NODE=M049

$\Upsilon(1S)$

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

$\Upsilon(1S)$ MASS

NODE=M049M

NODE=M049M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
9460.40±0.10 OUR AVERAGE					
9460.37±0.01±2.85	15M	[1] AAIJ	24AC	LHCB	$\Upsilon(1S) \to \mu^+\mu^-$
9460.40±0.09±0.04		[2] SHAMOV	23	RVUE	$e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
9460.11±0.11±0.07		[3] SHAMOV	23	RVUE	$e^+e^- \to$ hadrons
9460.51±0.09±0.05		[4,5] ARTAMONOV	00	MD1	$e^+e^- \to$ hadrons
9460.60±0.09±0.05		[6,7] BARU	92B	MD1	$e^+e^- \to$ hadrons
9460.59±0.12		BARU	86	MD1	$e^+e^- \to$ hadrons
9460.6 ±0.4		[7,8] ARTAMONOV	84	MD1	$e^+e^- \to$ hadrons
9459.97±0.11±0.07		[9] MACKAY	84	CUSB	$e^+e^- \to$ hadrons

OCCUR=2

[1] Observed in prompt pp production. NODE=M049M;LINKAGE=F

[2] Reanalysis of MD1 data using the electron mass from COHEN 87, the radiative corrections from KURAEV 85 and interference effects. NODE=M049M;LINKAGE=D

[3] Obtained by reanalysing CUSB data (MACKAY 84), but not authored by the CUSB collaboration. NODE=M049M;LINKAGE=E

[4] Reanalysis of BARU 92B and ARTAMONOV 84 using new electron mass (COHEN 87). NODE=M049M;LINKAGE=AR

[5] Superseded by SHAMOV 23. NODE=M049M;LINKAGE=B

[6] Supersedes BARU 86. NODE=M049M;LINKAGE=A

[7] Superseded by ARTAMONOV 00. NODE=M049M;LINKAGE=RZ

[8] Value includes data of ARTAMONOV 82. NODE=M049M;LINKAGE=G

[9] Reanalysed by SHAMOV 23. NODE=M049M;LINKAGE=C

$\Upsilon(1S)$ WIDTH

NODE=M049W

NODE=M049W

VALUE (keV)	DOCUMENT ID
54.02±1.25 OUR EVALUATION	See the Note on "Width Determinations of the Υ States"

→ UNCHECKED ←

$\Upsilon(1S)$ DECAY MODES

NODE=M049215;NODE=M049

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	
Γ_1	$\tau^+\tau^-$	(2.60 ±0.10) %		DESIG=3
Γ_2	e^+e^-	(2.39 ±0.08) %		DESIG=2
Γ_3	$\mu^+\mu^-$	(2.48 ±0.04) %		DESIG=1
	Hadronic decays			NODE=M049;CLUMP=A
Γ_4	ggg	(81.7 ±0.7) %		DESIG=117
Γ_5	γgg	(2.2 ±0.6) %		DESIG=118
Γ_6	$\eta'(958)$ anything	(2.94 ±0.24) %		DESIG=73
Γ_7	$J/\psi(1S)$ anything	(5.4 ±0.4) $\times 10^{-4}$	S=1.4	DESIG=12
Γ_8	$J/\psi(1S)\eta_c$	$<$ 2.2 $\times 10^{-6}$	CL=90%	DESIG=146
Γ_9	$J/\psi(1S)\chi_{c0}$	$<$ 3.4 $\times 10^{-6}$	CL=90%	DESIG=147
Γ_{10}	$J/\psi(1S)\chi_{c1}$	(3.9 ±1.2) $\times 10^{-6}$		DESIG=148
Γ_{11}	$J/\psi(1S)\chi_{c2}$	$<$ 1.4 $\times 10^{-6}$	CL=90%	DESIG=149
Γ_{12}	$J/\psi(1S)\eta_c(2S)$	$<$ 2.2 $\times 10^{-6}$	CL=90%	DESIG=150
Γ_{13}	$J/\psi(1S)X(3940)$	$<$ 5.4 $\times 10^{-6}$	CL=90%	DESIG=151
Γ_{14}	$J/\psi(1S)X(4160)$	$<$ 5.4 $\times 10^{-6}$	CL=90%	DESIG=152
Γ_{15}	$X(4350)$ anything, $X \to J/\psi(1S)\phi$	$<$ 8.1 $\times 10^{-6}$	CL=90%	DESIG=167
Γ_{16}	$T_{c\overline{c}1}(3900)^{\pm}$ anything, $T_{c\overline{c}1} \to J/\psi(1S)\pi^{\pm}$	$<$ 1.3 $\times 10^{-5}$	CL=90%	DESIG=168
Γ_{17}	$T_{c\overline{c}1}(4200)^{\pm}$ anything, $Z_c \to J/\psi(1S)\pi^{\pm}$	$<$ 6.0 $\times 10^{-5}$	CL=90%	DESIG=169
Γ_{18}	$T_{c\overline{c}1}(4430)^{\pm}$ anything, $T_{c\overline{c}1} \to J/\psi(1S)\pi^{\pm}$	$<$ 4.9 $\times 10^{-5}$	CL=90%	DESIG=170
Γ_{19}	$P_{c\overline{c}s}(4459)/\overline{P}_{c\overline{c}s}(4459)$ anything	(3.5 ±2.0) $\times 10^{-6}$		DESIG=201
Γ_{20}	$P_{c\overline{c}s}(4338)/\overline{P}_{c\overline{c}s}(4338)$ anything	$<$ 1.8 $\times 10^{-6}$	CL=90%	DESIG=203

