$\Gamma(p\overline{p})/\Gamma_{\text{total}}$ — Γ_{15}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
12± 4 OUR AVERAGE					
10± 3±4	18 ± 6	[7] BISELLO	91	DM2	$J/\psi \to \gamma p\overline{p}$
11± 6	23 ± 11	[7] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$
29^{+29}_{-15}		[10] HIMEL	80B	MRK2	$\psi(2S) \to \eta_c\gamma$

$\Gamma(K\overline{K}\eta)/\Gamma_{\text{total}}$ — Γ_{16}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.031	90	[7] BALTRUSAIT...86		MRK3	$J/\psi \to \eta_c\gamma$

$\Gamma(\pi^+\pi^-p\overline{p})/\Gamma_{\text{total}}$ — Γ_{17}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.012	90	HIMEL	80B	MRK2	$\psi(2S) \to \eta_c\gamma$

$\Gamma(\Lambda\overline{\Lambda})/\Gamma_{\text{total}}$ — Γ_{18}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.002	90	[7] BISELLO	91	DM2	$e^+e^- \to \gamma\Lambda\overline{\Lambda}$

$\Gamma_i\Gamma_f/\Gamma^2_{\text{total}}$ in $p\overline{p} \to \eta_c(1S) \to \phi\phi$ — $\Gamma_{15}\Gamma_5/\Gamma^2$

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
$\mathbf{4.0^{+3.5}_{-3.2}}$	BAGLIN	89	SPEC	$\overline{p}p \to K^+K^-K^+K^-$

[7] 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.

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

[9] Average from $K^+K^-\pi^0$ and $K^\pm K^0{}_S\pi^\mp$ decay channels.

[10] Estimated using $B(\psi(2S) \to \gamma\eta_c(1S)) = 0.0028 \pm 0.0006$.

RADIATIVE DECAYS

$\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ — Γ_{19}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
$\mathbf{6^{+4}_{-3}\pm4}$		BAGLIN	87B	SPEC	$\overline{p}p \to \gamma\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 9	90	[7] BISELLO	91	DM2	$J/\psi \to \gamma\gamma\gamma$
<18	90	[11] BLOOM	83	CBAL	$J/\psi \to \eta_c\gamma$

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

$\Gamma_i\Gamma_f/\Gamma^2_{\text{total}}$ in $p\overline{p} \to \eta_c(1S) \to \gamma\gamma$ — $\Gamma_{15}\Gamma_{19}/\Gamma^2$

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.68^{+0.42}_{-0.31}}$	12	BAGLIN	87B	SPEC	$\overline{p}p \to \gamma\gamma$

$\eta_c(1S)$ REFERENCES

ADRIANI	93N	PL B318 575	+Aguilar-Benitez, Ahlen+	(L3 Collab.)
BISELLO	91	NP B350 1	+Busetto+	(DM2 Collab.)
BAI	90B	PRL 65 1309	+Blaylock+	(Mark III Collab.)
CHEN	90B	PL B243 169	+McIlwain+	(CLEO Collab.)
BAGLIN	89	PL B231 557	+Baird, Bassompierre	(R704 Collab.)
BEHREND	89	ZPHY C42 367	+Criegee+	(CELLO Collab.)
BRAUNSCH...	89	ZPHY C41 533	Braunschweig, Bock+	(TASSO Collab.)
AIHARA	88D	PRL 60 2355	+Alston-Garnjost+	(TPC Collab.)
BAGLIN	87B	PL B187 191	+Baird, Bassompierre, Borreani+	(R704 Collab.)
BALTRUSAIT...	86	PR D33 629	Baltrusaitis, Coffman, Hauser+	(Mark III Collab.)
BERGER	86	PL 167B 120	+Genzel, Lackas, Pielorz+	(PLUTO Collab.)
BLINOV	86		+Blinov, Bondar, Bukin+	(NOVO)
		Proc. XXIII Int. HEP Conf., Berkeley, CA (1986); World Scientific, Singapore, 1987, ed. S.C. Loken		
GAISER	86	PR D34 711	+Bloom, Bulos, Godfrey+	(Crystal Ball Collab.)
ALTHOFF	85B	ZPHY C29 189	+Braunschweig, Kirschfink+	(TASSO Collab.)
BALTRUSAIT...	84	PRL 52 2126	Baltrusaitis+	(CIT, UCSC, ILL, SLAC, WASH) JP
BLOOM	83	ARNS 33 143	+Peck	(SLAC, CIT)
HIMEL	80B	PRL 45 1146	+Trilling, Abrams, Alam+	(SLAC, LBL, UCB)
PARTRIDGE	80B	PRL 45 1150	+Peck+	(CIT, HARV, PRIN, STAN, SLAC)

