NODE=M052

$\Upsilon(2S)$

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

$\Upsilon(2S)$ MASS

NODE=M052M

NODE=M052M

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
10023.4±0.5	[1] SHAMOV	23	RVUE	$e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •				
10022.7±0.4	[2] SHAMOV	23	RVUE	$e^+e^- \to$ hadrons
10023.5±0.5	[3,4] ARTAMONOV	00	MD1	$e^+e^- \to$ hadrons
10023.6±0.5	[5,6] BARU	86B	MD1	$e^+e^- \to$ hadrons
10023.1±0.4	[7] BARBER	84	ARG	$e^+e^- \to$ hadrons

OCCUR=2

[1] Reanalysis of MD1 data using the electron mass from COHEN 87, the radiative corrections from KURAEV 85 and interference effects. NODE=M052M;LINKAGE=A

[2] Obtained by reanalysing ARGUS and Crystal Ball data (BARBER 84), but not authored by the ARGUS and Crystal Ball collaboration. NODE=M052M;LINKAGE=B

[3] Reanalysis of BARU 86B using new electron mass (COHEN 87). NODE=M052M;LINKAGE=AR

[4] Superseded by SHAMOV 23. NODE=M052M;LINKAGE=E

[5] Reanalysis of ARTAMONOV 84. NODE=M052M;LINKAGE=C

[6] Superseded by ARTAMONOV 00. NODE=M052M;LINKAGE=RZ

[7] Reanalysed by SHAMOV 23. NODE=M052M;LINKAGE=D

$m_{\Upsilon(2S)} - m_{\Upsilon(1S)}$

NODE=M052A00

NODE=M052A00

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
562.81±0.11 OUR AVERAGE					
562.71±0.04±0.20	3.7M	[1] AAIJ	24AC	LHCB	$\Upsilon \to \mu^+\mu^-$
562.85±0.03±0.12	89k	[1] AAIJ	24AC	LHCB	$\Upsilon(2S) \to \Upsilon(1S)\pi^+\pi^-$

OCCUR=2

[1] Observed in prompt pp production. NODE=M052A00;LINKAGE=A

$\Upsilon(2S)$ WIDTH

NODE=M052W

NODE=M052W

VALUE (keV)	DOCUMENT ID
31.98±2.63 OUR EVALUATION	See the Note on "Width Determinations of the Υ States"

→ UNCHECKED ←

$\Upsilon(2S)$ DECAY MODES

NODE=M052215;NODE=M052

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	
Γ_1	$\Upsilon(1S)\pi^+\pi^-$	(17.85± 0.26) %		DESIG=4
Γ_2	$\Upsilon(1S)\pi^0\pi^0$	(8.6 ± 0.4) %		DESIG=5
Γ_3	$\tau^+\tau^-$	(2.00± 0.21) %		DESIG=3
Γ_4	$\mu^+\mu^-$	(1.93± 0.17) %	S=2.2	DESIG=1
Γ_5	e^+e^-	(1.91± 0.16) %		DESIG=2
Γ_6	$\Upsilon(1S)\pi^0$	$< 4 \times 10^{-5}$	CL=90%	DESIG=10
Γ_7	$\Upsilon(1S)\eta$	$(2.9 \pm 0.4) \times 10^{-4}$	S=2.0	DESIG=6
Γ_8	$J/\psi(1S)$ anything	$< 6 \times 10^{-3}$	CL=90%	DESIG=20
Γ_9	$J/\psi(1S)\eta_c$	$< 5.4 \times 10^{-6}$	CL=90%	DESIG=143
Γ_{10}	$J/\psi(1S)\chi_{c0}$	$< 3.4 \times 10^{-6}$	CL=90%	DESIG=144
Γ_{11}	$J/\psi(1S)\chi_{c1}$	$< 1.2 \times 10^{-6}$	CL=90%	DESIG=145
Γ_{12}	$J/\psi(1S)\chi_{c2}$	$< 2.0 \times 10^{-6}$	CL=90%	DESIG=146
Γ_{13}	$J/\psi(1S)\eta_c(2S)$	$< 2.5 \times 10^{-6}$	CL=90%	DESIG=147
Γ_{14}	$J/\psi(1S)X(3940)$	$< 2.0 \times 10^{-6}$	CL=90%	DESIG=148
Γ_{15}	$J/\psi(1S)X(4160)$	$< 2.0 \times 10^{-6}$	CL=90%	DESIG=149
Γ_{16}	χ_{c1} anything	$(2.2 \pm 0.5) \times 10^{-4}$		DESIG=157
Γ_{17}	$\chi_{c1}(1P)^0 X_{tetra}$	$< 3.67 \times 10^{-5}$	CL=90%	DESIG=160
Γ_{18}	χ_{c2} anything	$(2.3 \pm 0.8) \times 10^{-4}$		DESIG=158
Γ_{19}	$\psi(2S)\eta_c$	$< 5.1 \times 10^{-6}$	CL=90%	DESIG=150
Γ_{20}	$\psi(2S)\chi_{c0}$	$< 4.7 \times 10^{-6}$	CL=90%	DESIG=151
Γ_{21}	$\psi(2S)\chi_{c1}$	$< 2.5 \times 10^{-6}$	CL=90%	DESIG=152
Γ_{22}	$\psi(2S)\chi_{c2}$	$< 1.9 \times 10^{-6}$	CL=90%	DESIG=153
Γ_{23}	$\psi(2S)\eta_c(2S)$	$< 3.3 \times 10^{-6}$	CL=90%	DESIG=154

Γ_{24}	$\psi(2S)\,X(3940)$	$< 3.9 \times 10^{-6}$	CL=90%	DESIG=155
Γ_{25}	$\psi(2S)\,X(4160)$	$< 3.9 \times 10^{-6}$	CL=90%	DESIG=156
Γ_{26}	$T_{c\overline{c}1}(3900)^{+}\,T_{c\overline{c}1}(3900)^{-}$	$< 1.0 \times 10^{-6}$	CL=90%	DESIG=162
Γ_{27}	$T_{c\overline{c}1}(4200)^{+}\,T_{c\overline{c}1}(4200)^{-}$	$< 1.67 \times 10^{-5}$	CL=90%	DESIG=163
Γ_{28}	$T_{c\overline{c}1}(3900)^{\pm}\,T_{c\overline{c}1}(4200)^{\mp}$	$< 7.3 \times 10^{-6}$	CL=90%	DESIG=164
Γ_{29}	$T_{c\overline{c}}(4050)^{+}\,T_{c\overline{c}}(4050)^{-}$	$< 1.35 \times 10^{-5}$	CL=90%	DESIG=165
Γ_{30}	$T_{c\overline{c}}(4250)^{+}\,T_{c\overline{c}}(4250)^{-}$	$< 2.67 \times 10^{-5}$	CL=90%	DESIG=166
Γ_{31}	$T_{c\overline{c}}(4050)^{\pm}\,T_{c\overline{c}}(4250)^{\mp}$	$< 2.72 \times 10^{-5}$	CL=90%	DESIG=167
Γ_{32}	$T_{c\overline{c}1}(4430)^{+}\,T_{c\overline{c}1}(4430)^{-}$	$< 2.03 \times 10^{-5}$	CL=90%	DESIG=168
Γ_{33}	$T_{c\overline{c}}(4055)^{\pm}\,T_{c\overline{c}}(4055)^{\mp}$	$< 1.11 \times 10^{-5}$	CL=90%	DESIG=170
Γ_{34}	$T_{c\overline{c}}(4055)^{\pm}\,T_{c\overline{c}1}(4430)^{\mp}$	$< 2.11 \times 10^{-5}$	CL=90%	DESIG=171
Γ_{35}	$P_{c\overline{c}s}(4459)\,/\,\overline{P}_{c\overline{c}s}(4459)$ anything	$(2.9 \pm 1.7) \times 10^{-6}$		DESIG=189
Γ_{36}	$P_{c\overline{c}s}(4338)\,/\,\overline{P}_{c\overline{c}s}(4338)$ anything	$< 1.6 \times 10^{-6}$	CL=90%	DESIG=191
Γ_{37}	$P_c(4457)$ anything, $P_c(4457) \to p\,J/\psi(1S)$	$< 4.6 \times 10^{-6}$	CL=90%	DESIG=195
Γ_{38}	$P_c(4440)$ anything, $P_c(4440) \to p\,J/\psi(1S)$	$< 1.18 \times 10^{-5}$	CL=90%	DESIG=194
Γ_{39}	$P_c(4312)$ anything, $P_c(4312) \to p\,J/\psi(1S)$	$< 7.2 \times 10^{-6}$	CL=90%	DESIG=193
Γ_{40}	$p\,/\,\overline{p}\,J/\psi(1S)$ anything	$(4.3 \pm 0.6) \times 10^{-5}$		DESIG=192
Γ_{41}	$J/\psi(1S)\,\Lambda\,/\,\overline{\Lambda}$ anything	$(2.2 \pm 0.6) \times 10^{-5}$		DESIG=190
Γ_{42}	$\overline{^{2}H}$ anything	$(2.78^{+0.30}_{-0.26}) \times 10^{-5}$	S=1.2	DESIG=16
Γ_{43}	hadrons	(94 ± 11) %		DESIG=101
Γ_{44}	$g\,g\,g$	(58.8 ± 1.2) %		DESIG=105
Γ_{45}	$\gamma\,g\,g$	(1.87 ± 0.28) %		DESIG=106
Γ_{46}	$\phi\,K^{+}\,K^{-}$	$(1.6 \pm 0.4) \times 10^{-6}$		DESIG=133
Γ_{47}	$\omega\,\pi^{+}\,\pi^{-}$	$< 2.58 \times 10^{-6}$	CL=90%	DESIG=134
Γ_{48}	$K^{*}(892)^{0}\,K^{-}\,\pi^{+}$ + c.c.	$(2.3 \pm 0.7) \times 10^{-6}$		DESIG=135
Γ_{49}	$\phi\,f_2'(1525)$	$< 1.33 \times 10^{-6}$	CL=90%	DESIG=136
Γ_{50}	$\omega\,f_2(1270)$	$< 5.7 \times 10^{-7}$	CL=90%	DESIG=137
Γ_{51}	$\rho(770)\,a_2(1320)$	$< 8.8 \times 10^{-7}$	CL=90%	DESIG=138
Γ_{52}	$K^{*}(892)^{0}\,\overline{K}{}_2^{*}(1430)^{0}$ + c.c.	$(1.5 \pm 0.6) \times 10^{-6}$		DESIG=139
Γ_{53}	$K_1(1270)^{\pm}\,K^{\mp}$	$< 3.22 \times 10^{-6}$	CL=90%	DESIG=140
Γ_{54}	$K_1(1400)^{\pm}\,K^{\mp}$	$< 8.3 \times 10^{-7}$	CL=90%	DESIG=141
Γ_{55}	$b_1(1235)^{\pm}\,\pi^{\mp}$	$< 4.0 \times 10^{-7}$	CL=90%	DESIG=142
Γ_{56}	$\rho\,\pi$	$< 1.16 \times 10^{-6}$	CL=90%	DESIG=126
Γ_{57}	$\pi^{+}\,\pi^{-}\,\pi^{0}$	$< 8.0 \times 10^{-7}$	CL=90%	DESIG=127
Γ_{58}	$\omega\,\pi^{0}$	$< 1.63 \times 10^{-6}$	CL=90%	DESIG=128
Γ_{59}	$\pi^{+}\,\pi^{-}\,\pi^{0}\,\pi^{0}$	$(1.30 \pm 0.28) \times 10^{-5}$		DESIG=129
Γ_{60}	$K_S^{0}\,K^{+}\,\pi^{-}$ + c.c.	$(1.14 \pm 0.33) \times 10^{-6}$		DESIG=130
Γ_{61}	$K^{*}(892)^{0}\,\overline{K}{}^{0}$ + c.c.	$< 4.22 \times 10^{-6}$	CL=90%	DESIG=131
Γ_{62}	$K^{*}(892)^{-}\,K^{+}$ + c.c.	$< 1.45 \times 10^{-6}$	CL=90%	DESIG=132
Γ_{63}	$f_1(1285)$ anything	$(2.2 \pm 1.6) \times 10^{-3}$		DESIG=159
Γ_{64}	$f_1(1285)\,X_{tetra}$	$< 6.47 \times 10^{-5}$	CL=90%	DESIG=161
Γ_{65}	$D_s^{+}\,D_{s1}(2536)^{-}$			DESIG=177
Γ_{66}	$D_s^{+}\,D_{s1}(2536)^{-}$, $D_{s1}^{-} \to K^{-}\,D^{*}(2007)^{0}$	$(1.6 \pm 0.4) \times 10^{-5}$		DESIG=178
Γ_{67}	$D_s^{+}\,D_{s1}(2536)^{-}$, $D_{s1}^{-} \to K_S^{0}\,D^{*}(2010)^{-}$	$(8.4 \pm 2.3) \times 10^{-6}$		DESIG=179
Γ_{68}	$D_s^{*+}\,D_{s1}(2536)^{-}$			DESIG=180
Γ_{69}	$D_s^{*+}\,D_{s1}(2536)^{-}$, $D_{s1}^{-} \to K^{-}\,D^{*}(2007)^{0}$	$(1.4 \pm 0.4) \times 10^{-5}$		DESIG=181
Γ_{70}	$D_s^{*+}\,D_{s1}(2536)^{-}$, $D_{s1}^{-} \to K_S^{0}\,D^{*}(2010)^{-}$	$(8.2 \pm 3.1) \times 10^{-6}$		DESIG=182
Γ_{71}	$D_s^{+}\,D_{s2}^{*}(2573)^{-}$			DESIG=183
Γ_{72}	$D_s^{+}\,D_{s2}^{*}(2573)^{-}$, $D_{s2}^{*-} \to K^{-}\,D^{0}$	$(1.4 \pm 0.4) \times 10^{-5}$		DESIG=184