Γ_{21}	$P_c(4312)$ anything, $P_c(4312) \to p J/\psi(1S)$	<	5.7		$\times 10^{-6}$	CL=90%	DESIG=205
Γ_{22}	$P_c(4440)$ anything, $P_c(4440) \to p J/\psi(1S)$	<	1.00		$\times 10^{-5}$	CL=90%	DESIG=206
Γ_{23}	$P_c(4457)$ anything, $P_c(4457) \to p J/\psi(1S)$	<	7.6		$\times 10^{-6}$	CL=90%	DESIG=207
Γ_{24}	$p/\overline{p} J/\psi(1S)$ anything	(	8.1	± 0.8	) $\times 10^{-5}$		DESIG=204
Γ_{25}	$J/\psi(1S) \Lambda/\overline{\Lambda}$ anything	(	3.7	± 0.6	) $\times 10^{-5}$		DESIG=202
Γ_{26}	$X_{cs}^{\pm}$ anything, $X \to J/\psi K^{\pm}$	<	5.7		$\times 10^{-6}$	CL=90%	DESIG=173
Γ_{27}	$\psi(4230)$ anything, $\psi \to J/\psi(1S) \pi^+ \pi^-$	<	3.8		$\times 10^{-5}$	CL=90%	DESIG=161
Γ_{28}	$\psi(4230)$ anything, $\psi \to J/\psi(1S) K^+ K^-$	<	7.5		$\times 10^{-6}$	CL=90%	DESIG=165
Γ_{29}	$\chi_{c1}(4140)$ anything, $\chi_{c1} \to J/\psi(1S) \phi$	<	5.2		$\times 10^{-6}$	CL=90%	DESIG=166
Γ_{30}	χ_{c0} anything	<	4		$\times 10^{-3}$	CL=90%	DESIG=5
Γ_{31}	χ_{c1} anything	(	1.90	± 0.35	) $\times 10^{-4}$		DESIG=6
Γ_{32}	$\chi_{c1}(1P) X_{tetra}$	<	3.78		$\times 10^{-5}$	CL=90%	DESIG=175
Γ_{33}	χ_{c2} anything	(	2.8	± 0.8	) $\times 10^{-4}$		DESIG=7
Γ_{34}	$\psi(2S)$ anything	(	1.23	± 0.20	) $\times 10^{-4}$		DESIG=8
Γ_{35}	$\psi(2S) \eta_c$	<	3.6		$\times 10^{-6}$	CL=90%	DESIG=153
Γ_{36}	$\psi(2S) \chi_{c0}$	<	6.5		$\times 10^{-6}$	CL=90%	DESIG=154
Γ_{37}	$\psi(2S) \chi_{c1}$	<	4.5		$\times 10^{-6}$	CL=90%	DESIG=155
Γ_{38}	$\psi(2S) \chi_{c2}$	<	2.1		$\times 10^{-6}$	CL=90%	DESIG=156
Γ_{39}	$\psi(2S) \eta_c(2S)$	<	3.2		$\times 10^{-6}$	CL=90%	DESIG=157
Γ_{40}	$\psi(2S) X(3940)$	<	2.9		$\times 10^{-6}$	CL=90%	DESIG=158
Γ_{41}	$\psi(2S) X(4160)$	<	2.9		$\times 10^{-6}$	CL=90%	DESIG=159
Γ_{42}	$\psi(4230)$ anything, $\psi \to \psi(2S) \pi^+ \pi^-$	<	7.9		$\times 10^{-5}$	CL=90%	DESIG=162
Γ_{43}	$\psi(4360)$ anything, $\psi \to \psi(2S) \pi^+ \pi^-$	<	5.2		$\times 10^{-5}$	CL=90%	DESIG=163
Γ_{44}	$\psi(4660)$ anything, $\psi \to \psi(2S) \pi^+ \pi^-$	<	2.2		$\times 10^{-5}$	CL=90%	DESIG=164
Γ_{45}	$T_{c\overline{c}}(4050)^{\pm}$ anything, $X \to \psi(2S) \pi^{\pm}$	<	8.8		$\times 10^{-5}$	CL=90%	DESIG=171
Γ_{46}	$T_{c\overline{c}1}(4430)^{\pm}$ anything, $T_{c\overline{c}1} \to \psi(2S) \pi^{\pm}$	<	6.7		$\times 10^{-5}$	CL=90%	DESIG=172
Γ_{47}	$\chi_{c1}(3872)$ anything	<	2.2		$\times 10^{-4}$	CL=90%	DESIG=194
Γ_{48}	$T_{c\overline{c}1}(4200)^+ T_{c\overline{c}1}(4200)^-$	<	2.23		$\times 10^{-5}$	CL=90%	DESIG=178
Γ_{49}	$T_{c\overline{c}1}(3900)^{\pm} T_{c\overline{c}1}(4200)^{\mp}$	<	8.1		$\times 10^{-6}$	CL=90%	DESIG=179
Γ_{50}	$T_{c\overline{c}1}(3900)^+ T_{c\overline{c}1}(3900)^-$	<	1.8		$\times 10^{-6}$	CL=90%	DESIG=180
Γ_{51}	$T_{c\overline{c}}(4050)^+ T_{c\overline{c}}(4050)^-$	<	1.58		$\times 10^{-5}$	CL=90%	DESIG=181
Γ_{52}	$T_{c\overline{c}}(4250)^+ T_{c\overline{c}}(4250)^-$	<	2.66		$\times 10^{-5}$	CL=90%	DESIG=182
Γ_{53}	$T_{c\overline{c}}(4050)^{\pm} T_{c\overline{c}}(4250)^{\mp}$	<	4.42		$\times 10^{-5}$	CL=90%	DESIG=183
Γ_{54}	$T_{c\overline{c}1}(4430)^+ T_{c\overline{c}1}(4430)^-$	<	2.03		$\times 10^{-5}$	CL=90%	DESIG=184
Γ_{55}	$T_{c\overline{c}}(4055)^{\pm} T_{c\overline{c}}(4055)^{\mp}$	<	2.33		$\times 10^{-5}$	CL=90%	DESIG=186
Γ_{56}	$T_{c\overline{c}}(4055)^{\pm} T_{c\overline{c}1}(4430)^{\mp}$	<	4.55		$\times 10^{-5}$	CL=90%	DESIG=189
Γ_{57}	$\rho \pi$	<	3.68		$\times 10^{-6}$	CL=90%	DESIG=11
Γ_{58}	$\omega \pi^0$	<	3.90		$\times 10^{-6}$	CL=90%	DESIG=131
Γ_{59}	$\pi^+ \pi^-$	<	5		$\times 10^{-4}$	CL=90%	DESIG=23
Γ_{60}	$K^+ K^-$	<	5		$\times 10^{-4}$	CL=90%	DESIG=24
Γ_{61}	$p \overline{p}$	<	5		$\times 10^{-4}$	CL=90%	DESIG=25
Γ_{62}	$\pi^+ \pi^- \pi^0$	(	2.1	± 0.8	) $\times 10^{-6}$		DESIG=72
Γ_{63}	$\phi K^+ K^-$	(	2.4	± 0.5	) $\times 10^{-6}$		DESIG=136
Γ_{64}	$\omega \pi^+ \pi^-$	(	4.5	± 1.0	) $\times 10^{-6}$		DESIG=137
Γ_{65}	$K^*(892)^0 K^- \pi^+ +$ c.c.	(	4.4	± 0.8	) $\times 10^{-6}$		DESIG=138
Γ_{66}	$\phi f_2'(1525)$	<	1.63		$\times 10^{-6}$	CL=90%	DESIG=139
Γ_{67}	$\omega f_2(1270)$	<	1.79		$\times 10^{-6}$	CL=90%	DESIG=140

Γ_{68}	$\rho(770)\,a_2(1320)$		$<$ 2.24	$\times 10^{-6}$	CL=90%	DESIG=141
Γ_{69}	$K^*(892)^0\,\overline{K}^*_2(1430)^0 +$ c.c.		(3.0 ± 0.8)	$\times 10^{-6}$		DESIG=142
Γ_{70}	$K_1(1270)^{\pm}\,K^{\mp}$		$<$ 2.41	$\times 10^{-6}$	CL=90%	DESIG=143
Γ_{71}	$K_1(1400)^{\pm}\,K^{\mp}$		(1.0 ± 0.4)	$\times 10^{-6}$		DESIG=144
Γ_{72}	$b_1(1235)^{\pm}\,\pi^{\mp}$		$<$ 1.25	$\times 10^{-6}$	CL=90%	DESIG=145
Γ_{73}	$\pi^+\pi^-\pi^0\pi^0$		(1.28 ± 0.30)	$\times 10^{-5}$		DESIG=132
Γ_{74}	$K^0_S\,K^+\pi^- +$ c.c.		(1.6 ± 0.4)	$\times 10^{-6}$		DESIG=133
Γ_{75}	$K^*(892)^0\,\overline{K}^0 +$ c.c.		(2.9 ± 0.9)	$\times 10^{-6}$		DESIG=134
Γ_{76}	$K^*(892)^-\,K^+ +$ c.c.		$<$ 1.11	$\times 10^{-6}$	CL=90%	DESIG=135
Γ_{77}	$f_1(1285)$ anything		(4.6 ± 3.1)	$\times 10^{-3}$		DESIG=174
Γ_{78}	$D^*(2010)^{\pm}$ anything		(2.52 ± 0.20)	%		DESIG=30
Γ_{79}	$\underline{f_1}(1285)\,X_{tetra}$		$<$ 6.24	$\times 10^{-5}$	CL=90%	DESIG=176
Γ_{80}	^2H anything		(2.85 ± 0.25)	$\times 10^{-5}$		DESIG=107
Γ_{81}	Sum of 100 exclusive modes		(1.200 ± 0.017)	%		DESIG=128
	Radiative decays					NODE=M049;CLUMP=B
Γ_{82}	$\gamma\pi^+\pi^-$		(6.3 ± 1.8)	$\times 10^{-5}$		DESIG=70
Γ_{83}	$\gamma\pi^0\pi^0$		(1.7 ± 0.7)	$\times 10^{-5}$		DESIG=71
Γ_{84}	$\gamma\pi\pi$ (S-wave)		(4.6 ± 0.7)	$\times 10^{-5}$		DESIG=190
Γ_{85}	$\gamma\pi^0\eta$		$<$ 2.4	$\times 10^{-6}$	CL=90%	DESIG=111
Γ_{86}	γK^+K^-	[a]	(1.14 ± 0.13)	$\times 10^{-5}$		DESIG=102
Γ_{87}	$\gamma p\overline{p}$	[b]	$<$ 6	$\times 10^{-6}$	CL=90%	DESIG=103
Γ_{88}	$\gamma 2h^+2h^-$		(7.0 ± 1.5)	$\times 10^{-4}$		DESIG=20
Γ_{89}	$\gamma 3h^+3h^-$		(5.4 ± 2.0)	$\times 10^{-4}$		DESIG=21
Γ_{90}	$\gamma 4h^+4h^-$		(7.4 ± 3.5)	$\times 10^{-4}$		DESIG=22
Γ_{91}	$\gamma\pi^+\pi^-K^+K^-$		(2.9 ± 0.9)	$\times 10^{-4}$		DESIG=14
Γ_{92}	$\gamma 2\pi^+2\pi^-$		(2.5 ± 0.9)	$\times 10^{-4}$		DESIG=13
Γ_{93}	$\gamma 3\pi^+3\pi^-$		(2.5 ± 1.2)	$\times 10^{-4}$		DESIG=17
Γ_{94}	$\gamma 2\pi^+2\pi^-K^+K^-$		(2.4 ± 1.2)	$\times 10^{-4}$		DESIG=18
Γ_{95}	$\gamma\pi^+\pi^-p\overline{p}$		(1.5 ± 0.6)	$\times 10^{-4}$		DESIG=15
Γ_{96}	$\gamma 2\pi^+2\pi^-p\overline{p}$		(4 ± 6)	$\times 10^{-5}$		DESIG=19
Γ_{97}	$\gamma 2K^+2K^-$		(2.0 ± 2.0)	$\times 10^{-5}$		DESIG=16
Γ_{98}	$\gamma\eta'(958)$		$<$ 1.9	$\times 10^{-6}$	CL=90%	DESIG=55
Γ_{99}	$\gamma\eta$		$<$ 1.0	$\times 10^{-6}$	CL=90%	DESIG=54
Γ_{100}	$\gamma f_0(980)$		$<$ 3	$\times 10^{-5}$	CL=90%	DESIG=105
Γ_{101}	$\gamma f'_2(1525)$		(2.9 ± 0.6)	$\times 10^{-5}$		DESIG=52
Γ_{102}	$\gamma f_2(1270)$		(1.01 ± 0.06)	$\times 10^{-4}$		DESIG=51
Γ_{103}	$\gamma\eta(1405)$		$<$ 8.2	$\times 10^{-5}$	CL=90%	DESIG=65
Γ_{104}	$\gamma f_0(1500)$		$<$ 1.5	$\times 10^{-5}$	CL=90%	DESIG=108
Γ_{105}	$\gamma f_0(1500) \to \gamma K^+K^-$		(1.0 ± 0.4)	$\times 10^{-5}$		DESIG=192
Γ_{106}	$\gamma f_0(1710)$		$<$ 2.6	$\times 10^{-4}$	CL=90%	DESIG=53
Γ_{107}	$\gamma f_0(1710) \to \gamma K^+K^-$		(1.01 ± 0.32)	$\times 10^{-5}$		DESIG=112
Γ_{108}	$\gamma f_0(1710) \to \gamma\pi^+\pi^-$		(5.3 ± 2.0)	$\times 10^{-6}$		DESIG=191
Γ_{109}	$\gamma f_0(1710) \to \gamma\pi^0\pi^0$		$<$ 1.4	$\times 10^{-6}$	CL=90%	DESIG=109
Γ_{110}	$\gamma f_0(1710) \to \gamma\eta\eta$		$<$ 1.8	$\times 10^{-6}$	CL=90%	DESIG=110
Γ_{111}	$\gamma f_4(2050)$		$<$ 5.3	$\times 10^{-5}$	CL=90%	DESIG=104
Γ_{112}	$\gamma f_0(2200) \to \gamma K^+K^-$		$<$ 2	$\times 10^{-4}$	CL=90%	DESIG=69
Γ_{113}	$\gamma f_J(2220) \to \gamma K^+K^-$		$<$ 8	$\times 10^{-7}$	CL=90%	DESIG=60
Γ_{114}	$\gamma f_J(2220) \to \gamma\pi^+\pi^-$		$<$ 6	$\times 10^{-7}$	CL=90%	DESIG=61
Γ_{115}	$\gamma f_J(2220) \to \gamma p\overline{p}$		$<$ 1.1	$\times 10^{-6}$	CL=90%	DESIG=62
Γ_{116}	$\gamma\eta(2225) \to \gamma\phi\phi$		$<$ 3	$\times 10^{-3}$	CL=90%	DESIG=68
Γ_{117}	$\gamma\eta_c(1S)$		$<$ 2.9	$\times 10^{-5}$	CL=90%	DESIG=119
Γ_{118}	$\gamma\eta_c(2S)$		$<$ 4	$\times 10^{-4}$	CL=90%	DESIG=193
Γ_{119}	$\gamma\chi_{c0}$		$<$ 6.6	$\times 10^{-5}$	CL=90%	DESIG=120
Γ_{120}	$\gamma\chi_{c1}$		(4.7 $^{+2.4}_{-1.9}$)	$\times 10^{-5}$		DESIG=121
Γ_{121}	$\gamma\chi_{c2}$		$<$ 7.6	$\times 10^{-6}$	CL=90%	DESIG=122
Γ_{122}	$\gamma\chi_{c1}(3872)$		$<$ 4	$\times 10^{-5}$	CL=90%	DESIG=195