OTHER RELATED PAPERS

ARMSTRONG	89	PL B221 216	+Benayoun+	(CERN, CDEF, BIRM, BARI, ATHU, CURIN+)
BLOOM	79	Fermilab Symp. 92		(CIT, HARV, PRIN, SLAC, STAN)

$J/\psi(1S)$ or $J/\psi(3097)$

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

$J/\psi(1S)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
3096.88±0.04 OUR AVERAGE					
3096.87±0.03±0.03		ARMSTRONG	93B	SPEC	$\overline{p}p \to e^+e^-$
3096.95±0.1 ±0.3	193	BAGLIN	87	SPEC	$\overline{p}p \to e^+e^-X$
3098.4 ±2.0	38k	LEMOIGNE	82	GOLI	190 GeV π^- Be $\to 2\mu$
3096.93±0.09	502	ZHOLENTZ	80	REDE	e^+e^-
3097.0 ±1		[1] BRANDELIK	79C	DASP	e^+e^-

[1] From a simultaneous fit to e^+e^-, $\mu^+\mu^-$ and hadronic channels assuming $\Gamma(e^+e^-) = \Gamma(\mu^+\mu^-)$.

$J/\psi(1S)$ WIDTH

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
88 ± 5 OUR AVERAGE				
99 ±12 ±6	ARMSTRONG	93B	SPEC	$\overline{p}p \to e^+e^-$
$85.5^{+\ 6.1}_{-\ 5.8}$	[2] HSUEH	92	RVUE	See Υ mini-review

[2] Using data from COFFMAN 92, BALDINI-CELIO 75, BOYARSKI 75, ESPOSITO 75B, BRANDELIK 79C.