Γ_{73}	$D_s^+ D_{s2}^*(2573)^-$, $D_{s2}^{*-} \to K_S^0 D^-$		$(6.9 \pm 3.0) \times 10^{-6}$		DESIG=185
Γ_{74}	$D_s^{*+} D_{s2}^*(2573)^-$				DESIG=186
Γ_{75}	$D_s^{*+} D_{s2}^*(2573)^-$, $D_{s2}^{*-} \to K^- D^0$		$(9 \pm 5) \times 10^{-6}$		DESIG=187
Γ_{76}	$D_s^{*+} D_{s2}^*(2573)^-$, $D_{s2}^{*-} \to K_S^0 D^-$		$(5 \pm 6) \times 10^{-6}$		DESIG=188
Γ_{77}	Sum of 100 exclusive modes		$(2.90 \pm 0.30) \times 10^{-3}$		DESIG=121

Radiative decays

NODE=M052;CLUMP=A

Γ_{78}	$\gamma \chi_{b1}(1P)$		(6.9 ± 0.4) %		DESIG=8
Γ_{79}	$\gamma \chi_{b2}(1P)$		(7.15 ± 0.35) %		DESIG=7
Γ_{80}	$\gamma \chi_{b0}(1P)$		(3.8 ± 0.4) %		DESIG=9
Γ_{81}	$\gamma f_0(1710)$		$< 5.9 \times 10^{-4}$	CL=90%	DESIG=13
Γ_{82}	$\gamma f_2'(1525)$		$< 5.3 \times 10^{-4}$	CL=90%	DESIG=12
Γ_{83}	$\gamma f_2(1270)$		$< 2.41 \times 10^{-4}$	CL=90%	DESIG=11
Γ_{84}	$\gamma f_J(2220)$				DESIG=14
Γ_{85}	$\gamma \eta_c(1S)$		$< 2.7 \times 10^{-5}$	CL=90%	DESIG=111
Γ_{86}	$\gamma \chi_{c0}$		$< 1.0 \times 10^{-4}$	CL=90%	DESIG=112
Γ_{87}	$\gamma \chi_{c1}$		$< 3.6 \times 10^{-6}$	CL=90%	DESIG=113
Γ_{88}	$\gamma \chi_{c2}$		$< 1.5 \times 10^{-5}$	CL=90%	DESIG=114
Γ_{89}	$\gamma \chi_{c1}(3872)$		$< 1.8 \times 10^{-5}$	CL=90%	DESIG=172
Γ_{90}	$\gamma \chi_{c1}(3872)$, $\chi_{c1} \to \pi^+ \pi^- \pi^0 J/\psi$		$< 2.4 \times 10^{-6}$	CL=90%	DESIG=116
Γ_{91}	$\gamma \chi_{c0}(3915) \to \omega J/\psi$		$< 2.8 \times 10^{-6}$	CL=90%	DESIG=117
Γ_{92}	$\gamma \chi_{c1}(4140) \to \phi J/\psi$		$< 1.2 \times 10^{-6}$	CL=90%	DESIG=118
Γ_{93}	$\gamma X(4350) \to \phi J/\psi$		$< 1.3 \times 10^{-6}$	CL=90%	DESIG=119
Γ_{94}	$\gamma \eta_b(1S)$		$(5.5 {}^{+1.1}_{-0.9}) \times 10^{-4}$	S=1.2	DESIG=102
Γ_{95}	$\gamma \eta_b(1S) \to \gamma$Sum of 26 exclusive modes		$< 3.7 \times 10^{-6}$	CL=90%	DESIG=124
Γ_{96}	$\gamma X_{b\bar{b}} \to \gamma$Sum of 26 exclusive modes		$< 4.9 \times 10^{-6}$	CL=90%	DESIG=125
Γ_{97}	$\gamma X \to \gamma + \geq 4$ prongs	[a]	$< 1.95 \times 10^{-4}$	CL=95%	DESIG=103
Γ_{98}	$\gamma A^0 \to \gamma$hadrons		$< 8 \times 10^{-5}$	CL=90%	DESIG=108
Γ_{99}	$\gamma A^0 \to \gamma \mu^+ \mu^-$		$< 8.3 \times 10^{-6}$	CL=90%	DESIG=123

Lepton Family number (*LF*) violating modes

NODE=M052;CLUMP=B

Γ_{100}	$e^\pm \tau^\mp$	*LF*	$< 1.12 \times 10^{-6}$	CL=90%	DESIG=107
Γ_{101}	$\mu^\pm \tau^\mp$	*LF*	$< 2.3 \times 10^{-7}$	CL=90%	DESIG=104

[a] 1.5 GeV $< m_X <$ 5.0 GeV

LINKAGE=C52

FIT INFORMATION

An overall fit to 3 branching ratios uses 13 measurements to determine 2 parameters. The overall fit has a $\chi^2 = 11.8$ for 11 degrees of freedom.

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

x_7	2
	x_1

$\Upsilon(2S)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

NODE=M052218

$\Gamma(\mu^+\mu^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\qquad \Gamma_4\Gamma_5/\Gamma$

NODE=M052G1
NODE=M052G1

VALUE (eV)	*DOCUMENT ID*		*TECN*	*COMMENT*
6.5±1.5±1.0	KOBEL	92	CBAL	$e^+ e^- \to \mu^+ \mu^-$

$\Gamma(\Upsilon(1S)\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_1\Gamma_5/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
105.4±1.0±4.2	11.8k	[1] AUBERT	08BP	BABR	10.58 $e^+e^- \to \gamma\pi^+\pi^-\ell^+\ell^-$

[1] Using B($\Upsilon(1S) \to e^+e^-$) = (2.38 ± 0.11)% and B($\Upsilon(1S) \to \mu^+\mu^-$) = (2.48 ± 0.05)%.

$\Gamma(\text{hadrons}) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{43}\Gamma_5/\Gamma$

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
0.577±0.009 OUR AVERAGE				
0.581±0.004±0.009	[1] ROSNER	06	CLEO	10.0 $e^+e^- \to$ hadrons
0.552±0.031±0.017	[1] BARU	96	MD1	$e^+e^- \to$ hadrons
0.54 ±0.04 ±0.02	[1] JAKUBOWSKI	88	CBAL	$e^+e^- \to$ hadrons
0.58 ±0.03 ±0.04	[2] GILES	84B	CLEO	$e^+e^- \to$ hadrons
0.60 ±0.12 ±0.07	[2] ALBRECHT	82	DASP	$e^+e^- \to$ hadrons
0.54 ±0.07 $^{+0.09}_{-0.05}$	[2] NICZYPORUK	81C	LENA	$e^+e^- \to$ hadrons
0.41 ±0.18	[2] BOCK	80	CNTR	$e^+e^- \to$ hadrons

[1] Radiative corrections evaluated following KURAEV 85.
[2] Radiative corrections reevaluated by BUCHMUELLER 88 following KURAEV 85.

