes scale factor of 1.3.				
$5.7^{+3.9}_{-2.4}$	HIMEL	80B	MRK2	$\psi(2S) \to \eta_c\gamma$

$\Gamma(\eta_c(1S) \to 2(\pi^+\pi^-))/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{48}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026R92
NODE=M026R92

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
0.58±0.09 OUR FIT Error includes scale factor of 1.3.					
1.01±0.19±0.07	100	[1] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma 2(\pi^+\pi^-)$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to 2(\pi^+\pi^-))/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (7.51 \pm 0.85 \pm 1.11) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026R92;LINKAGE=A

$\Gamma(\eta_c(1S) \to 2(\pi^+\pi^-\pi^0))/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{49}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026R95
NODE=M026R95

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
10.1±1.7±0.7	175	[1] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma 2(\pi^+\pi^-\pi^0)$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to 2(\pi^+\pi^-\pi^0))/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (75.13 \pm 7.42 \pm 9.99) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026R95;LINKAGE=A

$\Gamma(\eta_c(1S) \to 3(\pi^+\pi^-))/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{50}/\Gamma \times \Gamma_{245}^{J/\psi(1S)}/\Gamma^{J/\psi(1S)}$

NODE=M026R97
NODE=M026R97

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.59±0.32±0.47	471	ABLIKIM	06A	BES2	$J/\psi \to 3(\pi^+\pi^-)\gamma$

$\Gamma(\eta_c(1S) \to 3(\pi^+\pi^-))/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{50}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026R96
NODE=M026R96

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.19±0.30±0.08	51	[1] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma 3(\pi^+\pi^-)$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to 3(\pi^+\pi^-))/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (8.82 \pm 1.57 \pm 1.59) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026R96;LINKAGE=A

$\Gamma(\eta_c(1S) \to p\bar{p})/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{51}/\Gamma \times \Gamma_{245}^{J/\psi(1S)}/\Gamma^{J/\psi(1S)}$

NODE=M026R99
NODE=M026R99

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
1.88±0.18 OUR FIT Error includes scale factor of 1.2.					
1.61±0.29 OUR AVERAGE					
1.9 ±0.3 ±0.3	213	BAI	04	BES	$J/\psi \to \gamma p\bar{p}$
1.3 ±0.4 ±0.3	18	BISELLO	91	DM2	$J/\psi \to \gamma p\bar{p}$
1.4 ±0.7	23	BALTRUSAIT...	86	MRK3	$J/\psi \to \eta_c\gamma$

$\Gamma(\eta_c(1S) \to p\overline{p})/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{51}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026R98
NODE=M026R98

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
8.0±0.8 OUR FIT					
8.7±2.9±0.6	15	[1] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0 \gamma p \overline{p}$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to p\overline{p})/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (0.65 \pm 0.19 \pm 0.10) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026R98;LINKAGE=A

$\Gamma(\eta_c(1S) \to p\overline{p})/\Gamma_{total} \times \Gamma(\psi(2S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{51}/\Gamma \times \Gamma_{184}^{\psi(2S)}/\Gamma^{\psi(2S)}$

NODE=M026P00
NODE=M026P00

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
4.8±0.7 OUR FIT Error includes scale factor of 1.2.				
$8\ ^{+8}_{-4}$	HIMEL	80B	MRK2	$\psi(2S) \to \eta_c \gamma$

$\Gamma(\eta_c(1S) \to p\overline{p})/\Gamma_{total} \times \Gamma(B^+ \to \eta_c K^+)/\Gamma_{total}$ $\Gamma_{51}/\Gamma \times \Gamma_{270}^{B^\pm}/\Gamma^{B^\pm}$

NODE=M026P01
NODE=M026P01

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
1.47±0.12 OUR FIT Error includes scale factor of 1.1.					
1.54±0.19 OUR AVERAGE Error includes scale factor of 1.1.					
$1.42 \pm 0.11 ^{+0.16}_{-0.20}$	195	WU	06	BELL	$B^+ \to p\overline{p}K^+$
$1.8\ ^{+0.3}_{-0.2} \pm 0.2$		AUBERT,B	05L	BABR	$e^+e^- \to \Upsilon(4S)$

$\Gamma(\eta_c(1S) \to p\overline{p}\pi^0)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{52}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026P02
NODE=M026P02

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
2.1±0.7±0.1	[1] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0 \gamma p \overline{p} \pi^0$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to p\overline{p}\pi^0)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (1.53 \pm 0.49 \pm 0.23) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026P02;LINKAGE=A

$\Gamma(\eta_c(1S) \to p\overline{p}\pi^+\pi^-)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{53}/\Gamma \times \Gamma_{30}^{h_c(1P)}/\Gamma^{h_c(1P)}$