$J/\psi(1S)$ DECAY MODES

	Mode		Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	hadrons		(86.0 ±2.0) %	
Γ_2	virtual $\gamma \to$ hadrons		(17.0 ±2.0) %	
Γ_3	e^+e^-		(5.99±0.25) %	
Γ_4	$\mu^+\mu^-$		(5.97±0.25) %	S=1.1
	Decays involving hadronic resonances			
Γ_5	$\rho\pi$		(1.28±0.10) %	
Γ_6	$\rho^0\pi^0$		(4.2 ±0.5) $\times 10^{-3}$	
Γ_7	$a_2(1320)\rho$		(1.09±0.22) %	
Γ_8	$\omega\pi^+\pi^+\pi^-\pi^-$		(8.5 ±3.4) $\times 10^{-3}$	
Γ_9	$\omega\pi^+\pi^-$		(7.2 ±1.0) $\times 10^{-3}$	
Γ_{10}	$K^*(892)^0\overline{K}^*_2(1430)^0$ + c.c.		(6.7 ±2.6) $\times 10^{-3}$	
Γ_{11}	$\omega K^*(892)\overline{K}$ + c.c.		(5.3 ±2.0) $\times 10^{-3}$	
Γ_{12}	$\omega f_2(1270)$		(4.3 ±0.6) $\times 10^{-3}$	
Γ_{13}	$K^+\overline{K}^*(892)^-$ + c.c.		(5.0 ±0.4) $\times 10^{-3}$	
Γ_{14}	$K^0\overline{K}^*(892)^0$ + c.c.		(4.2 ±0.4) $\times 10^{-3}$	
Γ_{15}	$\omega\pi^0\pi^0$		(3.4 ±0.8) $\times 10^{-3}$	
Γ_{16}	$b_1(1235)^\pm\pi^\mp$	[a]	(3.0 ±0.5) $\times 10^{-3}$	
Γ_{17}	$\omega K^\pm K^0_S\pi^\mp$	[a]	(3.0 ±0.7) $\times 10^{-3}$	
Γ_{18}	$b_1(1235)^0\pi^0$		(2.3 ±0.6) $\times 10^{-3}$	
Γ_{19}	$\phi K^*(892)\overline{K}$ + c.c.		(2.04±0.28) $\times 10^{-3}$	
Γ_{20}	$\omega K\overline{K}$		(1.9 ±0.4) $\times 10^{-3}$	
Γ_{21}	$\omega f_J(1710) \to \omega K\overline{K}$		(4.8 ±1.1) $\times 10^{-4}$	
Γ_{22}	$\phi 2(\pi^+\pi^-)$		(1.60±0.32) $\times 10^{-3}$	
Γ_{23}	$\Delta(1232)^{++}\overline{p}\pi^-$		(1.6 ±0.5) $\times 10^{-3}$	
Γ_{24}	$\omega\eta$		(1.58±0.16) $\times 10^{-3}$	
Γ_{25}	$\phi K\overline{K}$		(1.48±0.22) $\times 10^{-3}$	
Γ_{26}	$\phi f_J(1710) \to \phi K\overline{K}$		(3.6 ±0.6) $\times 10^{-4}$	
Γ_{27}	$p\overline{p}\omega$		(1.30±0.25) $\times 10^{-3}$	S=1.3
Γ_{28}	$\Delta(1232)^{++}\overline{\Delta}(1232)^{--}$		(1.10±0.29) $\times 10^{-3}$	
Γ_{29}	$\Sigma(1385)^-\overline{\Sigma}(1385)^+$ (or c.c.)	[a]	(1.03±0.13) $\times 10^{-3}$	
Γ_{30}	$p\overline{p}\eta'(958)$		(9 ±4) $\times 10^{-4}$	S=1.7
Γ_{31}	$\phi f'_2(1525)$		(8 ±4) $\times 10^{-4}$	S=2.7
Γ_{32}	$\phi\pi^+\pi^-$		(8.0 ±1.2) $\times 10^{-4}$	
Γ_{33}	$\phi K^\pm K^0_S\pi^\mp$	[a]	(7.2 ±0.9) $\times 10^{-4}$	
Γ_{34}	$\omega f_1(1420)$		(6.8 ±2.4) $\times 10^{-4}$	
Γ_{35}	$\phi\eta$		(6.5 ±0.7) $\times 10^{-4}$	
Γ_{36}	$\Xi(1530)^-\overline{\Xi}^+$		(5.9 ±1.5) $\times 10^{-4}$	
Γ_{37}	$pK^-\overline{\Sigma}(1385)^0$		(5.1 ±3.2) $\times 10^{-4}$	
Γ_{38}	$\omega\pi^0$		(4.2 ±0.6) $\times 10^{-4}$	S=1.4
Γ_{39}	$\phi\eta'(958)$		(3.3 ±0.4) $\times 10^{-4}$	
Γ_{40}	$\phi f_0(980)$		(3.2 ±0.9) $\times 10^{-4}$	S=1.9
Γ_{41}	$\Xi(1530)^0\overline{\Xi}^0$		(3.2 ±1.4) $\times 10^{-4}$	
Γ_{42}	$\Sigma(1385)^-\overline{\Sigma}^+$ (or c.c.)	[a]	(3.1 ±0.5) $\times 10^{-4}$	