$\Upsilon(2S)$ PARTIAL WIDTHS

$\Gamma(e^+e^-)$ — Γ_5

VALUE (keV)	DOCUMENT ID
0.612±0.011 OUR EVALUATION	

$\Upsilon(2S)$ BRANCHING RATIOS

$\Gamma(\Upsilon(1S)\pi^+\pi^-)/\Gamma_{total}$ — Γ_1/Γ

Abbreviation MM in the *COMMENT* field below stands for missing mass.

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
17.85±0.26 OUR FIT					
17.92±0.26 OUR AVERAGE					
16.8 ±1.1 ±1.3	906k	[1] LEES	11C	BABR	$e^+e^- \to \pi^+\pi^- X$
17.80±0.05±0.37	170k	[2] LEES	11L	BABR	$\Upsilon(2S) \to \pi^+\pi^-\mu^+\mu^-$
18.02±0.02±0.61	851k	[3] BHARI	09	CLEO	$e^+e^- \to \pi^+\pi^-$ MM
17.22±0.17±0.75	11.8k	[4] AUBERT	08BP	BABR	$e^+e^- \to \gamma\pi^+\pi^-\ell^+\ell^-$
19.2 ±0.2 ±1.0	52.6k	[5] ALEXANDER	98	CLE2	$\pi^+\pi^-\ell^+\ell^-$, $\pi^+\pi^-$ MM
18.1 ±0.5 ±1.0	11.6k	ALBRECHT	87	ARG	$e^+e^- \to \pi^+\pi^-$ MM
16.9 ±4.0		GELPHMAN	85	CBAL	$e^+e^- \to e^+e^-\pi^+\pi^-$
19.1 ±1.2 ±0.6		BESSON	84	CLEO	$\pi^+\pi^-$ MM
18.9 ±2.6		FONSECA	84	CUSB	$e^+e^- \to \ell^+\ell^-\pi^+\pi^-$
21 ±7	7	NICZYPORUK	81B	LENA	$e^+e^- \to \ell^+\ell^-\pi^+\pi^-$

[1] LEES 11C reports [$\Gamma(\Upsilon(2S) \to \Upsilon(1S)\pi^+\pi^-)/\Gamma_{total}$] × [B($\Upsilon(3S) \to \Upsilon(2S)$anything)] = (1.78 ± 0.02 ± 0.11) × 10^{-2} which we divide by our best (shown rounded) value B($\Upsilon(3S) \to \Upsilon(2S)$anything) = (10.6 ± 0.8) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.
[2] Using B($\Upsilon(1S) \to \mu^+\mu^-$) = (2.48 ± 0.05)%.
[3] A weighted average of the inclusive and exclusive results.
[4] Using B($\Upsilon(2S) \to e^+e^-$) = (1.91 ± 0.16)%, B($\Upsilon(2S) \to \mu^+\mu^-$) = (1.93 ± 0.17)% and, $\Gamma_{ee}(\Upsilon(2S))$ = 0.612 ± 0.011 keV.
[5] Using B($\Upsilon(1S) \to e^+e^-$) = (2.52 ± 0.17)% and B($\Upsilon(1S) \to \mu^+\mu^-$) = (2.48 ± 0.07)%.

$\Gamma(\Upsilon(1S)\pi^0\pi^0)/\Gamma_{total}$ — Γ_2/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
8.6 ±0.4 OUR AVERAGE					
8.43±0.16±0.42	38k	[1] BHARI	09	CLEO	$e^+e^- \to \pi^0\pi^0\ell^+\ell^-$
9.2 ±0.6 ±0.8	275	[2] ALEXANDER	98	CLE2	$e^+e^- \to \pi^0\pi^0\ell^+\ell^-$
9.5 ±1.9 ±1.9	25	ALBRECHT	87	ARG	$e^+e^- \to \pi^0\pi^0\ell^+\ell^-$
8.0 ±1.5		GELPHMAN	85	CBAL	$e^+e^- \to \pi^0\pi^0\ell^+\ell^-$
10.3 ±2.3		FONSECA	84	CUSB	$e^+e^- \to \pi^0\pi^0\ell^+\ell^-$

[1] Authors assume B($\Upsilon(1S) \to e^+e^-$) + B($\Upsilon(1S) \to \mu^+\mu^-$) = 4.96%.
[2] Using B($\Upsilon(1S) \to e^+e^-$) = (2.52 ± 0.17)% and B($\Upsilon(1S) \to \mu^+\mu^-$) = (2.48 ± 0.07)%.

NODE=M052G03
NODE=M052G03
NODE=M052G03;LINKAGE=AU
NODE=M052G2
NODE=M052G2
NODE=M052G2;LINKAGE=P
NODE=M052G2;LINKAGE=R
NODE=M052220
NODE=M052W2
NODE=M052W2
→ UNCHECKED ←
NODE=M052225
NODE=M052R4
NODE=M052R4
NODE=M052R4
NODE=M052R4;LINKAGE=ES
NODE=M052R4;LINKAGE=LE
NODE=M052R4;LINKAGE=BH
NODE=M052R4;LINKAGE=AU
NODE=M052R4;LINKAGE=T
NODE=M052R5
NODE=M052R5
NODE=M052R5;LINKAGE=BH
NODE=M052R5;LINKAGE=T

$\Gamma(\Upsilon(1S)\pi^0\pi^0)/\Gamma(\Upsilon(1S)\pi^+\pi^-)$ Γ_2/Γ_1

NODE=M052R21
NODE=M052R21

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.462 ± 0.037	[1] BHARI	09	CLEO	$e^+e^- \to \Upsilon(2S)$

[1] Not independent of other values reported by BHARI 09.

NODE=M052R21;LINKAGE=BH

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

NODE=M052R3
NODE=M052R3

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
2.00±0.21 OUR AVERAGE					
$2.00\pm0.12\pm0.18$	22k	[1] BESSON	07	CLEO	$e^+e^- \to \Upsilon(2S) \to \tau^+\tau^-$
$1.7\ \pm1.5\ \pm0.6$		HAAS	84B	CLEO	$e^+e^- \to \tau^+\tau^-$

[1] BESSON 07 reports $[\Gamma(\Upsilon(2S) \to \tau^+\tau^-)/\Gamma_{total}]$ / $[B(\Upsilon(2S) \to \mu^+\mu^-)] = 1.04 \pm 0.04 \pm 0.05$ which we multiply by our best (shown rounded) value $B(\Upsilon(2S) \to \mu^+\mu^-) = (1.93 \pm 0.17) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

NODE=M052R3;LINKAGE=BE

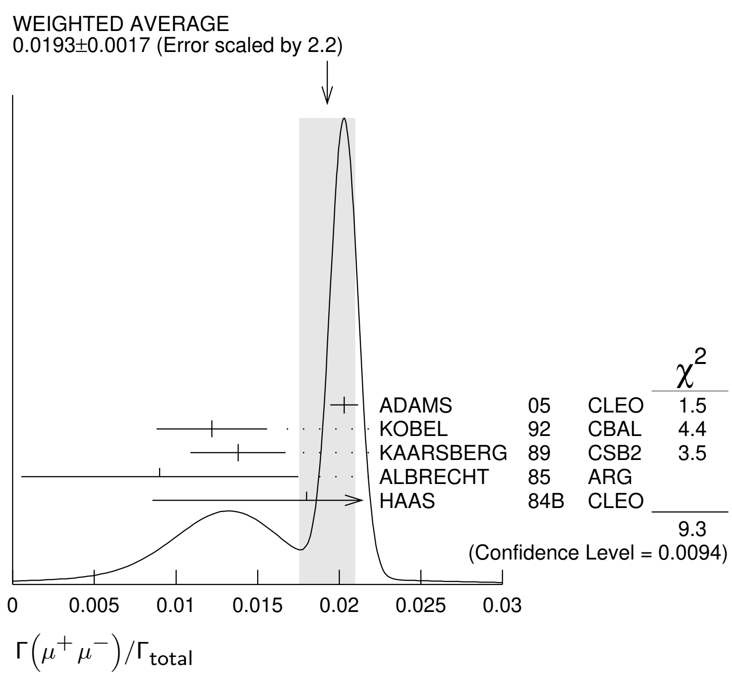
$\Gamma(\mu^+\mu^-)/\Gamma_{total}$ Γ_4/Γ

NODE=M052R1
NODE=M052R1

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.0193±0.0017 OUR AVERAGE Error includes scale factor of 2.2. See the ideogram below.						
$0.0203\pm0.0003\pm0.0008$		120k	ADAMS	05	CLEO	$e^+e^- \to \mu^+\mu^-$
$0.0122\pm0.0028\pm0.0019$			[1] KOBEL	92	CBAL	$e^+e^- \to \mu^+\mu^-$
$0.0138\pm0.0025\pm0.0015$			KAARSBERG	89	CSB2	$e^+e^- \to \mu^+\mu^-$
$0.009\ \pm0.006\ \pm0.006$			[2] ALBRECHT	85	ARG	$e^+e^- \to \mu^+\mu^-$
$0.018\ \pm0.008\ \pm0.005$			HAAS	84B	CLEO	$e^+e^- \to \mu^+\mu^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.038	90		NICZYPORUK	81C	LENA	$e^+e^- \to \mu^+\mu^-$

[1] Taking into account interference between the resonance and continuum.
[2] Re-evaluated using $B(\Upsilon(1S) \to \mu^+\mu^-) = 0.026$.