Γ_{123}	$\gamma\chi_{c1}(3872)$, $\chi_{c1} \to \pi^+\pi^-\pi^0 J/\psi$		$<$ 2.8	$\times 10^{-6}$	CL=90%	DESIG=124
Γ_{124}	$\gamma\chi_{c0}(3915) \to \omega J/\psi$		$<$ 3.0	$\times 10^{-6}$	CL=90%	DESIG=125
Γ_{125}	$\gamma\chi_{c1}(4140) \to \phi J/\psi$		$<$ 2.2	$\times 10^{-6}$	CL=90%	DESIG=126
Γ_{126}	$\gamma X\overline{X}$ ($m_X <$ 3.1 GeV)	[c]	$<$ 1	$\times 10^{-3}$	CL=90%	DESIG=67
Γ_{127}	$\gamma X\overline{X}$ ($m_X <$ 4.5 GeV)	[d]	$<$ 2.4	$\times 10^{-4}$	CL=90%	DESIG=127
Γ_{128}	$\gamma X \to \gamma + \geq 4$ prongs	[e]	$<$ 1.78	$\times 10^{-4}$	CL=95%	DESIG=113
Γ_{129}	γA^0	[f]				DESIG=66
Γ_{130}	$\gamma A^0 \to \gamma\mu^+\mu^-$	[g]	$<$ 9	$\times 10^{-6}$	CL=90%	DESIG=114
Γ_{131}	$\gamma A^0 \to \gamma\tau^+\tau^-$	[a]	$<$ 1.30	$\times 10^{-4}$	CL=90%	DESIG=115
Γ_{132}	$\gamma A^0 \to \gamma g g$	[h]	$<$ 1	%	CL=90%	DESIG=129
Γ_{133}	$\gamma A^0 \to \gamma s\overline{s}$	[h]	$<$ 1	$\times 10^{-3}$	CL=90%	DESIG=130

Lepton Family number (LF) violating modes

NODE=M049;CLUMP=C

Γ_{134}	$e^\pm\mu^\mp$	LF	$<$ 3.9	$\times 10^{-7}$	CL=90%	DESIG=196
Γ_{135}	$\mu^\pm\tau^\mp$	LF	$<$ 2.7	$\times 10^{-6}$	CL=90%	DESIG=116
Γ_{136}	$e^\pm\tau^\mp$	LF	$<$ 2.7	$\times 10^{-6}$	CL=90%	DESIG=197
Γ_{137}	$\gamma e^\pm\mu^\mp$	LF	$<$ 4.2	$\times 10^{-7}$	CL=90%	DESIG=198
Γ_{138}	$\gamma\mu^\pm\tau^\mp$	LF	$<$ 6.1	$\times 10^{-6}$	CL=90%	DESIG=199
Γ_{139}	$\gamma e^\pm\tau^\mp$	LF	$<$ 6.5	$\times 10^{-6}$	CL=90%	DESIG=200

Other decays

NODE=M049;CLUMP=D

Γ_{140}	invisible	$<$ 3.0	$\times 10^{-4}$	CL=90%	DESIG=106
Γ_{141}	hadrons	(96 $\pm$4) %			DESIG=101

[a] $2m_\tau <$ M($\tau^+\tau^-$) $<$ 9.2 GeV LINKAGE=E49

[b] 2 GeV $< m_{K^+K^-} <$ 3 GeV LINKAGE=G49

[c] $X\overline{X}$ = vectors with $m <$ 3.1 GeV LINKAGE=B49

[d] X and $\overline{X}$ = zero spin with $m <$ 4.5 GeV LINKAGE=F49

[e] 1.5 GeV $< m_X <$ 5.0 GeV LINKAGE=C49

[f] A^0 = scalar with $m <$ 8.0 GeV LINKAGE=A49

[g] 201 MeV $<$ M($\mu^+\mu^-$) $<$ 3565 MeV LINKAGE=D49

[h] 0.5 GeV $< m_X <$ 9.0 GeV, where m_X is the invariant mass of the hadronic final state. LINKAGE=I49

$\Upsilon(1S)$ Γ(i)$\Gamma(e^+e^-)/\Gamma$(total)

NODE=M049218

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

NODE=M049G1

NODE=M049G1

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

Γ(hadrons) × $\Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_{141}\Gamma_2/\Gamma$

NODE=M049G2

NODE=M049G2

VALUE (keV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1.240±0.016 OUR AVERAGE				
1.252±0.004±0.019	[1] ROSNER	06	CLEO	9.5 $e^+e^- \to$ hadrons
1.187±0.023±0.031	[1] BARU	92B	MD1	$e^+e^- \to$ hadrons
1.23 ±0.02 ±0.05	[1] JAKUBOWSKI	88	CBAL	$e^+e^- \to$ hadrons
1.37 ±0.06 ±0.09	[2] GILES	84B	CLEO	$e^+e^- \to$ hadrons
1.23 ±0.08 ±0.04	[2] ALBRECHT	82	DASP	$e^+e^- \to$ hadrons
1.13 ±0.07 ±0.11	[2] NICZYPORUK	82	LENA	$e^+e^- \to$ hadrons
1.09 ±0.25	[2] BOCK	80	CNTR	$e^+e^- \to$ hadrons
1.35 ±0.14	[3] BERGER	79	PLUT	$e^+e^- \to$ hadrons

[1] Radiative corrections evaluated following KURAEV 85. NODE=M049G2;LINKAGE=B

[2] Radiative corrections reevaluated by BUCHMUELLER 88 following KURAEV 85. NODE=M049G2;LINKAGE=R

