$\Upsilon(1S)$

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

$\Upsilon(1S)$ MASS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
9460.30±0.26 OUR AVERAGE	Error includes scale factor of 3.3.			
9460.51±0.09±0.05	[1] ARTAMONOV	00	MD1	$e^+e^- \to$ hadrons
9459.97±0.11±0.07	MACKAY	84	REDE	$e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •				
9460.60±0.09±0.05	[2,3] BARU	92B	REDE	$e^+e^- \to$ hadrons
9460.59±0.12	BARU	86	REDE	$e^+e^- \to$ hadrons
9460.6 ±0.4	[3,4] ARTAMONOV	84	REDE	$e^+e^- \to$ hadrons

[1] Reanalysis of BARU 92B and ARTAMONOV 84 using new electron mass (COHEN 87).
[2] Superseding BARU 86.
[3] Superseded by ARTAMONOV 00.
[4] Value includes data of ARTAMONOV 82.

$\Upsilon(1S)$ WIDTH

VALUE (keV)	DOCUMENT ID
53.0±1.5 OUR EVALUATION	See the Note on Width Determinations of the Υ states

$\Upsilon(1S)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1	$\tau^+\tau^-$	$(2.67^{+0.14}_{-0.16})$ %	
Γ_2	e^+e^-	(2.38±0.11) %	
Γ_3	$\mu^+\mu^-$	(2.48±0.05) %	
	Hadronic decays		
Γ_4	$\eta'(958)$ anything	(2.8 ±0.4) %	
Γ_5	$J/\psi(1S)$ anything	$(6.5 \pm 0.7) \times 10^{-4}$	
Γ_6	χ_{c0} anything	$< 5 \times 10^{-3}$	90%
Γ_7	χ_{c1} anything	$(2.3 \pm 0.7) \times 10^{-4}$	
Γ_8	χ_{c2} anything	$(3.4 \pm 1.0) \times 10^{-4}$	
Γ_9	$\psi(2S)$ anything	$(2.7 \pm 0.9) \times 10^{-4}$	
Γ_{10}	$\rho\pi$	$< 2 \times 10^{-4}$	90%
Γ_{11}	$\pi^+\pi^-$	$< 5 \times 10^{-4}$	90%
Γ_{12}	K^+K^-	$< 5 \times 10^{-4}$	90%
Γ_{13}	$p\overline{p}$	$< 5 \times 10^{-4}$	90%
Γ_{14}	$\pi^0\pi^+\pi^-$	$< 1.84 \times 10^{-5}$	90%
Γ_{15}	$D^*(2010)^\pm$ anything		