NODE=M052R1;LINKAGE=A
NODE=M052R1;LINKAGE=R



$\Gamma(\tau^+\tau^-)/\Gamma(\mu^+\mu^-)$ Γ_3/Γ_4

NODE=M052R17
NODE=M052R17

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.04±0.04±0.05	22k	BESSON	07	CLEO	$e^+e^- \to \Upsilon(2S)$

$\Gamma(\Upsilon(1S)\pi^0)/\Gamma_{total}$ Γ_6/Γ

NODE=M052R10
NODE=M052R10

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<\ 4$	90	[1] TAMPONI	13	BELL	$e^+e^- \to \Upsilon(1S)\pi^0$
$<\ 18$	90	[2] HE	08A	CLEO	$e^+e^- \to \ell^+\ell^-\gamma\gamma$
<110	90	ALEXANDER	98	CLE2	$e^+e^- \to \ell^+\ell^-\gamma\gamma$
<800	90	LURZ	87	CBAL	$e^+e^- \to \ell^+\ell^-\gamma\gamma$

[1] TAMPONI 13 reports $[\Gamma(\Upsilon(2S) \to \Upsilon(1S)\pi^0)/\Gamma_{total}] / [B(\Upsilon(2S) \to \Upsilon(1S)\pi^+\pi^-)] < 2.3 \times 10^{-4}$ which we multiply by our best (shown rounded) value $B(\Upsilon(2S) \to \Upsilon(1S)\pi^+\pi^-) = 17.85 \times 10^{-2}$. NODE=M052R10;LINKAGE=TA

[2] Authors assume $B(\Upsilon(1S) \to e^+e^-) + B(\Upsilon(1S) \to \mu^+\mu^-) = 4.96\%$. NODE=M052R10;LINKAGE=HE

$\Gamma(\Upsilon(1S)\pi^0)/\Gamma(\Upsilon(1S)\pi^+\pi^-)$ — Γ_6/Γ_1

NODE=M052R09
NODE=M052R09

VALUE (units 10^{-4})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<2.3	90	TAMPONI	13	BELL	$e^+e^- \to \Upsilon(1S)\pi^0$

$\Gamma(\Upsilon(1S)\eta)/\Gamma_{total}$ — Γ_7/Γ

NODE=M052R6
NODE=M052R6

VALUE (units 10^{-4})	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2.9 ±0.4 OUR FIT	Error includes scale factor of 2.0.					
2.9 ±0.4 OUR AVERAGE	Error includes scale factor of 1.9. See the ideogram below.					
2.39±0.31±0.14		112	[1] LEES	11L	BABR	$\Upsilon(2S) \to \ell^+\ell^-\eta$
$2.1\ ^{+0.7}_{-0.6}\ \pm0.3$		14	[2] HE	08A	CLEO	$e^+e^- \to \ell^+\ell^-\eta$
• • • We use the following data for averages but not for fits. • • •						
3.55±0.32±0.05		241	[3] TAMPONI	13	BELL	$e^+e^- \to \Upsilon(1S)\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 9	90		[1,4] AUBERT	08BP	BABR	$e^+e^- \to \gamma\pi^+\pi^-\pi^0\ell^+\ell^-$
< 28	90		ALEXANDER	98	CLE2	$e^+e^- \to \ell^+\ell^-\eta$
< 50	90		ALBRECHT	87	ARG	$e^+e^- \to \pi^+\pi^-\ell^+\ell^-$ MM
< 70	90		LURZ	87	CBAL	$e^+e^- \to \ell^+\ell^-(\gamma\gamma,\ 3\pi^0)$
< 100	90		BESSON	84	CLEO	$e^+e^- \to \pi^+\pi^-\ell^+\ell^-$ MM
< 20	90		FONSECA	84	CUSB	$e^+e^- \to \ell^+\ell^-(\gamma\gamma,\pi^+\pi^-\pi^0)$

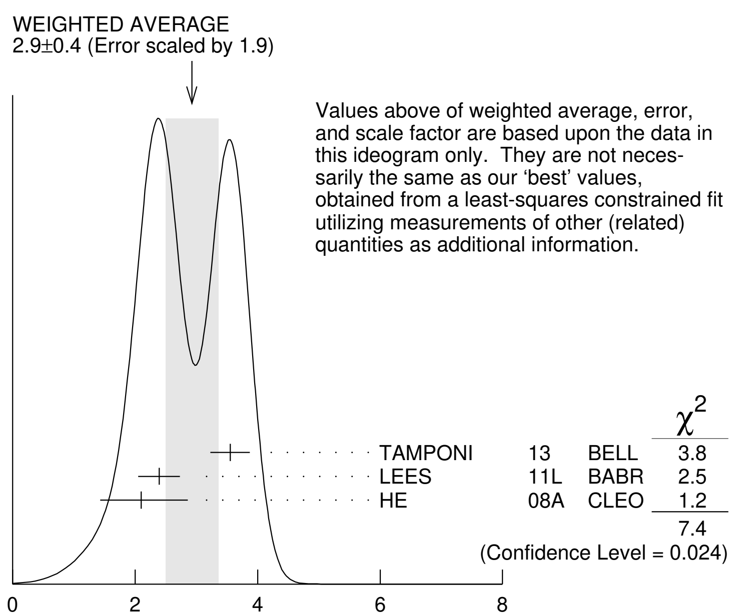
NOTFITTED

[1] Using $B(\Upsilon(1S) \to e^+e^-) = (2.38 \pm 0.11)\%$ and $B(\Upsilon(1S) \to \mu^+\mu^-) = (2.48 \pm 0.05)\%$. NODE=M052R6;LINKAGE=AU

[2] Authors assume $B(\Upsilon(1S) \to e^+e^-) + B(\Upsilon(1S) \to \mu^+\mu^-) = 4.96\%$. NODE=M052R6;LINKAGE=HE

[3] TAMPONI 13 reports $[\Gamma(\Upsilon(2S) \to \Upsilon(1S)\eta)/\Gamma_{total}] / [B(\Upsilon(2S) \to \Upsilon(1S)\pi^+\pi^-)] = (1.99 \pm 0.14 \pm 0.11) \times 10^{-3}$ which we multiply by our best (shown rounded) value $B(\Upsilon(2S) \to \Upsilon(1S)\pi^+\pi^-) = (17.85 \pm 0.26) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value. NODE=M052R6;LINKAGE=TA

[4] Using $\Gamma_{ee}(\Upsilon(2S)) = 0.612 \pm 0.011$ keV. NODE=M052R6;LINKAGE=UB



$\Gamma(\Upsilon(1S)\eta)/\Gamma_{total}$ (units 10^{-4})

$\Gamma(\Upsilon(1S)\eta)/\Gamma(\Upsilon(1S)\pi^+\pi^-)$ — Γ_7/Γ_1

NODE=M052R22
NODE=M052R22

VALUE (units 10^{-3})	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.64±0.25 OUR FIT	Error includes scale factor of 2.0.					
1.99±0.14±0.11		241	TAMPONI	13	BELL	$e^+e^- \to \Upsilon(1S)\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1.35±0.17±0.08			[1] LEES	11L	BABR	$\Upsilon(2S) \to (\pi^+\pi^-)(\gamma\gamma)\mu^+\mu^-$
< 5.2	90		[2] AUBERT	08BP	BABR	$e^+e^- \to \gamma\pi^+\pi^-(\pi^0)\ell^+\ell^-$

[1] Not independent of other values reported by LEES 11L. NODE=M052R22;LINKAGE=LE
[2] Not independent of other values reported by AUBERT 08BP. NODE=M052R22;LINKAGE=AU

$\Gamma(\Upsilon(1S)\pi^0)/\Gamma(\Upsilon(1S)\eta)$ — Γ_6/Γ_7

NODE=M052R23
NODE=M052R23

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.13	90	TAMPONI	13	BELL	$e^+e^- \to \Upsilon(1S)\pi^0$

$\Gamma(J/\psi(1S)$ anything$)/\Gamma_{total}$ — Γ_8/Γ

NODE=M052R16
NODE=M052R16

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.006	90	MASCHMANN	90	CBAL	$e^+e^- \to$ hadrons

$\Gamma(J/\psi(1S)\eta_c)/\Gamma_{total}$ — Γ_9/Γ

NODE=M052R53
NODE=M052R53

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.4 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to J/\psi X$

$\Gamma(J/\psi(1S)\chi_{c0})/\Gamma_{total}$ — Γ_{10}/Γ

NODE=M052R54
NODE=M052R54

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.4 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to J/\psi X$

$\Gamma(J/\psi(1S)\chi_{c1})/\Gamma_{total}$ — Γ_{11}/Γ

NODE=M052R55
NODE=M052R55

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.2 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to J/\psi X$

$\Gamma(J/\psi(1S)\chi_{c2})/\Gamma_{total}$ — Γ_{12}/Γ

NODE=M052R56
NODE=M052R56

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.0 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to J/\psi X$

$\Gamma(J/\psi(1S)\eta_c(2S))/\Gamma_{total}$ — Γ_{13}/Γ

NODE=M052R57
NODE=M052R57

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.5 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to J/\psi X$

$\Gamma(J/\psi(1S)X(3940))/\Gamma_{total}$ — Γ_{14}/Γ

NODE=M052R58
NODE=M052R58

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.0 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to J/\psi X$

$\Gamma(J/\psi(1S)X(4160))/\Gamma_{total}$ — Γ_{15}/Γ

NODE=M052R59
NODE=M052R59

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.0 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to J/\psi X$

$\Gamma(\chi_{c1}$ anything$)/\Gamma_{total}$ — Γ_{16}/Γ

NODE=M052R00
NODE=M052R00

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
$2.24 \pm 0.44 \pm 0.20$	376	JIA	17	BELL	$\Upsilon(2S) \to \gamma J/\psi(1S)$

$\Gamma(\chi_{c1}(1P)^0 X_{tetra})/\Gamma_{total}$ — Γ_{17}/Γ

NODE=M052R69
NODE=M052R69

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<36.7 \times 10^{-6}$	90	[1] JIA	17A	BELL	$e^+e^- \to$ hadrons

[1] For a tetraquark state X_{tetra}, with mass in the range 1.16–2.46 GeV and width in the range 0–0.3 GeV. Measured 90% CL limits as a function of X_{tetra} mass and width range from 4.4×10^{-6} to 36.7×10^{-6}. NODE=M052R69;LINKAGE=A

$\Gamma(\chi_{c2}$ anything$)/\Gamma_{total}$ — Γ_{18}/Γ

NODE=M052R67
NODE=M052R67

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
$2.28 \pm 0.73 \pm 0.34$	JIA	17	BELL	$\Upsilon(2S) \to \gamma J/\psi(1S)$

$\Gamma(\psi(2S)\eta_c)/\Gamma_{total}$ — Γ_{19}/Γ

NODE=M052R60
NODE=M052R60

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.1 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to \psi(2S)X$

$\Gamma(\psi(2S)\chi_{c0})/\Gamma_{total}$ — Γ_{20}/Γ

NODE=M052R61
NODE=M052R61

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.7 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to \psi(2S)X$

$\Gamma(\psi(2S)\chi_{c1})/\Gamma_{total}$ — Γ_{21}/Γ

NODE=M052R62
NODE=M052R62

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.5 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to \psi(2S)X$