[3] Radiative corrections reevaluated by ALEXANDER 89 using B($\mu\mu$) = 0.026. NODE=M049G2;LINKAGE=P

$\Upsilon(1S)$ PARTIAL WIDTHS

NODE=M049220

$\Gamma(e^+e^-)$ Γ_2

NODE=M049W2

NODE=M049W2

VALUE (keV)	*DOCUMENT ID*
1.340±0.018 OUR EVALUATION	

→ UNCHECKED ←

$\Upsilon(1S)$ BRANCHING RATIOS

NODE=M049225

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

NODE=M049R3
NODE=M049R3

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2.60±0.10 OUR AVERAGE					
$2.53\pm0.13\pm0.04$	60k	[1] BESSON	07	CLEO	$e^+e^- \to \Upsilon(1S) \to \tau^+\tau^-$
$2.61\pm0.12{}^{+0.09}_{-0.13}$	25k	CINABRO	94B	CLE2	$e^+e^- \to \tau^+\tau^-$
$2.7\ \pm0.4\ \pm0.2$		[2] ALBRECHT	85C	ARG	$\Upsilon(2S) \to \pi^+\pi^-\tau^+\tau^-$
$3.4\ \pm0.4\ \pm0.4$		GILES	83	CLEO	$e^+e^- \to \tau^+\tau^-$

[1] BESSON 07 reports $[\Gamma(\Upsilon(1S) \to \tau^+\tau^-)/\Gamma_{total}]$ / $[B(\Upsilon(1S) \to \mu^+\mu^-)] = 1.02 \pm 0.02 \pm 0.05$ which we multiply by our best (shown rounded) value $B(\Upsilon(1S) \to \mu^+\mu^-) = (2.48 \pm 0.04) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

NODE=M049R3;LINKAGE=BE

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

NODE=M049R3;LINKAGE=A

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

NODE=M049R2
NODE=M049R2

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2.39±0.08 OUR AVERAGE					
$2.40\pm0.01\pm0.12$	191k	PATRA	22	BELL	$\Upsilon(2S) \to \pi^+\pi^-e^+e^-$
$2.29\pm0.08\pm0.11$		ALEXANDER	98	CLE2	$\Upsilon(2S) \to \pi^+\pi^-e^+e^-$
$2.42\pm0.14\pm0.14$	307	ALBRECHT	87	ARG	$\Upsilon(2S) \to \pi^+\pi^-e^+e^-$
$2.8\ \pm0.3\ \pm0.2$	826	BESSON	84	CLEO	$\Upsilon(2S) \to \pi^+\pi^-e^+e^-$
$5.1\ \pm3.0$		BERGER	80C	PLUT	$e^+e^- \to e^+e^-$

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

NODE=M049R1
NODE=M049R1

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2.48±0.04 OUR AVERAGE					
$2.46\pm0.01\pm0.11$	246k	PATRA	22	BELL	$\Upsilon(2S) \to \pi^+\pi^-\mu^+\mu^-$
$2.49\pm0.02\pm0.07$	345k	ADAMS	05	CLEO	$e^+e^- \to \mu^+\mu^-$
$2.49\pm0.08\pm0.13$		ALEXANDER	98	CLE2	$\Upsilon(2S) \to \pi^+\pi^-\mu^+\mu^-$
$2.12\pm0.20\pm0.10$		[1] BARU	92	MD1	$e^+e^- \to \mu^+\mu^-$
$2.31\pm0.12\pm0.10$		[1] KOBEL	92	CBAL	$e^+e^- \to \mu^+\mu^-$
$2.52\pm0.07\pm0.07$		CHEN	89B	CLEO	$e^+e^- \to \mu^+\mu^-$
$2.61\pm0.09\pm0.11$		KAARSBERG	89	CSB2	$e^+e^- \to \mu^+\mu^-$
$2.30\pm0.25\pm0.13$	86	ALBRECHT	87	ARG	$\Upsilon(2S) \to \pi^+\pi^-\mu^+\mu^-$
$2.9\ \pm0.3\ \pm0.2$	864	BESSON	84	CLEO	$\Upsilon(2S) \to \pi^+\pi^-\mu^+\mu^-$
$2.7\ \pm0.3\ \pm0.3$		ANDREWS	83	CLEO	$e^+e^- \to \mu^+\mu^-$
$3.2\ \pm1.3\ \pm0.3$		ALBRECHT	82	DASP	$e^+e^- \to \mu^+\mu^-$
$3.8\ \pm1.5\ \pm0.2$		NICZYPORUK	82	LENA	$e^+e^- \to \mu^+\mu^-$
$1.4\ {}^{+3.4}_{-1.4}$		BOCK	80	CNTR	$e^+e^- \to \mu^+\mu^-$
$2.2\ \pm2.0$		BERGER	79	PLUT	$e^+e^- \to \mu^+\mu^-$

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

NODE=M049R1;LINKAGE=G

$\Gamma(\tau^+\tau^-)/\Gamma(\mu^+\mu^-)$ — Γ_1/Γ_3

NODE=M049R43
NODE=M049R43

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.008±0.023 OUR AVERAGE					
$1.005\pm0.013\pm0.022$	0.7M	[1] DEL-AMO-SA..	10C	BABR	$\Upsilon(3S) \to \pi^+\pi^-\Upsilon(1S)$
$1.02\ \pm0.02\ \pm0.05$	60k	BESSON	07	CLEO	$e^+e^- \to \Upsilon(1S)$

[1] Allows any number of extra photons with total energy < 500 MeV.

NODE=M049R43;LINKAGE=DE

$\Gamma(ggg)/\Gamma_{total}$ — Γ_4/Γ

NODE=M049R35
NODE=M049R35

VALUE (units 10^{-2})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
81.7±0.7	20M	[1] BESSON	06A	CLEO	$\Upsilon(1S) \to$ hadrons

[1] Calculated using the value $\Gamma(\gamma gg)/\Gamma(ggg) = (2.70 \pm 0.01 \pm 0.13 \pm 0.24)\%$ from BESSON 06A and PDG 08 values of $B(\mu^+\mu^-) = (2.48 \pm 0.05)\%$ and $R_{hadrons} = 3.51$. The statistical error is negligible and the systematic error is partially correlated with that of $\Gamma(\gamma gg)/\Gamma_{total}$ measurement of BESSON 06A.

NODE=M049R35;LINKAGE=BE

$\Gamma(\gamma g g)/\Gamma_{total}$ Γ_5/Γ

NODE=M049R36
NODE=M049R36

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
2.20±0.60	400k	[1] BESSON	06A	CLEO	$\Upsilon(1S) \rightarrow \gamma +$ hadrons

[1] Calculated using BESSON 06A values of $\Gamma(\gamma g g)/\Gamma(g g g) = (2.70 \pm 0.01 \pm 0.13 \pm 0.24)\%$ and $\Gamma(g g g)/\Gamma_{total}$. The statistical error is negligible and the systematic error is partially correlated with that of $\Gamma(g g g)/\Gamma_{total}$ measurement of BESSON 06A.

NODE=M049R36;LINKAGE=BE

$\Gamma(\gamma g g)/\Gamma(g g g)$ Γ_5/Γ_4

NODE=M049R37
NODE=M049R37

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
2.70±0.01±0.27	20M	BESSON	06A	CLEO	$\Upsilon(1S) \rightarrow (\gamma +)$ hadrons

$\Gamma(\eta'(958)$ anything$)/\Gamma_{total}$ Γ_6/Γ

NODE=M049R73
NODE=M049R73

VALUE	DOCUMENT ID		TECN	COMMENT
0.0294±0.0024 OUR AVERAGE				
0.030 ±0.002 ±0.002	AQUINES	06A	CLE3	$\Upsilon(1S) \rightarrow \eta'$ anything
0.028 ±0.004 ±0.002	ARTUSO	03	CLE2	$\Upsilon(1S) \rightarrow \eta'$ anything

$\Gamma(J/\psi(1S)$ anything$)/\Gamma_{total}$ Γ_7/Γ

NODE=M049R12
NODE=M049R12

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
5.4 ±0.4 OUR FIT Error includes scale factor of 1.4.						
5.4 ±0.4 OUR AVERAGE Error includes scale factor of 1.5.						
5.25±0.13±0.25		3k	SHEN	16	BELL	$e^+ e^- \rightarrow J/\psi X$
6.4 ±0.4 ±0.6		730	BRIERE	04	CLEO	$e^+ e^- \rightarrow J/\psi X$
11 ±4 ±2			[1] FULTON	89	CLEO	$e^+ e^- \rightarrow \mu^+ \mu^- X$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<6.8	90		ALBRECHT	92J	ARG	$e^+ e^- \rightarrow e^+ e^- X$, $\mu^+ \mu^- X$
<17	90		MASCHMANN	90	CBAL	$e^+ e^- \rightarrow$ hadrons
<200	90		NICZYPORUK	83	LENA	

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

NODE=M049R12;LINKAGE=K

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

NODE=M049R85
NODE=M049R85

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.2 × 10^{-6}	90	YANG	14	BELL	$e^+ e^- \rightarrow J/\psi X$