NODE=M026P07
NODE=M026P07

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
2.19±0.30 OUR FIT					
3.1 ±1.0 ±0.2	19	[1] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0 \gamma p \overline{p} \pi^+\pi^-$

[1] ABLIKIM 12N reports $[\Gamma(\eta_c(1S) \to p\overline{p}\pi^+\pi^-)/\Gamma_{total} \times \Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (2.30 \pm 0.65 \pm 0.36) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=M026P07;LINKAGE=A

$\Gamma(\eta_c(1S) \to p\overline{p}\pi^+\pi^-)/\Gamma_{total} \times \Gamma(B^+ \to \eta_c K^+)/\Gamma_{total}$ $\Gamma_{53}/\Gamma \times \Gamma_{270}^{B^\pm}/\Gamma^{B^\pm}$

NODE=M026R82
NODE=M026R82

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
4.0 ±0.4 OUR FIT				
$3.94 ^{+0.41}_{-0.39} {}^{+0.22}_{-0.18}$	CHILIKIN	19	BELL	$e^+e^- \to \Upsilon(4S)$

$\Gamma(\eta_c(1S) \to \Lambda\overline{\Lambda})/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{54}/\Gamma \times \Gamma_{245}^{J/\psi(1S)}/\Gamma^{J/\psi(1S)}$

NODE=M026P03
NODE=M026P03

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.5 ±0.4 OUR FIT Error includes scale factor of 1.5.				
1.98±0.21±0.32	ABLIKIM	12B	BES3	$J/\psi \to \Lambda\overline{\Lambda}\gamma$

$\Gamma(\eta_c(1S) \to \Lambda\overline{\Lambda})/\Gamma_{total} \times \Gamma(B^+ \to \eta_c K^+)/\Gamma_{total}$ $\Gamma_{54}/\Gamma \times \Gamma_{270}^{B^\pm}/\Gamma^{B^\pm}$

NODE=M026P04
NODE=M026P04

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
1.21±0.30 OUR FIT Error includes scale factor of 1.5.					
$0.95 ^{+0.25}_{-0.22} {}^{+0.08}_{-0.11}$	20	WU	06	BELL	$B^+ \to \Lambda\overline{\Lambda}K^+$

$\Gamma(\eta_c(1S) \to \Sigma^+\overline{\Sigma}^-)/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{57}/\Gamma \times \Gamma_{245}^{J/\psi(1S)}/\Gamma^{J/\psi(1S)}$

NODE=M026P05
NODE=M026P05

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
3.60±0.48±0.31	112	ABLIKIM	13C	BES3	$J/\psi \to \gamma p\overline{p}\pi^0\pi^0$

$\Gamma(\eta_c(1S) \to \Xi^-\overline{\Xi}^+)/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{58}/\Gamma \times \Gamma_{245}^{J/\psi(1S)}/\Gamma^{J/\psi(1S)}$

NODE=M026P06
NODE=M026P06

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
1.51±0.27±0.14	78	ABLIKIM	13C	BES3	$J/\psi \to \gamma\Lambda\overline{\Lambda}\pi^+\pi^-$

$\Gamma(\eta_c(1S) \to \gamma\gamma)/\Gamma_{total} \times \Gamma(J/\psi(1S) \to \gamma\eta_c(1S))/\Gamma_{total}$ $\Gamma_{59}/\Gamma \times \Gamma_{245}^{J/\psi(1S)}/\Gamma^{J/\psi(1S)}$

NODE=M026P08
NODE=M026P08

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
2.34±0.35 OUR FIT Error includes scale factor of 1.2.					
3.8 $^{+1.3}_{-1.0}$ OUR AVERAGE Error includes scale factor of 1.1.					
4.5 ±1.2 ±0.6		ABLIKIM	13I	BES3	
1.2 $^{+2.7}_{-1.1}$ ±0.3	$1.2^{+2.8}_{-1.1}$	ADAMS	08	CLEO	$\psi(2S) \to \pi^+\pi^- J/\psi$

$\Gamma(\eta_c(1S) \to \gamma\gamma)/\Gamma_{total} \times \Gamma(B^+ \to \eta_c K^+)/\Gamma_{total}$ $\Gamma_{59}/\Gamma \times \Gamma_{270}^{B^\pm}/\Gamma^{B^\pm}$

NODE=M026P09
NODE=M026P09

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
0.183±0.022 OUR FIT Error includes scale factor of 1.2.					
0.22 $^{+0.09}_{-0.07}$ $^{+0.04}_{-0.02}$	13	WICHT	08	BELL	$B^\pm \to K^\pm\gamma\gamma$