$\Gamma(\psi(2S)\chi_{c2})/\Gamma_{total}$ Γ_{22}/Γ

NODE=M052R63

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.9 × 10^{-6}	90	YANG	14	BELL	$e^+ e^- \rightarrow \psi(2S) X$

$\Gamma(\psi(2S)\eta_c(2S))/\Gamma_{total}$ Γ_{23}/Γ

NODE=M052R64

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.3 × 10^{-6}	90	YANG	14	BELL	$e^+ e^- \rightarrow \psi(2S) X$

$\Gamma(\psi(2S)X(3940))/\Gamma_{total}$ Γ_{24}/Γ

NODE=M052R65

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.9 × 10^{-6}	90	YANG	14	BELL	$e^+ e^- \rightarrow \psi(2S) X$

$\Gamma(\psi(2S)X(4160))/\Gamma_{total}$ Γ_{25}/Γ

NODE=M052R66

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.9 × 10^{-6}	90	YANG	14	BELL	$e^+ e^- \rightarrow \psi(2S) X$

$\Gamma(T_{c\overline{c}1}(3900)^+ T_{c\overline{c}1}(3900)^-)/\Gamma_{total}$ Γ_{26}/Γ

NODE=M052R71

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.0 × 10^{-6}	90	[1] JIA	18	BELL	$\Upsilon(2S) \rightarrow J/\psi \pi^{\pm} X$

[1] Assuming B($T_{c\overline{c}1}(3900)^{\pm} \rightarrow J/\psi \pi^{\pm}$) = 1.

NODE=M052R71;LINKAGE=A

$\Gamma(T_{c\overline{c}1}(4200)^+ T_{c\overline{c}1}(4200)^-)/\Gamma_{total}$ Γ_{27}/Γ

NODE=M052R72

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<16.7 × 10^{-6}	90	[1] JIA	18	BELL	$\Upsilon(1S) \rightarrow J/\psi \pi^{\pm} X$

[1] Assuming B($T_{c\overline{c}1}(4200)^{\pm} \rightarrow J/\psi \pi^{\pm}$) = 1

NODE=M052R72;LINKAGE=A

$\Gamma(T_{c\overline{c}1}(3900)^{\pm} T_{c\overline{c}1}(4200)^{\mp})/\Gamma_{total}$ Γ_{28}/Γ

NODE=M052R73

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<7.3 × 10^{-6}	90	[1] JIA	18	BELL	$\Upsilon(2S) \rightarrow J/\psi \pi^{\pm} X$

[1] Assuming B($T_{c\overline{c}1}(4200)^{\pm} \rightarrow J/\psi \pi^{\pm}$) = 1 = B($T_{c\overline{c}1}(3900)^{\pm} \rightarrow J/\psi \pi^{\pm}$).

NODE=M052R73;LINKAGE=A

$\Gamma(T_{c\overline{c}}(4050)^+ T_{c\overline{c}}(4050)^-)/\Gamma_{total}$ Γ_{29}/Γ

NODE=M052R74

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<13.5 × 10^{-6}	90	[1] JIA	18	BELL	$\Upsilon(2S) \rightarrow \chi_{c1}(1P) \pi^{\pm} X$

[1] Assuming B($T_{c\overline{c}}(4050)^{\pm} \rightarrow \chi_{c1}(1P) \pi^{\pm}$)

NODE=M052R74;LINKAGE=A

$\Gamma(T_{c\overline{c}}(4250)^+ T_{c\overline{c}}(4250)^-)/\Gamma_{total}$ Γ_{30}/Γ

NODE=M052R75

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<26.7 × 10^{-6}	90	[1] JIA	18	BELL	$\Upsilon(2S) \rightarrow \chi_{c1}(1P) \pi^{\pm} X$

[1] Assuming B($T_{c\overline{c}}(4250)^{\pm} \rightarrow \chi_{c1}(1P) \pi^{\pm}$) = 1

NODE=M052R75;LINKAGE=A

$\Gamma(T_{c\overline{c}}(4050)^{\pm} T_{c\overline{c}}(4250)^{\mp})/\Gamma_{total}$ Γ_{31}/Γ

NODE=M052R76

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<27.2 × 10^{-6}	90	[1] JIA	18	BELL	$\Upsilon(2S) \rightarrow \chi_{c1}(1P) \pi^{\pm} X$

[1] Assuming B($T_{c\overline{c}}(4050)^{\pm} \rightarrow \chi_{c1}(1P) \pi^{\pm}$) = 1 = B($T_{c\overline{c}}(4250)^{\pm} \rightarrow \chi_{c1}(1P) \pi^{\pm}$)

NODE=M052R76;LINKAGE=A

$\Gamma(T_{c\overline{c}1}(4430)^+ T_{c\overline{c}1}(4430)^-)/\Gamma_{total}$ Γ_{32}/Γ

NODE=M052R77

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<20.3 × 10^{-6}	90	[1] JIA	18	BELL	$\Upsilon(2S) \rightarrow \psi(2S) \pi^{\pm} X$

[1] Assuming B($T_{c\overline{c}1}(4430)^{\pm} \rightarrow \psi(2P) \pi^{\pm}$) = 1

NODE=M052R77;LINKAGE=A

$\Gamma(T_{c\overline{c}}(4055)^{\pm} T_{c\overline{c}}(4055)^{\mp})/\Gamma_{total}$ Γ_{33}/Γ

NODE=M052R79

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<11.1 × 10^{-6}	90	[1] JIA	18	BELL	$\Upsilon(2S) \rightarrow \psi(2S) \pi^{\pm} X$

[1] Assuming B($T_{c\overline{c}}(4055)^{\pm} \rightarrow \psi(2S) \pi^{\pm}$) = 1

NODE=M052R79;LINKAGE=A

$\Gamma(T_{c\overline{c}}(4055)^{\pm} T_{c\overline{c}1}(4430)^{\mp})/\Gamma_{total}$ Γ_{34}/Γ

NODE=M052R80

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<21.1 × 10^{-6}	90	[1] JIA	18	BELL	$\Upsilon(2S) \rightarrow \psi(2S) \pi^{\pm} X$

[1] Assuming B($T_{c\overline{c}}(4055)^{\pm} \rightarrow \psi(2S) \pi^{\pm}$) = 1 = B($T_{c\overline{c}1}(4430)^{\pm} \rightarrow \psi(2S) \pi^{\pm}$)

NODE=M052R80;LINKAGE=A

$\Gamma(P_{c\bar{c}s}(4459)/\overline{P}_{c\bar{c}s}(4459)\,\text{anything})/\Gamma_{\text{total}}$ — Γ_{35}/Γ

NODE=M052R94

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
2.9±1.7±0.4	21	[1] ADACHI	25A	BELL	$e^+e^- \to \Upsilon(2S)$

[1] 21 ± 5 corresponds to the number of $P_{c\bar{c}s}(4459)$ events in the combined $\Upsilon(1S)$ and $\Upsilon(2S)$ samples.

NODE=M052R94;LINKAGE=A

$\Gamma(P_{c\bar{c}s}(4338)/\overline{P}_{c\bar{c}s}(4338)\,\text{anything})/\Gamma_{\text{total}}$ — Γ_{36}/Γ

NODE=M052R96

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.6 × 10⁻⁶	90	ADACHI	25A	BELL	$e^+e^- \to \Upsilon(2S)$

$\Gamma(P_c(4457)\,\text{anything},\ P_c(4457) \to pJ/\psi(1S))/\Gamma_{\text{total}}$ — Γ_{37}/Γ

NODE=M052P00

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.6 \times 10^{-6}$	90	DONG	25	BELL	$e^+e^- \to \Upsilon(2S)$

$\Gamma(P_c(4440)\,\text{anything},\ P_c(4440) \to pJ/\psi(1S))/\Gamma_{\text{total}}$ — Γ_{38}/Γ

NODE=M052R99

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<11.8 \times 10^{-6}$	90	DONG	25	BELL	$e^+e^- \to \Upsilon(2S)$

$\Gamma(P_c(4312)\,\text{anything},\ P_c(4312) \to pJ/\psi(1S))/\Gamma_{\text{total}}$ — Γ_{39}/Γ

NODE=M052R98

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7.2 \times 10^{-6}$	90	DONG	25	BELL	$e^+e^- \to \Upsilon(2S)$

$\Gamma(p/\overline{p}J/\psi(1S)\,\text{anything})/\Gamma_{\text{total}}$ — Γ_{40}/Γ

NODE=M052R97

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
4.3±0.5±0.4	564	[1] DONG	25	BELL	$e^+e^- \to \Upsilon(2S)$

[1] The contribution from cascade $\Upsilon(1S)$ decays has been removed.

NODE=M052R97;LINKAGE=A

$\Gamma(J/\psi(1S)\Lambda/\overline{\Lambda}\,\text{anything})/\Gamma_{\text{total}}$ — Γ_{41}/Γ

NODE=M052R95

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
22.3±5.7±3.1	140	ADACHI	25A	BELL	$e^+e^- \to \Upsilon(2S)$

$\Gamma(\overline{^2H}\ \text{anything})/\Gamma_{\text{total}}$ — Γ_{42}/Γ

NODE=M052R18

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
$2.78^{+0.30}_{-0.26}$ OUR AVERAGE		Error includes scale factor of 1.2.			
$2.64\pm0.11^{+0.26}_{-0.21}$		LEES	14G	BABR	$e^+e^- \to \overline{^2H}\,X$
3.37±0.50±0.25	58	ASNER	07	CLEO	$e^+e^- \to \overline{^2H}\,X$

$\Gamma(ggg)/\Gamma_{\text{total}}$ — Γ_{44}/Γ

NODE=M052R01

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
58.8±1.2	6M	[1] BESSON	06A	CLEO	$\Upsilon(2S) \to$ hadrons

[1] Calculated using the value $\Gamma(\gamma gg)/\Gamma(ggg) = (3.18 \pm 0.04 \pm 0.22 \pm 0.41)\%$ from BESSON 06A and PDG 08 values of $B(\pi^+\pi^-\,\Upsilon(1S)) = (18.1\pm0.4)\%$, $B(\pi^0\pi^0\,\Upsilon(1S)) = (8.6\pm0.4)\%$, $B(\mu^+\mu^-) = (1.93\pm0.17)\%$, and $R_{\text{hadrons}} = 3.51$. The statistical error is negligible and the systematic error is partially correlated with that of $\Gamma(\gamma gg)/\Gamma_{\text{total}}$ measurement of BESSON 06A.