$\Gamma(J/\psi(1S)\chi_{c0})/\Gamma_{total}$ Γ_9/Γ

NODE=M049R86
NODE=M049R86

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

$\Gamma(J/\psi(1S)\chi_{c1})/\Gamma_{total}$ Γ_{10}/Γ

NODE=M049R87
NODE=M049R87

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
3.90±1.21±0.23	20	YANG	14	BELL	$e^+ e^- \rightarrow J/\psi X$

$\Gamma(J/\psi(1S)\chi_{c2})/\Gamma_{total}$ Γ_{11}/Γ

NODE=M049R88
NODE=M049R88

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.4 × 10^{-6}	90	YANG	14	BELL	$e^+ e^- \rightarrow J/\psi X$

$\Gamma(J/\psi(1S)\eta_c(2S))/\Gamma_{total}$ Γ_{12}/Γ

NODE=M049R89
NODE=M049R89

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.2 × 10^{-6}	90	YANG	14	BELL	$e^+ e^- \rightarrow J/\psi X$

$\Gamma(J/\psi(1S)X(3940))/\Gamma_{total}$ Γ_{13}/Γ

NODE=M049R90
NODE=M049R90

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

$\Gamma(J/\psi(1S)X(4160))/\Gamma_{total}$ Γ_{14}/Γ

NODE=M049R91
NODE=M049R91

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

$\Gamma(X(4350)$ anything, $X \rightarrow J/\psi(1S)\phi)/\Gamma_{total}$ Γ_{15}/Γ

NODE=M049P05
NODE=M049P05

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<8.1 × 10^{-6}	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow J/\psi K^+ K^- X$

$\Gamma(T_{c\overline{c}1}(3900)^{\pm}$ anything, $T_{c\overline{c}1} \rightarrow J/\psi(1S)\pi^{\pm})/\Gamma_{total}$ Γ_{16}/Γ

NODE=M049P06
NODE=M049P06

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.3 × 10^{-5}	90	SHEN	16	BELL	$\Upsilon(1S) \rightarrow J/\psi \pi^{\pm} X$

$\Gamma(T_{c\overline{c}1}(4200)^{\pm}$ anything, $Z_c \to J/\psi(1S)\pi^{\pm})/\Gamma_{total}$ — Γ_{17}/Γ

NODE=M049P07

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<6.0 × 10^{-5}	90	SHEN	16	BELL	$\Upsilon(1S) \to J/\psi\pi^{\pm}X$

$\Gamma(T_{c\overline{c}1}(4430)^{\pm}$ anything, $T_{c\overline{c}1} \to J/\psi(1S)\pi^{\pm})/\Gamma_{total}$ — Γ_{18}/Γ

NODE=M049P08

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4.9 × 10^{-5}	90	SHEN	16	BELL	$\Upsilon(1S) \to J/\psi\pi^{\pm}X$

$\Gamma(P_{c\overline{c}s}(4459)/\overline{P}_{c\overline{c}s}(4459)$anything$)/\Gamma_{total}$ — Γ_{19}/Γ

NODE=M049P38

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
3.5±2.0±0.2	21	[1] ADACHI	25A	BELL	$e^+e^- \to \Upsilon(1S)$

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

NODE=M049P38;LINKAGE=A

$\Gamma(P_{c\overline{c}s}(4338)/\overline{P}_{c\overline{c}s}(4338)$anything$)/\Gamma_{total}$ — Γ_{20}/Γ

NODE=M049P40

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.8 × 10^{-6}	90	ADACHI	25A	BELL	$e^+e^- \to \Upsilon(1S)$

$\Gamma(P_c(4312)$anything, $P_c(4312) \to pJ/\psi(1S))/\Gamma_{total}$ — Γ_{21}/Γ

NODE=M049P42

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.7 × 10^{-6}	90	DONG	25	BELL	$e^+e^- \to \Upsilon(1S)$

$\Gamma(P_c(4440)$anything, $P_c(4440) \to pJ/\psi(1S))/\Gamma_{total}$ — Γ_{22}/Γ

NODE=M049P43

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<10.0 × 10^{-6}	90	DONG	25	BELL	$e^+e^- \to \Upsilon(1S)$

$\Gamma(P_c(4457)$anything, $P_c(4457) \to pJ/\psi(1S))/\Gamma_{total}$ — Γ_{23}/Γ

NODE=M049P44

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<7.6 × 10^{-6}	90	DONG	25	BELL	$e^+e^- \to \Upsilon(1S)$

$\Gamma(p/\overline{p}J/\psi(1S)$anything$)/\Gamma_{total}$ — Γ_{24}/Γ

NODE=M049P41

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
8.1±0.6±0.5	377	DONG	25	BELL	$e^+e^- \to \Upsilon(1S)$

$\Gamma(J/\psi(1S)\Lambda/\overline{\Lambda}$anything$)/\Gamma_{total}$ — Γ_{25}/Γ

NODE=M049P39

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
36.9±5.3±2.4	84	ADACHI	25A	BELL	$e^+e^- \to \Upsilon(1S)$

$\Gamma(X_{cs}^{\pm}$ anything, $X \to J/\psi K^{\pm})/\Gamma_{total}$ — Γ_{26}/Γ

NODE=M049P11

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.7 × 10^{-6}	90	SHEN	16	BELL	$\Upsilon(1S) \to J/\psi K^- X$

$\Gamma(\psi(4230)$ anything, $\psi \to J/\psi(1S)\pi^+\pi^-)/\Gamma_{total}$ — Γ_{27}/Γ

NODE=M049R99

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.8 × 10^{-5}	90	SHEN	16	BELL	$\Upsilon(1S) \to J/\psi\pi^+\pi^- X$

$\Gamma(\psi(4230)$ anything, $\psi \to J/\psi(1S)K^+K^-)/\Gamma_{total}$ — Γ_{28}/Γ

NODE=M049P03

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<7.5 × 10^{-6}	90	SHEN	16	BELL	$\Upsilon(1S) \to J/\psi K^+K^- X$

$\Gamma(\chi_{c1}(4140)$ anything, $\chi_{c1} \to J/\psi(1S)\phi)/\Gamma_{total}$ — Γ_{29}/Γ

NODE=M049P04

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.2 × 10^{-6}	90	SHEN	16	BELL	$\Upsilon(1S) \to J/\psi K^+K^- X$

$\Gamma(\chi_{c0}$ anything$)/\Gamma(J/\psi(1S)$ anything$)$ — Γ_{30}/Γ_7

NODE=M049R25

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

$\Gamma(\chi_{c1}$ anything$)/\Gamma_{total}$ — Γ_{31}/Γ

NODE=M049P13

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.90±0.35 OUR FIT					
1.90±0.43±0.14	215	JIA	17	BELL	$\Upsilon(1S) \to \gamma J/\psi(1S)$

$\Gamma(\chi_{c1}$ anything$)/\Gamma(J/\psi(1S)$ anything$)$ — Γ_{31}/Γ_7

NODE=M049R26

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.35±0.07 OUR FIT					
0.35±0.08±0.06	52 ± 12	BRIERE	04	CLEO	$e^+e^- \to J/\psi X$

$\Gamma(\chi_{c1}(1P)X_{tetra})/\Gamma_{total}$ — Γ_{32}/Γ

NODE=M049P15

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<37.8 × 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 37.8×10^{-6}.

NODE=M049P15;LINKAGE=A

$\Gamma(\chi_{c2}$ anything$)/\Gamma(J/\psi(1S)$ anything$)$ — Γ_{33}/Γ_7

NODE=M049R27

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

$\Gamma(\psi(2S)$ anything$)/\Gamma_{total}$ — Γ_{34}/Γ

NODE=M049P12

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.23±0.17±0.11	215	SHEN	16	BELL	$e^+e^- \to \psi(2S)X$

$\Gamma(\psi(2S)$ anything$)/\Gamma(J/\psi(1S)$ anything$)$ — Γ_{34}/Γ_7

NODE=M049R28

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

$\Gamma(\psi(2S)\eta_c)/\Gamma_{total}$ — Γ_{35}/Γ

NODE=M049R92

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.6 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to \psi(2S)X$

$\Gamma(\psi(2S)\chi_{c0})/\Gamma_{total}$ — Γ_{36}/Γ

NODE=M049R93

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<6.5 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to \psi(2S)X$

$\Gamma(\psi(2S)\chi_{c1})/\Gamma_{total}$ — Γ_{37}/Γ

NODE=M049R94

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.5 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to \psi(2S)X$

$\Gamma(\psi(2S)\chi_{c2})/\Gamma_{total}$ — Γ_{38}/Γ

NODE=M049R95

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.1 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to \psi(2S)X$

$\Gamma(\psi(2S)\eta_c(2S))/\Gamma_{total}$ — Γ_{39}/Γ

NODE=M049R96

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.2 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to \psi(2S)X$

$\Gamma(\psi(2S)X(3940))/\Gamma_{total}$ — Γ_{40}/Γ

NODE=M049R97

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.9 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to \psi(2S)X$