Radiative decays

Γ_{16}	$\gamma\pi^+\pi^-$	$(6.3 \pm 1.8) \times 10^{-5}$	
Γ_{17}	$\gamma\pi^0\pi^0$	$(1.7 \pm 0.7) \times 10^{-5}$	
Γ_{18}	$\gamma 2h^+ 2h^-$	$(7.0 \pm 1.5) \times 10^{-4}$	
Γ_{19}	$\gamma 3h^+ 3h^-$	$(5.4 \pm 2.0) \times 10^{-4}$	
Γ_{20}	$\gamma 4h^+ 4h^-$	$(7.4 \pm 3.5) \times 10^{-4}$	
Γ_{21}	$\gamma\pi^+\pi^- K^+ K^-$	$(2.9 \pm 0.9) \times 10^{-4}$	
Γ_{22}	$\gamma 2\pi^+ 2\pi^-$	$(2.5 \pm 0.9) \times 10^{-4}$	
Γ_{23}	$\gamma 3\pi^+ 3\pi^-$	$(2.5 \pm 1.2) \times 10^{-4}$	
Γ_{24}	$\gamma 2\pi^+ 2\pi^- K^+ K^-$	$(2.4 \pm 1.2) \times 10^{-4}$	
Γ_{25}	$\gamma\pi^+\pi^- p\overline{p}$	$(1.5 \pm 0.6) \times 10^{-4}$	
Γ_{26}	$\gamma 2\pi^+ 2\pi^- p\overline{p}$	$(4 \pm 6) \times 10^{-5}$	
Γ_{27}	$\gamma 2K^+ 2K^-$	$(2.0 \pm 2.0) \times 10^{-5}$	
Γ_{28}	$\gamma\eta'(958)$	$< 1.6 \times 10^{-5}$	90%
Γ_{29}	$\gamma\eta$	$< 2.1 \times 10^{-5}$	90%
Γ_{30}	$\gamma f_2'(1525)$	$< 1.4 \times 10^{-4}$	90%
Γ_{31}	$\gamma f_2(1270)$	$(8 \pm 4) \times 10^{-5}$	
Γ_{32}	$\gamma\eta(1405)$	$< 8.2 \times 10^{-5}$	90%
Γ_{33}	$\gamma f_0(1710) \rightarrow \gamma K\overline{K}$	$< 2.6 \times 10^{-4}$	90%
Γ_{34}	$\gamma f_0(2200) \rightarrow \gamma K^+ K^-$	$< 2 \times 10^{-4}$	90%
Γ_{35}	$\gamma f_J(2220) \rightarrow \gamma K^+ K^-$	$< 1.5 \times 10^{-5}$	90%
Γ_{36}	$\gamma f_J(2220) \rightarrow \gamma\pi^+\pi^-$	$< 1.2 \times 10^{-5}$	90%
Γ_{37}	$\gamma f_J(2220) \rightarrow \gamma p\overline{p}$	$< 1.6 \times 10^{-5}$	90%
Γ_{38}	$\gamma\eta(2225) \rightarrow \gamma\phi\phi$	$< 3 \times 10^{-3}$	90%
Γ_{39}	γX (X = pseudoscalar with $m < 7.2$ GeV)	$< 3 \times 10^{-5}$	90%
Γ_{40}	$\gamma X\overline{X}$ ($X\overline{X}$ = vectors with $m < 3.1$ GeV)	$< 1 \times 10^{-3}$	90%

$\Upsilon(1S)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

$\Gamma(e^+e^-) \times \Gamma(\mu^+\mu^-)/\Gamma_{\text{total}}$ — $\Gamma_2\Gamma_3/\Gamma$

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
31.2±1.6±1.7	KOBEL	92	CBAL	$e^+e^- \rightarrow \mu^+\mu^-$

$\Gamma(\text{hadrons}) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ — $\Gamma_0\Gamma_2/\Gamma$

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
1.216±0.027 OUR AVERAGE				
1.187±0.023±0.031	[5] BARU	92B	MD1	$e^+e^- \rightarrow$ hadrons
1.23 ±0.02 ±0.05	[5] JAKUBOWSKI	88	CBAL	$e^+e^- \rightarrow$ hadrons
1.37 ±0.06 ±0.09	[6] GILES	84B	CLEO	$e^+e^- \rightarrow$ hadrons
1.23 ±0.08 ±0.04	[6] ALBRECHT	82	DASP	$e^+e^- \rightarrow$ hadrons
1.13 ±0.07 ±0.11	[6] NICZYPORUK	82	LENA	$e^+e^- \rightarrow$ hadrons
1.09 ±0.25	[6] BOCK	80	CNTR	$e^+e^- \rightarrow$ hadrons
1.35 ±0.14	[7] BERGER	79	PLUT	$e^+e^- \rightarrow$ hadrons

[5] Radiative corrections evaluated following KURAEV 85.
[6] Radiative corrections reevaluated by BUCHMUELLER 88 following KURAEV 85.
[7] Radiative corrections reevaluated by ALEXANDER 89 using B($\mu\mu$) = 0.026.