NODE=M052R01;LINKAGE=BE

$\Gamma(\gamma gg)/\Gamma(ggg)$ — Γ_{45}/Γ_{44}

NODE=M052R03

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
3.18±0.04±0.47	6M	BESSON	06A	CLEO	$\Upsilon(2S) \to (\gamma +)$ hadrons

$\Gamma(\phi K^+K^-)/\Gamma_{\text{total}}$ — Γ_{46}/Γ

NODE=M052R43

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
1.58±0.33±0.18	58	SHEN	12A	BELL	$\Upsilon(1S) \to 2(K^+K^-)$

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

NODE=M052R44

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<2.58	90	SHEN	12A	BELL	$\Upsilon(1S) \to 2(\pi^+\pi^-)\pi^0$

$\Gamma(K^*(892)^0K^-\pi^+ + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{48}/Γ

NODE=M052R45

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
2.32±0.40±0.54	135	SHEN	12A	BELL	$\Upsilon(1S) \to K^+K^-\pi^+\pi^-$

$\Gamma(\phi f_2'(1525))/\Gamma_{total}$ Γ_{49}/Γ

NODE=M052R46
NODE=M052R46

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<1.33	90	SHEN	12A	BELL	$\Upsilon(1S) \to 2(K^+K^-)$

$\Gamma(\omega f_2(1270))/\Gamma_{total}$ Γ_{50}/Γ

NODE=M052R47
NODE=M052R47

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<0.57	90	SHEN	12A	BELL	$\Upsilon(1S) \to 2(\pi^+\pi^-)\pi^0$

$\Gamma(\rho(770)a_2(1320))/\Gamma_{total}$ Γ_{51}/Γ

NODE=M052R48
NODE=M052R48

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<0.88	90	SHEN	12A	BELL	$\Upsilon(1S) \to 2(\pi^+\pi^-)\pi^0$

$\Gamma(K^*(892)^0\overline{K}_2^*(1430)^0 + \text{c.c.})/\Gamma_{total}$ Γ_{52}/Γ

NODE=M052R49
NODE=M052R49

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
1.53±0.52±0.19	32	SHEN	12A	BELL	$\Upsilon(1S) \to K^+K^-\pi^+\pi^-$

$\Gamma(K_1(1270)^\pm K^\mp)/\Gamma_{total}$ Γ_{53}/Γ

NODE=M052R50
NODE=M052R50

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<3.22	90	SHEN	12A	BELL	$\Upsilon(1S) \to K^+K^-\pi^+\pi^-$

$\Gamma(K_1(1400)^\pm K^\mp)/\Gamma_{total}$ Γ_{54}/Γ

NODE=M052R51
NODE=M052R51

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<0.83	90	SHEN	12A	BELL	$\Upsilon(1S) \to K^+K^-\pi^+\pi^-$

$\Gamma(b_1(1235)^\pm\pi^\mp)/\Gamma_{total}$ Γ_{55}/Γ

NODE=M052R52
NODE=M052R52

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<0.40	90	SHEN	12A	BELL	$\Upsilon(1S) \to 2(\pi^+\pi^-)\pi^0$

$\Gamma(\rho\pi)/\Gamma_{total}$ Γ_{56}/Γ

NODE=M052R27
NODE=M052R27

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<1.16	90	SHEN	13	BELL	$\Upsilon(2S) \to \pi^+\pi^-\pi^0$

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{total}$ Γ_{57}/Γ

NODE=M052R28
NODE=M052R28

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<0.80	90	SHEN	13	BELL	$\Upsilon(2S) \to \pi^+\pi^-\pi^0$

$\Gamma(\omega\pi^0)/\Gamma_{total}$ Γ_{58}/Γ

NODE=M052R29
NODE=M052R29

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<1.63	90	SHEN	13	BELL	$\Upsilon(2S) \to \pi^+\pi^-\pi^0\pi^0$

$\Gamma(\pi^+\pi^-\pi^0\pi^0)/\Gamma_{total}$ Γ_{59}/Γ

NODE=M052R30
NODE=M052R30

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
13.0±1.9±2.1	261 ± 37	SHEN	13	BELL	$\Upsilon(2S) \to \pi^+\pi^-\pi^0\pi^0$

$\Gamma(K_S^0 K^+\pi^- + \text{c.c.})/\Gamma_{total}$ Γ_{60}/Γ

NODE=M052R40
NODE=M052R40

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.14±0.30±0.13		40 ± 10	SHEN	13	BELL	$\Upsilon(2S) \to K_S^0 K^-\pi^+$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<3.2	90		[1] DOBBS	12A		$\Upsilon(2S) \to K_S^0 K^-\pi^+$

[1] Obtained by analyzing CLEO III data but not authored by the CLEO Collaboration.

NODE=M052R40;LINKAGE=DO

$\Gamma(K^*(892)^0\overline{K}^0 + \text{c.c.})/\Gamma_{total}$ Γ_{61}/Γ

NODE=M052R41
NODE=M052R41

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<4.22	90	SHEN	13	BELL	$\Upsilon(2S) \to K_S^0 K^-\pi^+$

$\Gamma(K^*(892)^- K^+ + \text{c.c.})/\Gamma_{total}$ Γ_{62}/Γ

NODE=M052R42
NODE=M052R42

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<1.45	90	SHEN	13	BELL	$\Upsilon(2S) \to K_S^0 K^-\pi^+$

$\Gamma(f_1(1285)\,\text{anything})/\Gamma_{total}$ Γ_{63}/Γ

NODE=M052R68
NODE=M052R68

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
2.20±1.50±0.63	2.9k	JIA	17A	BELL	$e^+e^- \to$ hadrons

$\Gamma(f_1(1285) X_{tetra})/\Gamma_{total}$ Γ_{64}/Γ

NODE=M052R70
NODE=M052R70

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<64.7 × 10^{-6}	90	[1] JIA	17A	BELL	$e^+ e^- \rightarrow$ hadrons

[1] For a tetraquark state X_{tetra}, with mass in the range 1.16–2.46 GeV and width in the range 0–0.3 GeV. Measured 90% CL limits as a function of X_{tetra} mass and width range from 7.8×10^{-6} to 64.7×10^{-6}.

NODE=M052R70;LINKAGE=A

$\Gamma(D_s^+ D_{s1}(2536)^-,\ D_{s1}^- \rightarrow K^- D^*(2007)^0)/\Gamma_{total}$ Γ_{66}/Γ

NODE=M052R86
NODE=M052R86

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.6±0.3±0.2	GAO	23	BELL	$e^+ e^-$ at 10.52 GeV

$\Gamma(D_s^+ D_{s1}(2536)^-,\ D_{s1}^- \rightarrow K_S^0 D^*(2010)^-)/\Gamma_{total}$ Γ_{67}/Γ

NODE=M052R87
NODE=M052R87

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
0.84±0.18±0.15	GAO	23	BELL	$e^+ e^-$ at 10.52 GeV

$\Gamma(D_s^{*+} D_{s1}(2536)^-,\ D_{s1}^- \rightarrow K^- D^*(2007)^0)/\Gamma_{total}$ Γ_{69}/Γ

NODE=M052R88
NODE=M052R88

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.4±0.4±0.2	GAO	23	BELL	$e^+ e^-$ at 10.52 GeV

$\Gamma(D_s^{*+} D_{s1}(2536)^-,\ D_{s1}^- \rightarrow K_S^0 D^*(2010)^-)/\Gamma_{total}$ Γ_{70}/Γ

NODE=M052R89
NODE=M052R89

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
0.82±0.25±0.19	GAO	23	BELL	$e^+ e^-$ at 10.52 GeV

$\Gamma(D_s^+ D_{s2}^*(2573)^-,\ D_{s2}^{*-} \rightarrow K^- D^0)/\Gamma_{total}$ Γ_{72}/Γ

NODE=M052R90
NODE=M052R90

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.4±0.4±0.2	GAO	23	BELL	$e^+ e^-$ at 10.52 GeV

$\Gamma(D_s^+ D_{s2}^*(2573)^-,\ D_{s2}^{*-} \rightarrow K_S^0 D^-)/\Gamma_{total}$ Γ_{73}/Γ

NODE=M052R91
NODE=M052R91

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
0.69±0.20±0.22	GAO	23	BELL	$e^+ e^-$ at 10.52 GeV

$\Gamma(D_s^{*+} D_{s2}^*(2573)^-,\ D_{s2}^{*-} \rightarrow K^- D^0)/\Gamma_{total}$ Γ_{75}/Γ

NODE=M052R92
NODE=M052R92

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
0.9±0.5±0.2	GAO	23	BELL	$e^+ e^-$ at 10.52 GeV

$\Gamma(D_s^{*+} D_{s2}^*(2573)^-,\ D_{s2}^{*-} \rightarrow K_S^0 D^-)/\Gamma_{total}$ Γ_{76}/Γ

NODE=M052R93
NODE=M052R93

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
0.54±0.31±0.47	GAO	23	BELL	$e^+ e^-$ at 10.52 GeV

Γ(Sum of 100 exclusive modes)$/\Gamma_{total}$ Γ_{77}/Γ

NODE=M052R08
NODE=M052R08

VALUE (units 10^{-2})	DOCUMENT ID		COMMENT
0.29±0.03	[1,2] DOBBS	12A	$\Upsilon(2S) \rightarrow$ hadrons

[1] DOBBS 12A presents individual exclusive branching fractions or upper limits for 100 modes of four to ten pions, kaons, or protons.

NODE=M052R08;LINKAGE=DO

[2] Obtained by analyzing CLEO III data but not authored by the CLEO Collaboration.