$\Gamma(\psi(2S)X(4160))/\Gamma_{total}$ — Γ_{41}/Γ

NODE=M049R98

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.9 \times 10^{-6}$	90	YANG	14	BELL	$e^+e^- \to \psi(2S)X$

$\Gamma(\psi(4230)$ anything, $\psi \to \psi(2S)\pi^+\pi^-)/\Gamma_{total}$ — Γ_{42}/Γ

NODE=M049P00

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7.9 \times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \to \psi(2S)\pi^+\pi^- X$

$\Gamma(\psi(4360)$ anything, $\psi \to \psi(2S)\pi^+\pi^-)/\Gamma_{total}$ — Γ_{43}/Γ

NODE=M049P01

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.2 \times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \to \psi(2S)\pi^+\pi^- X$

$\Gamma(\psi(4660)$ anything, $\psi \to \psi(2S)\pi^+\pi^-)/\Gamma_{total}$ — Γ_{44}/Γ

NODE=M049P02

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.2 \times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \to \psi(2S)\pi^+\pi^- X$

$\Gamma(T_{c\bar{c}}(4050)^{\pm}\text{ anything},\ X \to \psi(2S)\pi^{\pm})/\Gamma_{\text{total}}$ — Γ_{45}/Γ

NODE=M049P09

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8.8 \times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \to \psi(2S)\pi^{\pm}X$

$\Gamma(T_{c\bar{c}1}(4430)^{\pm}\text{ anything},\ T_{c\bar{c}1} \to \psi(2S)\pi^{\pm})/\Gamma_{\text{total}}$ — Γ_{46}/Γ

NODE=M049P10

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<6.7 \times 10^{-5}$	90	SHEN	16	BELL	$\Upsilon(1S) \to \psi(2S)\pi^{\pm}X$

$\Gamma(\chi_{c1}(3872)\text{anything})/\Gamma_{\text{total}}$ — Γ_{47}/Γ

NODE=M049P31

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.2 \times 10^{-4}$	90	[1] SHEN	16	BELL	$\Upsilon(1S) \to J/\psi\pi^{+}\pi^{-}X$

[1] SHEN 16 reports $[\Gamma(\Upsilon(1S) \to \chi_{c1}(3872)\text{anything})/\Gamma_{\text{total}}] \times [B(\chi_{c1}(3872) \to \pi^{+}\pi^{-}J/\psi(1S))] < 9.5 \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\chi_{c1}(3872) \to \pi^{+}\pi^{-}J/\psi(1S)) = 4.3 \times 10^{-2}$. NODE=M049P31;LINKAGE=A

$\Gamma(T_{c\bar{c}1}(4200)^{+}\,T_{c\bar{c}1}(4200)^{-})/\Gamma_{\text{total}}$ — Γ_{48}/Γ

NODE=M049P17

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<22.3 \times 10^{-6}$	90	[1] JIA	18	BELL	$\Upsilon(1S) \to J/\psi\pi^{\pm}X$

[1] Assuming $B(T_{c\bar{c}1}(4200)^{\pm} \to J/\psi\pi^{\pm}) = 1$. NODE=M049P17;LINKAGE=A

$\Gamma(T_{c\bar{c}1}(3900)^{\pm}\,T_{c\bar{c}1}(4200)^{\mp})/\Gamma_{\text{total}}$ — Γ_{49}/Γ

NODE=M049P18

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8.1 \times 10^{-6}$	90	[1] JIA	18	BELL	$\Upsilon(1S) \to J/\psi\pi^{\pm}X$

[1] Assuming $B(T_{c\bar{c}1}(4200)^{\pm} \to J/\psi\pi^{\pm}) = 1 = B(T_{c\bar{c}1}(3900)^{\pm} \to J/\psi\pi^{\pm})$. NODE=M049P18;LINKAGE=A

$\Gamma(T_{c\bar{c}1}(3900)^{+}\,T_{c\bar{c}1}(3900)^{-})/\Gamma_{\text{total}}$ — Γ_{50}/Γ

NODE=M049P19

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.8 \times 10^{-6}$	90	[1] JIA	18	BELL	$\Upsilon(1S) \to J/\psi\pi^{\pm}X$

[1] Assuming $B(T_{c\bar{c}1}(3900)^{\pm} \to J/\psi\pi^{\pm}) = 1$ NODE=M049P19;LINKAGE=A

$\Gamma(T_{c\bar{c}}(4050)^{+}\,T_{c\bar{c}}(4050)^{-})/\Gamma_{\text{total}}$ — Γ_{51}/Γ

NODE=M049P20

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<15.8 \times 10^{-6}$	90	[1] JIA	18	BELL	$\Upsilon(1S) \to \chi_{c1}(1P)\pi^{\pm}X$

[1] Assuming $B(T_{c\bar{c}}(4050)^{\pm} \to \chi_{c1}(1P)\pi^{\pm}) = 1$ NODE=M049P20;LINKAGE=A

$\Gamma(T_{c\bar{c}}(4250)^{+}\,T_{c\bar{c}}(4250)^{-})/\Gamma_{\text{total}}$ — Γ_{52}/Γ

NODE=M049P21

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<26.6 \times 10^{-6}$	90	[1] JIA	18	BELL	$\Upsilon(1S) \to \chi_{c1}(1P)\pi^{\pm}X$

[1] Assuming $B(T_{c\bar{c}}(4250)^{\pm} \to \chi_{c1}(1P)\pi^{\pm}) = 1$ NODE=M049P21;LINKAGE=A

$\Gamma(T_{c\bar{c}}(4050)^{\pm}\,T_{c\bar{c}}(4250)^{\mp})/\Gamma_{\text{total}}$ — Γ_{53}/Γ

NODE=M049P22

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<44.2 \times 10^{-6}$	90	[1] JIA	18	BELL	$\Upsilon(1S) \to \chi_{c1}(1P)\pi^{\pm}X$

[1] Assuming $B(T_{c\bar{c}}(4050)^{\pm} \to \chi_{c1}(1P)\pi^{\pm}) = 1 = B(T_{c\bar{c}}(4250)^{\pm} \to \chi_{c1}(1P)\pi^{\pm})$ NODE=M049P22;LINKAGE=A

$\Gamma(T_{c\bar{c}1}(4430)^{+}\,T_{c\bar{c}1}(4430)^{-})/\Gamma_{\text{total}}$ — Γ_{54}/Γ

NODE=M049P23

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

[1] Assuming $B(T_{c\bar{c}1}(4430)^{\pm} \to \psi(2S)\pi^{\pm}) = 1$ NODE=M049P23;LINKAGE=A

$\Gamma(T_{c\bar{c}}(4055)^{\pm}\,T_{c\bar{c}}(4055)^{\mp})/\Gamma_{\text{total}}$ — Γ_{55}/Γ

NODE=M049P25

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<23.3 \times 10^{-6}$	90	[1] JIA	18	BELL	$\Upsilon(1S) \to \psi(2S)\pi^{\pm}X$

[1] Assuming $B(T_{c\bar{c}}(4055)^{\pm} \to \psi(2S)\pi^{\pm}) = 1$ NODE=M049P25;LINKAGE=A

$\Gamma(T_{c\bar{c}}(4055)^{\pm}\,T_{c\bar{c}1}(4430)^{\mp})/\Gamma_{\text{total}}$ — Γ_{56}/Γ

NODE=M049P26

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<45.5 \times 10^{-6}$	90	[1] JIA	18	BELL	$\Upsilon(1S) \to \psi(2S)\pi^{\pm}X$

[1] Assuming $B(T_{c\bar{c}}(4055)^{\pm} \to \psi(2S)\pi^{\pm}) = 1 = B(T_{c\bar{c}1}(4430)^{\pm} \to \psi(2S)\pi^{\pm})$ NODE=M049P26;LINKAGE=A

$\Gamma(\rho\pi)/\Gamma_{\text{total}}$ Γ_{57}/Γ

NODE=M049R11

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<3.68	90	SHEN	13	BELL	$\Upsilon(1S) \to \pi^+\pi^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1 \times 10^3$	90	BLINOV	90	MD1	$\Upsilon(1S) \to \rho^0\pi^0$
$<2 \times 10^2$	90	FULTON	90B		$\Upsilon(1S) \to \rho^0\pi^0$
$<2.1 \times 10^3$	90	NICZYPORUK	83	LENA	$\Upsilon(1S) \to \rho^0\pi^0$

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

NODE=M049R05

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<3.90	90	SHEN	13	BELL	$\Upsilon(1S) \to \pi^+\pi^-\pi^0\pi^0$

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

NODE=M049R57

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

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

NODE=M049R58

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

$\Gamma(p\overline{p})/\Gamma_{\text{total}}$ Γ_{61}/Γ

NODE=M049R59

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

[1] Supersedes BARU 92 in this node.