$\eta_c(1S)$ REFERENCES

NODE=M026

AAIJ	23AH	PR D108 032010	R. Aaij *et al.*	(LHCb Collab.)	REFID=62349
ABLIKIM	21C	PR D103 012009	M. Ablikim *et al.*	(BESIII Collab.)	REFID=61030
LEES	21A	PR D104 072002	J.P. Lees *et al.*	(BABAR Collab.)	REFID=61442
AAIJ	20H	EPJ C80 191	R. Aaij *et al.*	(LHCb Collab.)	REFID=60419
ABLIKIM	19AP	PR D100 012003	M. Ablikim *et al.*	(BESIII Collab.)	REFID=59901
ABLIKIM	19AV	PR D100 052012	M. Ablikim *et al.*	(BESIII Collab.)	REFID=59998
CHILIKIN	19	PR D100 012001	K. Chilikin *et al.*	(BELLE Collab.)	REFID=59899
LU	19	PR D99 032003	P.-C. Lu *et al.*	(BELLE Collab.)	REFID=59614
XU	18	PR D98 072001	Q.N. Xu *et al.*	(BELLE Collab.)	REFID=59453
AAIJ	17AD	PL B769 305	R. Aaij *et al.*	(LHCb Collab.)	REFID=57896
AAIJ	17BB	EPJ C77 609	R. Aaij *et al.*	(LHCb Collab.)	REFID=58191
ABLIKIM	17AJ	PR D96 112008	M. Ablikim *et al.*	(BESIII Collab.)	REFID=58322
ABLIKIM	17P	PR D95 092004	M. Ablikim *et al.*	(BESIII Collab.)	REFID=57989
LEES	16A	PR D93 012005	J.P. Lees *et al.*	(BABAR Collab.)	REFID=57125
AAIJ	15BI	EPJ C75 311	R. Aaij *et al.*	(LHCb Collab.)	REFID=57147
ANASHIN	14	PL B738 391	V.V. Anashin *et al.*	(KEDR Collab.)	REFID=56130
LEES	14E	PR D89 112004	J.P. Lees *et al.*	(BABAR Collab.)	REFID=55937
ABLIKIM	13C	PR D87 012003	M. Ablikim *et al.*	(BESIII Collab.)	REFID=54878
ABLIKIM	13I	PR D87 032003	M. Ablikim *et al.*	(BESIII Collab.)	REFID=54954
UEHARA	13	PTEP 2013 123C01	S. Uehara *et al.*	(BELLE Collab.)	REFID=55592
ABLIKIM	12B	PR D86 032008	M. Ablikim *et al.*	(BESIII Collab.)	REFID=54267
ABLIKIM	12F	PRL 108 222002	M. Ablikim *et al.*	(BESIII Collab.)	REFID=54271
ABLIKIM	12N	PR D86 092009	M. Ablikim *et al.*	(BESIII Collab.)	REFID=54741
LIU	12B	PRL 108 232001	Z.Q. Liu *et al.*	(BELLE Collab.)	REFID=54303
ZHANG	12A	PR D86 052002	C.C. Zhang *et al.*	(BELLE Collab.)	REFID=54763
ABLIKIM	11G	PR D84 032006	M. Ablikim *et al.*	(BESIII Collab.)	REFID=53711
DEL-AMO-SA...	11M	PR D84 012004	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=16751
VINOKUROVA	11	PL B706 139	A. Vinokurova *et al.*	(BELLE Collab.)	REFID=53927
LEES	10	PR D81 052010	J.P. Lees *et al.*	(BABAR Collab.)	REFID=53236
MITCHELL	09	PRL 102 011801	R.E. Mitchell *et al.*	(CLEO Collab.)	REFID=52676
ADAMS	08	PRL 101 101801	G.S. Adams *et al.*	(CLEO Collab.)	REFID=52261
AUBERT	08AB	PR D78 012006	B. Aubert *et al.*	(BABAR Collab.)	REFID=52267
UEHARA	08	EPJ C53 1	S. Uehara *et al.*	(BELLE Collab.)	REFID=52064
WICHT	08	PL B662 323	J. Wicht *et al.*	(BELLE Collab.)	REFID=52204
ABE	07	PRL 98 082001	K. Abe *et al.*	(BELLE Collab.)	REFID=51627
ABLIKIM	06A	PL B633 19	M. Ablikim *et al.*	(BES Collab.)	REFID=50987
ABLIKIM	06B	EPJ C45 337	M. Ablikim *et al.*	(BES Collab.)	REFID=50988
AUBERT	06E	PRL 96 052002	B. Aubert *et al.*	(BABAR Collab.)	REFID=51059
PDG	06	JP G33 1	W.-M. Yao *et al.*	(PDG Collab.)	REFID=51004
WU	06	PRL 97 162003	C.-H. Wu *et al.*	(BELLE Collab.)	REFID=51472
ABLIKIM	05L	PR D72 072005	M. Ablikim *et al.*	(BES Collab.)	REFID=50837
AUBERT,B	05L	PR D72 051101	B. Aubert *et al.*	(BABAR Collab.)	REFID=50827
KUO	05	PL B621 41	C.C. Kuo *et al.*	(BELLE Collab.)	REFID=50801
ABE	04G	PR D70 071102	K. Abe *et al.*	(BELLE Collab.)	REFID=50182
ABLIKIM	04M	PR D70 112008	M. Ablikim *et al.*	(BES Collab.)	REFID=50329
ASNER	04	PRL 92 142001	D.M. Asner *et al.*	(CLEO Collab.)	REFID=49745
AUBERT	04D	PRL 92 142002	B. Aubert *et al.*	(BABAR Collab.)	REFID=49746
AUBERT,B	04B	PR D70 011101	B. Aubert *et al.*	(BABAR Collab.)	REFID=50043
BAI	04	PL B578 16	J.Z. Bai *et al.*	(BES Collab.)	REFID=49620
ABDALLAH	03J	EPJ C31 481	J. Abdallah *et al.*	(DELPHI Collab.)	REFID=49625