$\Upsilon(1S)$ PARTIAL WIDTHS

$\Gamma(e^+e^-)$ — Γ_2

VALUE (keV)	DOCUMENT ID
1.314±0.029 OUR EVALUATION	

$\Upsilon(1S)$ BRANCHING RATIOS

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.0267^{+0.0014}_{-0.0016}$ OUR AVERAGE					
$0.0261 \pm 0.0012^{+0.0009}_{-0.0013}$	25k	CINABRO	94B	CLE2	$e^+e^- \to \tau^+\tau^-$
$0.027 \pm 0.004 \pm 0.002$		[8] ALBRECHT	85C	ARG	$\Upsilon(2S) \to \pi^+\pi^-\tau^+\tau^-$
$0.034 \pm 0.004 \pm 0.004$		GILES	83	CLEO	$e^+e^- \to \tau^+\tau^-$

[8] Using B($\Upsilon(1S) \to e\,e$) = B($\Upsilon(1S) \to \mu\mu$) = 0.0256; not used for width evaluations.

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0248±0.0005 OUR AVERAGE					
$0.0249 \pm 0.0002 \pm 0.0007$	345k	ADAMS	05	CLEO	$e^+e^- \to \mu^+\mu^-$
$0.0249 \pm 0.0008 \pm 0.0013$		ALEXANDER	98	CLE2	$\Upsilon(2S) \to \pi^+\pi^-\mu^+\mu^-$
$0.0212 \pm 0.0020 \pm 0.0010$		[9] BARU	92	MD1	$e^+e^- \to \mu^+\mu^-$
$0.0231 \pm 0.0012 \pm 0.0010$		[9] KOBEL	92	CBAL	$e^+e^- \to \mu^+\mu^-$
$0.0252 \pm 0.0007 \pm 0.0007$		CHEN	89B	CLEO	$e^+e^- \to \mu^+\mu^-$
$0.0261 \pm 0.0009 \pm 0.0011$		KAARSBERG	89	CSB2	$e^+e^- \to \mu^+\mu^-$
$0.0230 \pm 0.0025 \pm 0.0013$	86	ALBRECHT	87	ARG	$\Upsilon(2S) \to \pi^+\pi^-\mu^+\mu^-$
$0.029 \pm 0.003 \pm 0.002$	864	BESSON	84	CLEO	$\Upsilon(2S) \to \pi^+\pi^-\mu^+\mu^-$
$0.027 \pm 0.003 \pm 0.003$		ANDREWS	83	CLEO	$e^+e^- \to \mu^+\mu^-$
$0.032 \pm 0.013 \pm 0.003$		ALBRECHT	82	DASP	$e^+e^- \to \mu^+\mu^-$
$0.038 \pm 0.015 \pm 0.002$		NICZYPORUK	82	LENA	$e^+e^- \to \mu^+\mu^-$
$0.014\ ^{+0.034}_{-0.014}$		BOCK	80	CNTR	$e^+e^- \to \mu^+\mu^-$
0.022 ± 0.020		BERGER	79	PLUT	$e^+e^- \to \mu^+\mu^-$

[9] Taking into account interference between the resonance and continuum.

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0238±0.0011 OUR AVERAGE					
0.0229±0.0008±0.0011		ALEXANDER	98	CLE2	$\Upsilon(2S) \to \pi^+\pi^- e^+e^-$
0.0242±0.0014±0.0014	307	ALBRECHT	87	ARG	$\Upsilon(2S) \to \pi^+\pi^- e^+e^-$
0.028 ±0.003 ±0.002	826	BESSON	84	CLEO	$\Upsilon(2S) \to \pi^+\pi^- e^+e^-$
0.051 ±0.030		BERGER	80C	PLUT	$e^+e^- \to e^+e^-$

$\Gamma(\eta'(958)\text{ anything})/\Gamma_{total}$ — Γ_4/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.028±0.004±0.002	ARTUSO	03	CLE2	$\Upsilon(1S) \to \eta'$anything

$\Gamma(J/\psi(1S)\text{ anything})/\Gamma_{total}$ — Γ_5/Γ

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.65±0.07 OUR AVERAGE						
0.64±0.04±0.06		730± 40	BRIERE	04	CLEO	$e^+e^- \to J/\psi X$
1.1 ±0.4 ±0.2		[10]	FULTON	89	CLEO	$e^+e^- \to \mu^+\mu^- X$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.68	90		ALBRECHT	92J	ARG	$e^+e^- \to e^+e^- X$, $e^+e^- \to \mu^+\mu^- X$
<1.7	90		MASCHMANN	90	CBAL	$e^+e^- \to$ hadrons
<20	90		NICZYPORUK	83	LENA	

[10] Using B$((J/\psi) \to \mu^+\mu^-) = (6.9 \pm 0.9)$%.