NODE=M052R08;LINKAGE=NC

$\Gamma(\gamma \chi_{b1}(1P))/\Gamma_{total}$ Γ_{78}/Γ

NODE=M052R8
NODE=M052R8

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.069 ±0.004 OUR AVERAGE					
0.0693±0.0012±0.0041	407k	ARTUSO	05	CLEO	$e^+ e^- \rightarrow \gamma X$
0.069 ±0.005 ±0.009		EDWARDS	99	CLE2	$\Upsilon(2S) \rightarrow \gamma \chi(1P)$
0.091 ±0.018 ±0.022		ALBRECHT	85E	ARG	$e^+ e^- \rightarrow \gamma$conv. X
0.065 ±0.007 ±0.012		NERNST	85	CBAL	$e^+ e^- \rightarrow \gamma$X
0.080 ±0.017 ±0.016		HAAS	84	CLEO	$e^+ e^- \rightarrow \gamma$conv. X
0.059 ±0.014		KLOPFEN...	83	CUSB	$e^+ e^- \rightarrow \gamma$X

$\Gamma(\gamma \chi_{b2}(1P))/\Gamma_{total}$ Γ_{79}/Γ

NODE=M052R7
NODE=M052R7

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0715±0.0035 OUR AVERAGE					
0.0724±0.0011±0.0040	410k	ARTUSO	05	CLEO	$e^+ e^- \rightarrow \gamma X$
0.074 ±0.005 ±0.008		EDWARDS	99	CLE2	$\Upsilon(2S) \rightarrow \gamma \chi(1P)$
0.098 ±0.021 ±0.024		ALBRECHT	85E	ARG	$e^+ e^- \rightarrow \gamma$conv. X
0.058 ±0.007 ±0.010		NERNST	85	CBAL	$e^+ e^- \rightarrow \gamma$X
0.102 ±0.018 ±0.021		HAAS	84	CLEO	$e^+ e^- \rightarrow \gamma$conv. X
0.061 ±0.014		KLOPFEN...	83	CUSB	$e^+ e^- \rightarrow \gamma$X

$\Gamma(\gamma\chi_{b0}(1P))/\Gamma_{total}$ — Γ_{80}/Γ

NODE=M052R9
NODE=M052R9

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.038 ±0.004 OUR AVERAGE					
0.0375±0.0012±0.0047	198k	ARTUSO	05	CLEO	$e^+e^- \to \gamma X$
0.034 ±0.005 ±0.006		EDWARDS	99	CLE2	$\Upsilon(2S) \to \gamma\chi(1P)$
0.064 ±0.014 ±0.016		ALBRECHT	85E	ARG	$e^+e^- \to \gamma$conv. X
0.036 ±0.008 ±0.009		NERNST	85	CBAL	$e^+e^- \to \gamma$X
0.044 ±0.023 ±0.009		HAAS	84	CLEO	$e^+e^- \to \gamma$conv. X
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.035 ±0.014		KLOPFEN...	83	CUSB	$e^+e^- \to \gamma$X

$\Gamma(\gamma f_0(1710))/\Gamma_{total}$ — Γ_{81}/Γ

NODE=M052R13
NODE=M052R13

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<59	90	[1] ALBRECHT	89	ARG	$\Upsilon(2S) \to \gamma K^+K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 5.9	90	[2] ALBRECHT	89	ARG	$\Upsilon(2S) \to \gamma\pi^+\pi^-$

OCCUR=2

[1] Re-evaluated assuming B($f_0(1710) \to K^+K^-$) = 0.19.

NODE=M052R13;LINKAGE=M

[2] Includes unknown branching ratio of $f_0(1710) \to \pi^+\pi^-$.

NODE=M052R13;LINKAGE=N

$\Gamma(\gamma f'_2(1525))/\Gamma_{total}$ — Γ_{82}/Γ

NODE=M052R12
NODE=M052R12

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<53	90	[1] ALBRECHT	89	ARG	$\Upsilon(2S) \to \gamma K^+K^-$

[1] Re-evaluated assuming B($f'_2(1525) \to K\overline{K}$) = 0.71.

NODE=M052R12;LINKAGE=L

$\Gamma(\gamma f_2(1270))/\Gamma_{total}$ — Γ_{83}/Γ

NODE=M052R11
NODE=M052R11

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<24.1	90	[1] ALBRECHT	89	ARG	$\Upsilon(2S) \to \gamma\pi^+\pi^-$

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

NODE=M052R11;LINKAGE=K

$\Gamma(\gamma f_J(2220))/\Gamma_{total}$ — Γ_{84}/Γ

NODE=M052R14
NODE=M052R14

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<6.8	90	[1] ALBRECHT	89	ARG	$\Upsilon(2S) \to \gamma K^+K^-$

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

NODE=M052R14;LINKAGE=S

$\Gamma(\gamma\eta_c(1S))/\Gamma_{total}$ — Γ_{85}/Γ

NODE=M052R31
NODE=M052R31

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.7\times10^{-5}$	90	WANG	11B	BELL	$\Upsilon(2S) \to \gamma X$

$\Gamma(\gamma\chi_{c0})/\Gamma_{total}$ — Γ_{86}/Γ

NODE=M052R32
NODE=M052R32

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.0\times10^{-4}$	90	WANG	11B	BELL	$\Upsilon(2S) \to \gamma X$

$\Gamma(\gamma\chi_{c1})/\Gamma_{total}$ — Γ_{87}/Γ

NODE=M052R33
NODE=M052R33

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.6\times10^{-6}$	90	WANG	11B	BELL	$\Upsilon(2S) \to \gamma X$

$\Gamma(\gamma\chi_{c2})/\Gamma_{total}$ — Γ_{88}/Γ

NODE=M052R34
NODE=M052R34

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.5\times10^{-5}$	90	WANG	11B	BELL	$\Upsilon(2S) \to \gamma X$

$\Gamma(\gamma\chi_{c1}(3872))/\Gamma_{total}$ — Γ_{89}/Γ

NODE=M052R81
NODE=M052R81

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.8\times10^{-5}$	90	[1] WANG	11B	BELL	$\Upsilon(2S) \to \gamma X$

[1] WANG 11B reports $[\Gamma(\Upsilon(2S) \to \gamma\chi_{c1}(3872))/\Gamma_{total}] \times [B(\chi_{c1}(3872) \to \pi^+\pi^- J/\psi(1S))] < 0.8\times10^{-6}$ which we divide by our best (shown rounded) value $B(\chi_{c1}(3872) \to \pi^+\pi^- J/\psi(1S)) = 4.3\times10^{-2}$.

NODE=M052R81;LINKAGE=A

$\Gamma(\gamma\chi_{c1}(3872),\ \chi_{c1} \to \pi^+\pi^-\pi^0 J/\psi)/\Gamma_{total}$ — Γ_{90}/Γ

NODE=M052R36
NODE=M052R36

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.4\times10^{-6}$	90	WANG	11B	BELL	$\Upsilon(2S) \to \gamma X$

$\Gamma(\gamma\chi_{c0}(3915) \to \omega J/\psi)/\Gamma_{\text{total}}$ Γ_{91}/Γ

NODE=M052R37
NODE=M052R37

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.8 × 10^{-6}	90	WANG	11B	BELL	$\Upsilon(2S) \to \gamma X$

$\Gamma(\gamma\chi_{c1}(4140) \to \phi J/\psi)/\Gamma_{\text{total}}$ Γ_{92}/Γ

NODE=M052R38
NODE=M052R38

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.2 × 10^{-6}	90	WANG	11B	BELL	$\Upsilon(2S) \to \gamma X$

$\Gamma(\gamma X(4350) \to \phi J/\psi)/\Gamma_{\text{total}}$ Γ_{93}/Γ

NODE=M052R39
NODE=M052R39

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.3 × 10^{-6}	90	WANG	11B	BELL	$\Upsilon(2S) \to \gamma X$

$\Gamma(\gamma\eta_b(1S))/\Gamma_{\text{total}}$ Γ_{94}/Γ

NODE=M052R15
NODE=M052R15

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$5.5^{+1.1}_{-0.9}$ OUR AVERAGE Error includes scale factor of 1.2.						
$6.1^{+0.6}_{-0.7}{}^{+0.9}_{-0.6}$		29k	FULSOM	18	BELL	$\Upsilon(2S) \to \gamma X$
$3.9 \pm 1.1^{+1.1}_{-0.9}$		13 ± 5k	[1] AUBERT	09AQ	BABR	$\Upsilon(2S) \to \gamma X$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<21	90		LEES	11J	BABR	$\Upsilon(2S) \to X\gamma$
< 8.4	90		[1] BONVICINI	10	CLEO	$\Upsilon(2S) \to \gamma X$
< 5.1	90		[2] ARTUSO	05	CLEO	$e^+e^- \to \gamma X$

[1] Assuming $\Gamma_{\eta_b(1S)}$ = 10 MeV.
[2] Superseded by BONVICINI 10.

NODE=M052R15;LINKAGE=BO
NODE=M052R15;LINKAGE=SU

$\Gamma(\gamma\eta_b(1S) \to \gamma\,\text{Sum of 26 exclusive modes})/\Gamma_{\text{total}}$ Γ_{95}/Γ

NODE=M052R25
NODE=M052R25

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.7 × 10^{-6}	90	SANDILYA	13	BELL	$\Upsilon(2S) \to \gamma$ hadrons

$\Gamma(\gamma X_{b\bar{b}} \to \gamma\,\text{Sum of 26 exclusive modes})/\Gamma_{\text{total}}$ Γ_{96}/Γ

NODE=M052R26
NODE=M052R26

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
< 4.9	90		SANDILYA	13	BELL	$\Upsilon(2S) \to \gamma$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$46.2^{+29.7}_{-14.2} \pm 10.6$		10	[1] DOBBS	12		$\Upsilon(2S) \to \gamma$ hadrons

[1] Obtained by analyzing CLEO III data but not authored by the CLEO Collaboration.

NODE=M052R26;LINKAGE=DO

$\Gamma(\gamma X \to \gamma + \geq 4\,\text{prongs})/\Gamma_{\text{total}}$ Γ_{97}/Γ

NODE=M052R19

(1.5 GeV < m_X < 5.0 GeV)

NODE=M052R19
NODE=M052R19

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<1.95	95	ROSNER	07A	CLEO	$e^+e^- \to \gamma X$

$\Gamma(\gamma A^0 \to \gamma\,\text{hadrons})/\Gamma_{\text{total}}$ Γ_{98}/Γ

NODE=M052R06

(0.3 GeV < m_{A^0} < 7 GeV)

NODE=M052R06
NODE=M052R06

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<8 × 10^{-5}	90	[1] LEES	11H	BABR	$\Upsilon(2S) \to \gamma$ hadrons

[1] For a narrow scalar or pseudoscalar, A^0, excluding known resonances, with mass in the range 0.3–7 GeV. Measured 90% CL limits as a function of m_{A^0} range from 1×10^{-6} to 8×10^{-5}.