AMBROGIANI	03	PL B566 45	M. Ambrogiani *et al.*	(FNAL E835 Collab.)	REFID=49465
BAI	03	PL B555 174	J.Z. Bai *et al.*	(BES Collab.)	REFID=49185
FANG	03	PRL 90 071801	F. Fang *et al.*	(BELLE Collab.)	REFID=49206
HUANG	03	PRL 91 241802	H.-C. Huang *et al.*	(BELLE Collab.)	REFID=49621
ABE,K	02	PRL 89 142001	K. Abe *et al.*	(BELLE Collab.)	REFID=49188
BAI	00F	PR D62 072001	J.Z. Bai *et al.*	(BES Collab.)	REFID=48546
BRANDENB...	00B	PRL 85 3095	G. Brandenburg *et al.*	(CLEO Collab.)	REFID=48553
ACCIARRI	99T	PL B461 155	M. Acciarri *et al.*	(L3 Collab.)	REFID=47476
BAI	99B	PR D60 072001	J.Z. Bai *et al.*	(BES Collab.)	REFID=47385
ABREU	98O	PL B441 479	P. Abreu *et al.*	(DELPHI Collab.)	REFID=46553
SHIRAI	98	PL B424 405	M. Shirai *et al.*	(AMY Collab.)	REFID=46381
ARMSTRONG	95F	PR D52 4839	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)	REFID=44623
ALBRECHT	94H	PL B338 390	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=44098
ADRIANI	93N	PL B318 575	O. Adriani *et al.*	(L3 Collab.)	REFID=43670
BISELLO	91	NP B350 1	D. Bisello *et al.*	(DM2 Collab.)	REFID=41668
BAI	90B	PRL 65 1309	Z. Bai *et al.*	(Mark III Collab.)	REFID=41354
CHEN	90B	PL B243 169	W.Y. Chen *et al.*	(CLEO Collab.)	REFID=41360
BAGLIN	89	PL B231 557	C. Baglin, S. Baird, G. Bassompierre	(R704 Collab.)	REFID=41015
BEHREND	89	ZPHY C42 367	H.J. Behrend *et al.*	(CELLO Collab.)	REFID=40732
BRAUNSCH...	89	ZPHY C41 533	W. Braunschweig *et al.*	(TASSO Collab.)	REFID=40728
AIHARA	88D	PRL 60 2355	H. Aihara *et al.*	(TPC Collab.)	REFID=40588
BAGLIN	87B	PL B187 191	C. Baglin *et al.*	(R704 Collab.)	REFID=40018
BALTRUSAIT...	86	PR D33 629	R.M. Baltrusaitis *et al.*	(Mark III Collab.)	REFID=22009
BERGER	86	PL 167B 120	C. Berger *et al.*	(PLUTO Collab.)	REFID=22010
GAISER	86	PR D34 711	J. Gaiser *et al.*	(Crystal Ball Collab.)	REFID=22012
ALTHOFF	85B	ZPHY C29 189	M. Althoff *et al.*	(TASSO Collab.)	REFID=21349
BALTRUSAIT...	84	PRL 52 2126	R.M. Baltrusaitis *et al.*	(CIT, UCSC+) JP	REFID=22006
BLOOM	83	ARNS 33 143	E.D. Bloom, C. Peck	(SLAC, CIT)	REFID=21682
HIMEL	80B	PRL 45 1146	T.M. Himel *et al.*	(SLAC, LBL, UCB)	REFID=22003
PARTRIDGE	80B	PRL 45 1150	R. Partridge *et al.*	(CIT, HARV, PRIN+)	REFID=22004