NODE=M049R59;LINKAGE=A

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$ Γ_{62}/Γ

NODE=M049R72

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
2.14±0.72±0.34		26 ± 9	SHEN	13	BELL	$\Upsilon(1S) \to \pi^+\pi^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<18.4	90		ANASTASSOV	99	CLE2	$e^+e^- \to$ hadrons

$\Gamma(\phi K^+K^-)/\Gamma_{\text{total}}$ Γ_{63}/Γ

NODE=M049R75

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
2.36±0.37±0.29	56	SHEN	12A	BELL	$\Upsilon(1S) \to 2(K^+K^-)$

$\Gamma(\omega\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{64}/Γ

NODE=M049R76

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
4.46±0.67±0.72	64	SHEN	12A	BELL	$\Upsilon(1S) \to 2(\pi^+\pi^-)\pi^0$

$\Gamma(K^*(892)^0K^-\pi^+ + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{65}/Γ

NODE=M049R77

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
4.42±0.50±0.58	173	SHEN	12A	BELL	$\Upsilon(1S) \to K^+K^-\pi^+\pi^-$

$\Gamma(\phi f_2'(1525))/\Gamma_{\text{total}}$ Γ_{66}/Γ

NODE=M049R78

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<1.63	90	SHEN	12A	BELL	$\Upsilon(1S) \to 2(K^+K^-)$

$\Gamma(\omega f_2(1270))/\Gamma_{\text{total}}$ Γ_{67}/Γ

NODE=M049R79

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<1.79	90	SHEN	12A	BELL	$\Upsilon(1S) \to 2(\pi^+\pi^-)\pi^0$

$\Gamma(\rho(770)a_2(1320))/\Gamma_{\text{total}}$ Γ_{68}/Γ

NODE=M049R80

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<2.24	90	SHEN	12A	BELL	$\Upsilon(1S) \to 2(\pi^+\pi^-)\pi^0$

$\Gamma(K^*(892)^0\overline{K}_2^*(1430)^0 + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{69}/Γ

NODE=M049R81

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
3.02±0.68±0.34	42	SHEN	12A	BELL	$\Upsilon(1S) \to K^+K^-\pi^+\pi^-$

$\Gamma(K_1(1270)^{\pm}K^{\mp})/\Gamma_{\text{total}}$ Γ_{70}/Γ

NODE=M049R82

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<2.41	90	SHEN	12A	BELL	$\Upsilon(1S) \to K^+K^-\pi^+\pi^-$

$\Gamma(K_1(1400)^{\pm} K^{\mp})/\Gamma_{total}$ — Γ_{71}/Γ

NODE=M049R83
NODE=M049R83

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
1.02±0.35±0.22	24	SHEN	12A	BELL	$\Upsilon(1S) \to K^+ K^- \pi^+ \pi^-$

$\Gamma(b_1(1235)^{\pm} \pi^{\mp})/\Gamma_{total}$ — Γ_{72}/Γ

NODE=M049R84
NODE=M049R84

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<1.25	90	SHEN	12A	BELL	$\Upsilon(1S) \to 2(\pi^+ \pi^-) \pi^0$

$\Gamma(\pi^+ \pi^- \pi^0 \pi^0)/\Gamma_{total}$ — Γ_{73}/Γ

NODE=M049R06
NODE=M049R06

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
12.8±2.0±2.3	143 ± 22	SHEN	13	BELL	$\Upsilon(1S) \to \pi^+ \pi^- \pi^0 \pi^0$

$\Gamma(K^0_S K^+ \pi^- + c.c.)/\Gamma_{total}$ — Γ_{74}/Γ

NODE=M049R07
NODE=M049R07

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.59±0.33±0.18		37 ± 8	SHEN	13	BELL	$\Upsilon(1S) \to K^0_S K^- \pi^+$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<3.4	90		[1] DOBBS	12A		$\Upsilon(1S) \to K^0_S K^- \pi^+$

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

NODE=M049R07;LINKAGE=DO

$\Gamma(K^*(892)^0 \overline{K}^0 + c.c.)/\Gamma_{total}$ — Γ_{75}/Γ

NODE=M049R08
NODE=M049R08

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
2.92±0.85±0.37	16 ± 5	SHEN	13	BELL	$\Upsilon(1S) \to K^0_S K^- \pi^+$

$\Gamma(K^*(892)^- K^+ + c.c.)/\Gamma_{total}$ — Γ_{76}/Γ

NODE=M049R09
NODE=M049R09

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<1.11	90	SHEN	13	BELL	$\Upsilon(1S) \to K^0_S K^- \pi^+$

$\Gamma(f_1(1285)$ anything$)/\Gamma_{total}$ — Γ_{77}/Γ

NODE=M049P14
NODE=M049P14

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
4.6±2.8±1.3	3.1k	JIA	17A	BELL	$e^+ e^- \to$ hadrons

$\Gamma(D^*(2010)^{\pm}$ anything$)/\Gamma_{total}$ — Γ_{78}/Γ

NODE=M049R32
NODE=M049R32

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
25.2±1.3±1.5		≈ 2k	[1] AUBERT	10C	BABR	$\Upsilon(2S) \to \pi^+ \pi^- \Upsilon(1S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<19	90		[2] ALBRECHT	92J	ARG	$e^+ e^- \to D^0 \pi^{\pm} X$

[1] For $x_p > 0.1$.

NODE=M049R32;LINKAGE=AU

[2] For $x_p > 0.2$.

NODE=M049R32;LINKAGE=B

$\Gamma(f_1(1285) X_{tetra})/\Gamma_{total}$ — Γ_{79}/Γ

NODE=M049P16
NODE=M049P16

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<62.4 × 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 4.6×10^{-6} to 62.4×10^{-6}.

NODE=M049P16;LINKAGE=A

$\Gamma(\overline{^2H}$ anything$)/\Gamma_{total}$ — Γ_{80}/Γ

NODE=M049R33
NODE=M049R33

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
2.85±0.25 OUR AVERAGE					
$2.81 \pm 0.49^{+0.20}_{-0.24}$		LEES	14G	BABR	$e^+ e^- \to \overline{^2H} X$
2.86±0.19±0.21	455	ASNER	07	CLEO	$e^+ e^- \to \overline{^2H} X$

OCCUR=2

$\Gamma($Sum of 100 exclusive modes$)/\Gamma_{total}$ — Γ_{81}/Γ

NODE=M049R02
NODE=M049R02

VALUE (units 10^{-2})	DOCUMENT ID		COMMENT
1.200±0.017	[1,2] DOBBS	12A	$\Upsilon(1S) \to$ hadrons

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

NODE=M049R02;LINKAGE=DO

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

NODE=M049R02;LINKAGE=NC

$\Gamma(ggg, \gamma gg \to \overline{d}$ anything$)/\Gamma(ggg, \gamma gg \to$ anything$)$

NODE=M049R34
NODE=M049R34

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
3.36±0.23±0.25	455	ASNER	07	CLEO	$e^+ e^- \to \overline{d} X$

$\Gamma(\gamma \pi^+ \pi^-)/\Gamma_{total}$ — Γ_{82}/Γ

NODE=M049R70
NODE=M049R70

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
6.3±1.2±1.3	[1] ANASTASSOV	99	CLE2	$e^+ e^- \rightarrow$ hadrons

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

NODE=M049R70;LINKAGE=A

$\Gamma(\gamma \pi^0 \pi^0)/\Gamma_{total}$ — Γ_{83}/Γ

NODE=M049R71
NODE=M049R71

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.7±0.6±0.3	[1] ANASTASSOV	99	CLE2	$e^+ e^- \rightarrow$ hadrons

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

NODE=M049R71;LINKAGE=A

$\Gamma(\gamma \pi\pi(\text{S-wave}))/\Gamma_{total}$ — Γ_{84}/Γ

NODE=M049P27
NODE=M049P27

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
4.63±0.56±0.48	LEES	18A	BABR	$\Upsilon(1S) \rightarrow \gamma \pi^+ \pi^-$

$\Gamma(\gamma \pi^0 \eta)/\Gamma_{total}$ — Γ_{85}/Γ

NODE=M049R47
NODE=M049R47

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<2.4	90	[1] BESSON	07A	CLEO	$e^+ e^- \rightarrow \Upsilon(1S)$

[1] BESSON 07A obtained this limit for $0.7 < m_{\pi^0 \eta} < 3$ GeV.