NODE=M052R06;LINKAGE=LE

$\Gamma(\gamma A^0 \to \gamma\mu^+\mu^-)/\Gamma_{\text{total}}$ Γ_{99}/Γ

NODE=M052R24
NODE=M052R24

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<8.3	90	[1] AUBERT	09Z	BABR	$e^+e^- \to A^0 \to \gamma\mu^+\mu^-$

[1] For a narrow scalar or pseudoscalar, A^0, with mass in the range 212–9300 MeV, excluding J/ψ and $\psi(2S)$. Measured 90% CL limits as a function of m_{A^0} range from 0.26–8.3 × 10^{-6}.

NODE=M052R24;LINKAGE=AU

LEPTON FAMILY NUMBER (*LF*) VIOLATING MODES

NODE=M052230

$\Gamma(e^\pm\tau^\mp)/\Gamma_{\text{total}}$ Γ_{100}/Γ

NODE=M052R04
NODE=M052R04

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<1.12	90	DHAMIJA	24	BELL	$e^+e^- \to e^\pm\tau^\mp$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<3.2	90	LEES	10B	BABR	$e^+e^- \to e^\pm\tau^\mp$

$\Gamma(\mu^{\pm}\tau^{\mp})/\Gamma_{total}$ — Γ_{101}/Γ

NODE=M052R20
NODE=M052R20

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
< 0.23	90	DHAMIJA	24	BELL	$e^+e^- \rightarrow \mu^{\pm}\tau^{\mp}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 3.3	90	LEES	10B	BABR	$e^+e^- \rightarrow \mu^{\pm}\tau^{\mp}$
<14.4	95	LOVE	08A	CLEO	$e^+e^- \rightarrow \mu^{\pm}\tau^{\mp}$

$\Upsilon(2S)$ Cross-Particle Branching Ratios

NODE=M052240

$B(\Upsilon(2S) \rightarrow \pi^+\pi^-) \times B(\Upsilon(3S) \rightarrow \Upsilon(2S)X)$

NODE=M052R05
NODE=M052R05

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.78±0.02±0.11	906k	LEES	11C	BABR	$e^+e^- \rightarrow \pi^+\pi^- X$

$\Upsilon(2S)$ REFERENCES

NODE=M052

ADACHI	25A	PRL 135 041901	I. Adachi *et al.*	(BELLE and BELLE II Collab.)	REFID=63241
DONG	25	JHEP 2509 048	X. Dong *et al.*	(BELLE Collab.)	REFID=63693
AAIJ	24AC	JHEP 2410 122	R. Aaij *et al.*	(LHCb Collab.)	REFID=63036
DHAMIJA	24	JHEP 2402 187	R. Dhamija *et al.*	(BELLE Collab.)	REFID=62686
GAO	23	PR D108 112015	B.S. Gao *et al.*	(BELLE Collab.)	REFID=62519
SHAMOV	23	PL B839 137766	A.G. Shamov, O.L. Rezanova	(NOVO, NOVOU)	REFID=62012
FULSOM	18	PRL 121 232001	B.G. Fulsom *et al.*	(BELLE Collab.)	REFID=59535
JIA	18	PR D97 112004	S. Jia *et al.*	(BELLE Collab.)	REFID=58949
JIA	17	PR D95 012001	S. Jia *et al.*	(BELLE Collab.)	REFID=57635
JIA	17A	PR D96 112002	S. Jia *et al.*	(BELLE Collab.)	REFID=58318
LEES	14G	PR D89 111102	J.P. Lees *et al.*	(BABAR Collab.)	REFID=55939
YANG	14	PR D90 112008	S.D. Yang *et al.*	(BELLE Collab.)	REFID=56345
SANDILYA	13	PRL 111 112001	S. Sandilya *et al.*	(BELLE Collab.)	REFID=55590
SHEN	13	PR D88 011102	C.P. Shen *et al.*	(BELLE Collab.)	REFID=55395
TAMPONI	13	PR D87 011104	U. Tamponi *et al.*	(BELLE Collab.)	REFID=54919
DOBBS	12	PRL 109 082001	S. Dobbs *et al.*		REFID=54288
DOBBS	12A	PR D86 052003	S. Dobbs *et al.*		REFID=54746
SHEN	12A	PR D86 031102	C.P. Shen *et al.*	(BELLE Collab.)	REFID=54314
LEES	11C	PR D84 011104	J.P. Lees *et al.*	(BABAR Collab.)	REFID=16775
LEES	11H	PRL 107 221803	J.P. Lees *et al.*	(BABAR Collab.)	REFID=53877
LEES	11J	PR D84 072002	J.P. Lees *et al.*	(BABAR Collab.)	REFID=53936
LEES	11L	PR D84 092003	J.P. Lees *et al.*	(BABAR Collab.)	REFID=53938
WANG	11B	PR D84 071107	X.L. Wang *et al.*	(BELLE Collab.)	REFID=53939
BONVICINI	10	PR D81 031104	G. Bonvicini *et al.*	(CLEO Collab.)	REFID=53231
LEES	10B	PRL 104 151802	J.P. Lees *et al.*	(BABAR Collab.)	REFID=53355
AUBERT	09AQ	PRL 103 161801	B. Aubert *et al.*	(BABAR Collab.)	REFID=53106
AUBERT	09Z	PRL 103 081803	B. Aubert *et al.*	(BABAR Collab.)	REFID=52930
BHARI	09	PR D79 011103	S.R. Bhari *et al.*	(CLEO Collab.)	REFID=52662
AUBERT	08BP	PR D78 112002	B. Aubert *et al.*	(BABAR Collab.)	REFID=52660
HE	08A	PRL 101 192001	Q. He *et al.*	(CLEO Collab.)	REFID=52587
LOVE	08A	PRL 101 201601	W. Love *et al.*	(CLEO Collab.)	REFID=52592
PDG	08	PL B667 1	C. Amsler *et al.*	(PDG Collab.)	REFID=52166
ASNER	07	PR D75 012009	D.M. Asner *et al.*	(CLEO Collab.)	REFID=51617
BESSON	07	PRL 98 052002	D. Besson *et al.*	(CLEO Collab.)	REFID=51620
ROSNER	07A	PR D76 117102	J.L. Rosner *et al.*	(CLEO Collab.)	REFID=52079
BESSON	06A	PR D74 012003	D. Besson *et al.*	(CLEO Collab.)	REFID=51147
ROSNER	06	PRL 96 092003	J.L. Rosner *et al.*	(CLEO Collab.)	REFID=51035
ADAMS	05	PRL 94 012001	G.S. Adams *et al.*	(CLEO Collab.)	REFID=50452
ARTUSO	05	PRL 94 032001	M. Artuso *et al.*	(CLEO Collab.)	REFID=50454
ARTAMONOV	00	PL B474 427	A.S. Artamonov *et al.*		REFID=47424
EDWARDS	99	PR D59 032003	K.W. Edwards *et al.*	(CLEO Collab.)	REFID=46612
ALEXANDER	98	PR D58 052004	J.P. Alexander *et al.*	(CLEO Collab.)	REFID=46329
BARU	96	PRPL 267 71	S.E. Baru *et al.*	(NOVO)	REFID=44651
KOBEL	92	ZPHY C53 193	M. Kobel *et al.*	(Crystal Ball Collab.)	REFID=41861
MASCHMANN	90	ZPHY C46 555	W.S. Maschmann *et al.*	(Crystal Ball Collab.)	REFID=41224
ALBRECHT	89	ZPHY C42 349	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=40731
KAARSBERG	89	PRL 62 2077	T.M. Kaarsberg *et al.*	(CUSB Collab.)	REFID=40733
BUCHMUEL...	88	HE e^+e^- Physics 412	W. Buchmueller, S. Cooper	(HANN, DESY, MIT)	REFID=40034
		Editors: A. Ali and P. Soeding, World Scientific, Singapore			
JAKUBOWSKI	88	ZPHY C40 49	Z. Jakubowski *et al.*	(Crystal Ball Collab.) IGJPC	REFID=40742
ALBRECHT	87	ZPHY C35 283	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=40016
COHEN	87	RMP 59 1121	E.R. Cohen, B.N. Taylor	(RISC, NBS)	REFID=11616
LURZ	87	ZPHY C36 383	B. Lurz *et al.*	(Crystal Ball Collab.)	REFID=40021
BARU	86B	ZPHY C32 622 (errat.)	S.E. Baru *et al.*	(NOVO)	REFID=22338
ALBRECHT	85	ZPHY C28 45	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=22334
ALBRECHT	85E	PL 160B 331	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=22288
GELPHMAN	85	PR D32 2893	D. Gelphman *et al.*	(Crystal Ball Collab.)	REFID=22336
KURAEV	85	SJNP 41 466	E.A. Kuraev, V.S. Fadin	(NOVO)	REFID=40033
		Translated from YAF 41 733.			
NERNST	85	PRL 54 2195	R. Nernst *et al.*	(Crystal Ball Collab.)	REFID=22289
ARTAMONOV	84	PL 137B 272	A.S. Artamonov *et al.*	(NOVO)	REFID=22278
BARBER	84	PL 135B 498	D.P. Barber *et al.*		REFID=22327;ERROR=1
BESSON	84	PR D30 1433	D. Besson *et al.*	(CLEO Collab.)	REFID=22279
FONSECA	84	NP B242 31	V. Fonseca *et al.*	(CUSB Collab.)	REFID=22329
GILES	84B	PR D29 1285	R. Giles *et al.*	(CLEO Collab.)	REFID=22280
HAAS	84	PRL 52 799	J. Haas *et al.*	(CLEO Collab.)	REFID=22287
HAAS	84B	PR D30 1996	J. Haas *et al.*	(CLEO Collab.)	REFID=22332
KLOPFEN...	83	PRL 51 160	C. Klopfenstein *et al.*	(CUSB Collab.)	REFID=22285
ALBRECHT	82	PL 116B 383	H. Albrecht *et al.*	(DESY, DORT, HEIDH+)	REFID=22270
NICZYPORUK	81B	PL 100B 95	B. Niczyporuk *et al.*	(LENA Collab.)	REFID=22319
NICZYPORUK	81C	PL 99B 169	B. Niczyporuk *et al.*	(LENA Collab.)	REFID=22318
BOCK	80	ZPHY C6 125	P. Bock *et al.*	(HEIDP, MPIM, DESY, HAMB)	REFID=22264