$\Gamma(\chi_{c0}\text{ anything})/\Gamma(J/\psi(1S)\text{ anything})$ — Γ_6/Γ_5

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<7.4	90	BRIERE	04	CLEO	$e^+e^- \to J/\psi X$

$\Gamma(\chi_{c1}\text{ anything})/\Gamma(J/\psi(1S)\text{ anything})$ — Γ_7/Γ_5

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.35±0.08±0.06	52 ± 12	BRIERE	04	CLEO	$e^+e^- \to J/\psi X$

$\Gamma(\chi_{c2}\text{ anything})/\Gamma(J/\psi(1S)\text{ anything})$ — Γ_8/Γ_5

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.52±0.12±0.09	47 ± 11	BRIERE	04	CLEO	$e^+e^- \to J/\psi X$

$\Gamma(\psi(2S)\text{ anything})/\Gamma(J/\psi(1S)\text{ anything})$ — Γ_9/Γ_5

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.41±0.11±0.08	42 ± 11	BRIERE	04	CLEO	$e^+e^- \to J/\psi\pi^+\pi^- X$

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

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<5	90	BARU	92	MD1	$\Upsilon(1S) \to \pi^+\pi^-$

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

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<5	90	BARU	92	MD1	$\Upsilon(1S) \to K^+K^-$

$\Gamma(p\overline{p})/\Gamma_{total}$ — Γ_{13}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<5	90	[11] BARU	96	MD1	$\Upsilon(1S) \to p\overline{p}$

[11] Supersedes BARU 92 in this node.

$\Gamma(\pi^0\pi^+\pi^-)/\Gamma_{total}$ — Γ_{14}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<1.84	90	ANASTASSOV	99	CLE2	$e^+e^- \to$ hadrons

$\Gamma(\gamma X)/\Gamma_{total}$ — Γ_{39}/Γ

(X = pseudoscalar with m< 7.2 GeV)

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<3	90	[12] BALEST	95	CLEO	$e^+e^- \to \gamma + X$

[12] For a noninteracting pseudoscalar X with mass < 7.2 GeV.

$\Gamma(\gamma X\overline{X})/\Gamma_{total}$ — Γ_{40}/Γ

($X\overline{X}$ = vectors with m< 3.1 GeV)

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<1	90	[13] BALEST	95	CLEO	$e^+e^- \to \gamma + X\overline{X}$

[13] For a noninteracting vector X with mass < 3.1 GeV.

$\Gamma(\gamma\pi^+\pi^-)/\Gamma_{total}$ — Γ_{16}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
6.3±1.2±1.3	[14] ANASTASSOV	99	CLE2	$e^+e^- \to$ hadrons

[14] For $m_{\pi\pi}$ >1 GeV.

$\Gamma(\gamma\pi^0\pi^0)/\Gamma_{total}$ — Γ_{17}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.7±0.6±0.3	[15] ANASTASSOV	99	CLE2	$e^+e^- \to$ hadrons

[15] For $m_{\pi\pi}$ >1 GeV.

$\Gamma(\gamma 2\pi^+2\pi^-)/\Gamma_{total}$ — Γ_{22}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.5±0.7±0.5	26 ± 7	FULTON	90B	CLEO	$e^+e^- \to$ hadrons

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

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.9±0.7±0.6	29 ± 8	FULTON	90B	CLEO	$e^+e^- \to$ hadrons

$\Gamma(\gamma\pi^+\pi^-p\overline{p})/\Gamma_{total}$ — Γ_{25}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.5±0.5±0.3	22 ± 6	FULTON	90B	CLEO	$e^+e^- \to$ hadrons

