$\eta_c(1S)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Confidence level
	Decays involving hadronic resonances		
Γ_1	$\eta'(958)\pi\pi$	(4.1 ±1.7) %	
Γ_2	$\rho\rho$	(2.6 ±0.9) %	
Γ_3	$K^*(892)^0 K^-\pi^+$ + c.c.	(2.0 ±0.7) %	
Γ_4	$K^*(892)\overline{K}^*(892)$	$(8.5 \pm 3.1)\times 10^{-3}$	
Γ_5	$\phi\phi$	$(7.1 \pm 2.8)\times 10^{-3}$	
Γ_6	$a_0(980)\pi$	< 2 %	90%
Γ_7	$a_2(1320)\pi$	< 2 %	90%
Γ_8	$K^*(892)\overline{K}$ + c.c.	< 1.28 %	90%
Γ_9	$f_2(1270)\eta$	< 1.1 %	90%
Γ_{10}	$\omega\omega$	$< 3.1 \times 10^{-3}$	90%
	Decays into stable hadrons		
Γ_{11}	$K\overline{K}\pi$	(6.6 ±1.8) %	
Γ_{12}	$\eta\pi\pi$	(4.9 ±1.8) %	
Γ_{13}	$\pi^+\pi^- K^+K^-$	$(2.0\ ^{+0.7}_{-0.6})$ %	
Γ_{14}	$2(\pi^+\pi^-)$	(1.2 ±0.4) %	
Γ_{15}	$p\overline{p}$	$(1.2 \pm 0.4)\times 10^{-3}$	
Γ_{16}	$K\overline{K}\eta$	< 3.1 %	90%
Γ_{17}	$\pi^+\pi^- p\overline{p}$	< 1.2 %	90%
Γ_{18}	$\Lambda\overline{\Lambda}$	$< 2 \times 10^{-3}$	90%
	Radiative decays		
Γ_{19}	$\gamma\gamma$	$(6\ ^{+6}_{-5}) \times 10^{-4}$	

$\eta_c(1S)$ PARTIAL WIDTHS

$\Gamma(\gamma\gamma)$ Γ_{19}

VALUE (keV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$7.0^{+2.0}_{-1.7}$ OUR AVERAGE						
$8.0 \pm 2.3 \pm 2.4$		17 ± 5	ADRIANI	93N	L3	$e^+e^- \to e^+e^-\eta_c$
$5.9^{+2.1}_{-1.8} \pm 1.9$			CHEN	90B	CLEO	$e^+e^- \to e^+e^-\eta_c$
$6.4^{+5.0}_{-3.4}$			AIHARA	88D	TPC	$e^+e^- \to e^+e^-X$
28 ±15			[5] BERGER	86	PLUT	$\gamma\gamma \to K\overline{K}\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<11	90		BLINOV	86	MD1	$e^+e^- \to e^+e^-X$

[5] Re-evaluated by AIHARA 88D.

$\eta_c(1S)$ Γ(i)$\Gamma(\gamma\gamma)/\Gamma$(total)

$\Gamma(K\overline{K}\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{11}\Gamma_{19}/\Gamma$

VALUE (keV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.2 ±0.4 OUR AVERAGE						
$1.06 \pm 0.41 \pm 0.27$		11 ± 4	BRAUNSCH...	89	TASS	$\gamma\gamma \to K\overline{K}\pi$
$1.5\ ^{+0.60}_{-0.45} \pm 0.3$		7	[6] BERGER	86	PLUT	$\gamma\gamma \to K\overline{K}\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.63	95		[6] BEHREND	89	CELL	$\gamma\gamma \to K^0_S K^\pm\pi^\mp$
<4.4	95		ALTHOFF	85B	TASS	$\gamma\gamma \to K\overline{K}\pi$

[6] $K^\pm K^0_S \pi^\mp$ corrected to $K\overline{K}\pi$ by factor 3.

$\eta_c(1S)$ BRANCHING RATIOS

HADRONIC DECAYS

$\Gamma(\eta'(958)\pi\pi)/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.041 ±0.017	14 ± 4	[7] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$

$\Gamma(\rho\rho)/\Gamma_{\text{total}}$ Γ_2/Γ

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
26 ± 9 OUR EVALUATION (Treating systematic errors as correlated.)						
25 ± 8 OUR AVERAGE						
$26.0 \pm 2.4 \pm 8.8$		113 ± 11	[7] BISELLO	91	DM2	$J/\psi \to \gamma\rho^0\rho^0$
$23.6 \pm 10.6 \pm 8.2$		32 ± 14	[7] BISELLO	91	DM2	$J/\psi \to \gamma\rho^+\rho^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<140	90		[7] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$

$\Gamma(K^*(892)^0 K^-\pi^+ + \text{c.c.})/\Gamma_{\text{total}}$ Γ_3/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.02 ±0.007	63 ± 10	[7] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$

$\Gamma(K^*(892)\overline{K}^*(892))/\Gamma_{\text{total}}$ Γ_4/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
85 ±31 OUR AVERAGE					
$82 \pm 28 \pm 27$	14 ± 5	[7] BISELLO	91	DM2	$e^+e^- \to \gamma K^+K^-\pi^+\pi^-$
90 ± 50	9 ± 4	[7] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$

$\Gamma(K^*(892)\overline{K} + \text{c.c.})/\Gamma_{\text{total}}$ Γ_8/Γ

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	[7] BISELLO	91	DM2	$J/\psi \to \gamma K^+K^-\pi^0$

$\Gamma(\phi\phi)/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
71 ±28 OUR EVALUATION (Treating systematic errors as correlated.)					
71 ±22 OUR AVERAGE					
$74 \pm 18 \pm 24$	80	[7] BAI	90B	MRK3	$J/\psi \to \gamma K^+K^-K^+K^-$
$67 \pm 21 \pm 24$		[7] 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. • • •					
$31 \pm 7 \pm 10$	19 ± 5	[7] BISELLO	91	DM2	$J/\psi \to \gamma K^+K^-K^+K^-$
$30^{+18}_{-12} \pm 10$	5 ± 3	[7] BISELLO	91	DM2	$J/\psi \to \gamma K^+K^-K^0_S K^0_L$

$\Gamma(a_0(980)\pi)/\Gamma_{\text{total}}$ Γ_6/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.02	90	[7,8] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$

$\Gamma(a_2(1320)\pi)/\Gamma_{\text{total}}$ Γ_7/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.02	90	[7] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$

$\Gamma(f_2(1270)\eta)/\Gamma_{\text{total}}$ Γ_9/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.011	90	[7] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$

$\Gamma(\omega\omega)/\Gamma_{\text{total}}$ Γ_{10}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0031	90	[7] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.0063		[7] BISELLO	91	DM2	$J/\psi \to \gamma\omega\omega$

$\Gamma(K\overline{K}\pi)/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.066 ±0.018 OUR EVALUATION (Treating systematic errors as correlated.)						
0.063 ±0.013 OUR AVERAGE						
$0.0690 \pm 0.0144 \pm 0.0234$		33 ± 7	[7] BISELLO	91	DM2	$J/\psi \to \gamma K^+K^-\pi^0$
$0.0543 \pm 0.0096 \pm 0.0180$		68 ± 10	[7] BISELLO	91	DM2	$J/\psi \to \gamma K^\pm\pi^\mp K^0_S$
0.061 ± 0.022		95 ± 18	[7,9] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$
$0.161\ ^{+0.092}_{-0.073}$			[10] HIMEL	80B	MRK2	$\psi(2S) \to \eta_c\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.107	90		[7] PARTRIDGE	80B	CBAL	$J/\psi \to \eta_c\gamma$

$\Gamma(\eta\pi\pi)/\Gamma_{\text{total}}$ Γ_{12}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.049 ±0.018 OUR EVALUATION					
0.047 ±0.015 OUR AVERAGE					
0.054 ± 0.020	75 ± 11	[7] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$
$0.037 \pm 0.013 \pm 0.020$	18	[7] PARTRIDGE	80B	CBAL	$J/\psi \to \eta\pi^+\pi^-\gamma$

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.020^{+0.007}_{-0.006}$ OUR AVERAGE					
0.021 ± 0.007	110 ± 17	[7] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$
$0.014^{+0.022}_{-0.009}$		[10] HIMEL	80B	MRK2	$\psi(2S) \to \eta_c\gamma$

$\Gamma(2(\pi^+\pi^-))/\Gamma_{\text{total}}$ Γ_{14}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.012 ±0.004 OUR EVALUATION					
0.0120 ±0.0031 OUR AVERAGE					
$0.0105 \pm 0.0017 \pm 0.0034$	137 ± 23	[7] BISELLO	91	DM2	$J/\psi \to \gamma 2\pi^+ 2\pi^-$
0.013 ± 0.006	25 ± 9	[7] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$
$0.020\ ^{+0.015}_{-0.010}$		[10] HIMEL	80B	MRK2	$\psi(2S) \to \eta_c\gamma$