$\Gamma(\gamma 2K^+ 2K^-)/\Gamma_{total}$ — Γ_{27}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.2 ±0.2	2 ± 2	FULTON	90B	CLEO	$e^+e^- \to$ hadrons

$\Gamma(\gamma 3\pi^+ 3\pi^-)/\Gamma_{total}$ — Γ_{23}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.5±0.9±0.8	17 ± 5	FULTON	90B	CLEO	$e^+e^- \to$ hadrons

$\Gamma(\gamma 2\pi^+ 2\pi^- K^+ K^-)/\Gamma_{total}$ — Γ_{24}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.4±0.9±0.8	18 ± 7	FULTON	90B	CLEO	$e^+e^- \to$ hadrons

$\Gamma(\gamma 2\pi^+ 2\pi^- p\overline{p})/\Gamma_{total}$ — Γ_{26}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.4±0.4±0.4	7 ± 6	FULTON	90B	CLEO	$e^+e^- \to$ hadrons

$\Gamma(\gamma 2h^+ 2h^-)/\Gamma_{total}$ — Γ_{18}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
7.0±1.1±1.0	80 ± 12	FULTON	90B	CLEO	$e^+e^- \to$ hadrons

$\Gamma(\gamma 3h^+ 3h^-)/\Gamma_{total}$ — Γ_{19}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
5.4±1.5±1.3	39 ± 11	FULTON	90B	CLEO	$e^+e^- \to$ hadrons

$\Gamma(\gamma 4h^+ 4h^-)/\Gamma_{total}$ — Γ_{20}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
7.4±2.5±2.5	36 ± 12	FULTON	90B	CLEO	$e^+e^- \to$ hadrons

$\Gamma(\rho\pi)/\Gamma_{total}$ — Γ_{10}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
< 2	90	FULTON	90B		$\Upsilon(1S) \to \rho^0\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<10	90	BLINOV	90	MD1	$\Upsilon(1S) \to \rho^0\pi^0$
<21	90	NICZYPORUK	83	LENA	$\Upsilon(1S) \to \rho^0\pi^0$

$\Gamma(D^*(2010)^\pm \text{ anything})/\Gamma_{total}$ — Γ_{15}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<19	90	[16] ALBRECHT	92J	ARG	$e^+e^- \to D^0\pi^\pm X$

[16] For $x_p > 0.2$.

$\Gamma(\gamma\eta(1405))/\Gamma_{total}$ — Γ_{32}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<8.2	90	[17] FULTON	90B	CLEO	$\Upsilon(1S) \to \gamma K^\pm\pi^\mp K^0_S$

[17] Includes unknown branching ratio of $\eta(1405) \to K^\pm\pi^\mp K^0_S$.

$\Gamma(\gamma\eta'(958))/\Gamma_{total}$ — Γ_{28}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
< 1.6	90	RICHICHI	01B	CLE2	$\Upsilon(1S) \to \gamma\eta' \to \gamma\eta\pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<130	90	SCHMITT	88	CBAL	$\Upsilon(1S) \to \gamma X$

$\Gamma(\gamma\eta)/\Gamma_{total}$ — Γ_{29}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
< 2.1	90	MASEK	02	CLEO	$\Upsilon(1S) \to \gamma\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<28.2	90	MASEK	02	CLEO	$\eta \to \gamma\gamma$
< 6.7	90	MASEK	02	CLEO	$\eta \to \pi^0\pi^0\pi^0$
< 2.6	90	MASEK	02	CLEO	$\eta \to \pi^+\pi^-\pi^0$
<35	90	SCHMITT	88	CBAL	$\Upsilon(1S) \to \gamma X$

$\Gamma(\gamma f_2'(1525))/\Gamma_{total}$ — Γ_{30}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<14	90	[18] FULTON	90B	CLEO	$\Upsilon(1S) \to \gamma K^+K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<19.4	90	[18] ALBRECHT	89	ARG	$\Upsilon(1S) \to \gamma K^+K^-$

[18] Assuming $B(f_2'(1525) \to K\overline{K}) = 0.71$.

$\Gamma(\gamma f_0(1710) \to \gamma K\overline{K})/\Gamma_{total}$ — Γ_{33}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
< 2.6	90	[19] ALBRECHT	89	ARG	$\Upsilon(1S) \to \gamma K^+K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 6.3	90	[19] FULTON	90B	CLEO	$\Upsilon(1S) \to \gamma K^+K^-$
<19	90	[19] FULTON	90B	CLEO	$\Upsilon(1S) \to \gamma K^0_S K^0_S$
< 8	90	[20] ALBRECHT	89	ARG	$\Upsilon(1S) \to \gamma\pi^+\pi^-$
<24	90	[21] SCHMITT	88	CBAL	$\Upsilon(1S) \to \gamma X$

[19] Assuming $B(f_0(1710) \to K\overline{K}) = 0.38$.
[20] Assuming $B(f_0(1710) \to \pi\pi) = 0.04$.
[21] Assuming $B(f_0(1710) \to \eta\eta) = 0.18$.

$\Gamma(\gamma f_2(1270))/\Gamma_{total}$ — Γ_{31}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
$8.1 \pm 2.3^{+2.9}_{-2.7}$		[22] ANASTASSOV	99	CLE2	$e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<21	90	[22] FULTON	90B	CLEO	$\Upsilon(1S) \to \gamma\pi^+\pi^-$
<13	90	[22] ALBRECHT	89	ARG	$\Upsilon(1S) \to \gamma\pi^+\pi^-$
<81	90	SCHMITT	88	CBAL	$\Upsilon(1S) \to \gamma X$

[22] Using $B(f_2(1270) \to \pi\pi) = 0.84$.

$\Gamma(\gamma f_J(2220) \to \gamma K^+ K^-)/\Gamma_{total}$ — Γ_{35}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
< 1.6	90	MASEK	02	CLEO	$\Upsilon(1S) \to \gamma K^+ K^-$
< 1.5	90	[23] FULTON	90B	CLEO	$\Upsilon(1S) \to \gamma K^+ K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 2.9	90	[23] ALBRECHT	89	ARG	$\Upsilon(1S) \to \gamma K^+ K^-$
<20	90	[23] BARU	89	MD1	$\Upsilon(1S) \to \gamma K^+ K^-$

[23] Including unknown branching ratio of $f_J(2220) \to K^+ K^-$.

$\Gamma(\gamma f_J(2220) \to \gamma \pi^+ \pi^-)/\Gamma_{total}$ — Γ_{36}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<1.2	90	MASEK	02	CLEO	$\Upsilon(1S) \to \gamma \pi^+ \pi^-$

$\Gamma(\gamma f_J(2220) \to \gamma p \overline{p})/\Gamma_{total}$ — Γ_{37}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<1.6	90	MASEK	02	CLEO	$\Upsilon(1S) \to \gamma p \overline{p}$

$\Gamma(\gamma \eta(2225) \to \gamma \phi \phi)/\Gamma_{total}$ — Γ_{38}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.003	90	[24] BARU	89	MD1	$\Upsilon(1S) \to \gamma K^+ K^- K^+ K^-$

[24] Assuming that the $\eta(2225)$ decays only into $\phi\phi$.

$\Gamma(\gamma f_0(2200) \to \gamma K^+ K^-)/\Gamma_{total}$ — Γ_{34}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.0002	90	[25] BARU	89	MD1	$\Upsilon(1S) \to \gamma K^+ K^-$

[25] Assuming that the $f_0(2200)$ decays only into $K^+ K^-$.

$\Upsilon(1S)$ REFERENCES

ADAMS	05	PRL 94 012001	G.S. Adams et al.	(CLEO Collab.)
BRIERE	04	PR D70 072001	R.A. Briere et al.	(CLEO Collab.)
ARTUSO	03	PR D67 052003	M. Artuso et al.	(CLEO Collab.)
MASEK	02	PR D65 072002	G. Masek et al.	(CLEO Collab.)
RICHICHI	01B	PRL 87 141801	S.J. Richichi et al.	(CLEO Collab.)
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