NODE=M049R47;LINKAGE=BE

$\Gamma(\gamma K^+ K^-)/\Gamma_{total}$ — Γ_{86}/Γ

NODE=M049R24

$(2 < m_{K^+ K^-} < 3$ GeV)

NODE=M049R24
NODE=M049R24

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
1.14±0.08±0.10	90	ATHAR	06	CLE3	$\Upsilon(1S) \rightarrow \gamma K^+ K^-$

$\Gamma(\gamma p \overline{p})/\Gamma_{total}$ — Γ_{87}/Γ

NODE=M049R29

$(2 < m_{p \overline{p}} < 3$ GeV)

NODE=M049R29
NODE=M049R29

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<0.6	90	ATHAR	06	CLE3	$\Upsilon(1S) \rightarrow \gamma p \overline{p}$

$\Gamma(\gamma 2h^+ 2h^-)/\Gamma_{total}$ — Γ_{88}/Γ

NODE=M049R20
NODE=M049R20

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

$\Gamma(\gamma 3h^+ 3h^-)/\Gamma_{total}$ — Γ_{89}/Γ

NODE=M049R21
NODE=M049R21

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

$\Gamma(\gamma 4h^+ 4h^-)/\Gamma_{total}$ — Γ_{90}/Γ

NODE=M049R22
NODE=M049R22

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

$\Gamma(\gamma \pi^+ \pi^- K^+ K^-)/\Gamma_{total}$ — Γ_{91}/Γ

NODE=M049R14
NODE=M049R14

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

$\Gamma(\gamma 2\pi^+ 2\pi^-)/\Gamma_{total}$ — Γ_{92}/Γ

NODE=M049R13
NODE=M049R13

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

$\Gamma(\gamma 3\pi^+ 3\pi^-)/\Gamma_{total}$ — Γ_{93}/Γ

NODE=M049R17
NODE=M049R17

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

$\Gamma(\gamma 2\pi^+ 2\pi^- K^+ K^-)/\Gamma_{total}$ — Γ_{94}/Γ

NODE=M049R18
NODE=M049R18

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

$\Gamma(\gamma \pi^+ \pi^- p \overline{p})/\Gamma_{total}$ — Γ_{95}/Γ

NODE=M049R15
NODE=M049R15

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

$\Gamma(\gamma 2\pi^+ 2\pi^- p\overline{p})/\Gamma_{total}$ Γ_{96}/Γ

NODE=M049R19
NODE=M049R19

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

$\Gamma(\gamma 2K^+ 2K^-)/\Gamma_{total}$ Γ_{97}/Γ

NODE=M049R16
NODE=M049R16

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

$\Gamma(\gamma \eta'(958))/\Gamma_{total}$ Γ_{98}/Γ

NODE=M049R55
NODE=M049R55

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
< 1.9	90	ATHAR	07A	CLEO	$\Upsilon(1S) \to \gamma\eta' \to \gamma\pi^+\pi^-\eta, \gamma\rho$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<16	90	RICHICHI	01B	CLE2	$\Upsilon(1S) \to \gamma\eta' \to \gamma\eta\pi^+\pi^-$

$\Gamma(\gamma \eta)/\Gamma_{total}$ Γ_{99}/Γ

NODE=M049R54
NODE=M049R54

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
< 1.0	90	ATHAR	07A	CLEO	$\Upsilon(1S) \to \gamma\eta \to \gamma\gamma\gamma, \gamma\pi^+\pi^-\pi^0, \gamma 3\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<21	90	MASEK	02	CLEO	$\Upsilon(1S) \to \gamma\eta$

$\Gamma(\gamma f_0(980))/\Gamma_{total}$ Γ_{100}/Γ

NODE=M049R31
NODE=M049R31

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<3	90	[1] ATHAR	06	CLE3	$\Upsilon(1S) \to \gamma\pi^+\pi^-$

[1] Assuming B($f_0(980) \to \pi\pi$) = 1.

NODE=M049R31;LINKAGE=AT

$\Gamma(\gamma f'_2(1525))/\Gamma_{total}$ Γ_{101}/Γ

NODE=M049R52
NODE=M049R52

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
2.9 ±0.6 OUR AVERAGE						
2.13±0.28±0.72			[1] LEES	18A	BABR	$\Upsilon(1S) \to \gamma K^+ K^-$
4.0 ±1.4 ±0.1		17	[2] BESSON	11	CLEO	$\Upsilon(1S) \to K^0_S K^0_S$
3.7 $^{+0.9}_{-0.7}$ ±0.8			ATHAR	06	CLE3	$\Upsilon(1S) \to \gamma K^+ K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<14	90		[3] FULTON	90B	CLEO	$\Upsilon(1S) \to \gamma K^+ K^-$
<19.4	90		[3] ALBRECHT	89	ARG	$\Upsilon(1S) \to \gamma K^+ K^-$

[1] Using B($f'_2(1525) \to K\overline{K}$) = 0.887 ± 0.022 and B($K^0\overline{K}^0$) = 1/2 B($K\overline{K}$).

NODE=M049R52;LINKAGE=A

[2] BESSON 11 reports (4.0 ± 1.3 ± 0.6) × 10^{-5} from a measurement of [$\Gamma(\Upsilon(1S) \to \gamma f'_2(1525))/\Gamma_{total}$] × [B($f'_2(1525) \to K\overline{K}$)] assuming B($f'_2(1525) \to K\overline{K}$) = (88.8 ± 3.1) × 10^{-2}, which we rescale to our best (shown rounded) value B($f'_2(1525) \to K\overline{K}$) = (88.8 ± 2.2) × 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. The result also assumes B($K^0_S \to \pi^+\pi^-$) = (69.20 ± 0.05)% and B($f'_2(1525) \to K\overline{K}$) = 4 B($f'_2(1525) \to K^0_S K^0_S$).

NODE=M049R52;LINKAGE=BE

[3] Assuming B($f'_2(1525) \to K\overline{K}$) = 0.71.

NODE=M049R52;LINKAGE=D

$\Gamma(\gamma f_2(1270))/\Gamma_{total}$ Γ_{102}/Γ

NODE=M049R51
NODE=M049R51

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
10.1 ±0.6 OUR AVERAGE					
10.15±0.59$^{+0.54}_{-0.43}$		[1] LEES	18A	BABR	$\Upsilon(1S) \to \gamma\pi^+\pi^-$
10.5 ±1.6 $^{+1.9}_{-1.8}$		[2] BESSON	07A	CLE3	$\Upsilon(1S) \to \gamma\pi^0\pi^0$
10.2 ±0.8 ±0.7		ATHAR	06	CLE3	$\Upsilon(1S) \to \gamma\pi^+\pi^-$
8.1 ±2.3 $^{+2.9}_{-2.7}$		[3] ANASTASSOV	99	CLE2	$e^+ e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<21	90	[3] FULTON	90B	CLEO	$\Upsilon(1S) \to \gamma\pi^+\pi^-$
<13	90	[3] ALBRECHT	89	ARG	$\Upsilon(1S) \to \gamma\pi^+\pi^-$
<81	90	SCHMITT	88	CBAL	$\Upsilon(1S) \to \gamma X$

[1] Using B($f_2(1270) \to \pi^0\pi^0$) = 1/3 B($f_2(1270) \to \pi\pi$) and B($f_2(1270) \to \pi\pi$) = ($84.2^{+2.9}_{-0.9}$)%.

NODE=M049R51;LINKAGE=A

[2] Using B($f_2(1270) \to \pi^0\pi^0$) = B($f_2(1270) \to \pi\pi$)/3 and B($f_2(1270) \to \pi\pi$) = ($84.7^{+2.5}_{-1.2}$)%.

NODE=M049R51;LINKAGE=BE

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

NODE=M049R51;LINKAGE=C

$\Gamma(\gamma\eta(1405))/\Gamma_{total}$ — Γ_{103}/Γ

NODE=M049R23

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

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

NODE=M049R23;LINKAGE=J

$\Gamma(\gamma f_0(1500))/\Gamma_{total}$ — Γ_{104}/Γ

NODE=M049R44

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<1.5	90	[1] BESSON	07A	CLEO	$e^+e^- \to \Upsilon(1S) \to \gamma\pi^0\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<6.1	90	[2] BESSON	07A	CLEO	$e^+e^- \to \Upsilon(1S) \to \gamma\eta\eta$

OCCUR=2

[1] Using $B(f_0(1500) \to \pi^0\pi^0) = B(f_0(1500) \to \pi\pi)/3$ and $B(f_0(1500) \to \pi\pi) = (0.349 \pm 0.023)\%$.

NODE=M049R44;LINKAGE=BE

[2] Calculated by us using $B(f_0(1500) \to \eta\eta) = (5.1 \pm 0.9)\%$.

NODE=M049R44;LINKAGE=BS

$\Gamma(\gamma f_0(1500) \to \gamma K^+K^-)/\Gamma_{total}$ — Γ_{105}/Γ

NODE=M049P29

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.04±0.14±0.33	[1] LEES	18A	BABR	$e^+e^- \to \Upsilon(1S) \to \gamma K^+K^-$

[1] LEES 18A quotes $B(\Upsilon(1S) \to \gamma f_0(1500) \to \gamma K\overline{K}) = (2.08 \pm 0.27 \pm 0.65) \times 10^{-5}$ assuming $B(K^0\overline{K}^0) = 1/2\ B(K\overline{K})$.

NODE=M049P29;LINKAGE=A

$\Gamma(\gamma f_0(1710))/\Gamma_{total}$ — Γ_{106}/Γ

NODE=M049R53

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
< 2.6	90	[1] ALBRECHT	89	ARG	$\Upsilon(1S) \to \gamma K^+K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 6.3	90	[1] FULTON	90B	CLEO	$\Upsilon(1S) \to \gamma K^+K^-$
<19	90	[1] FULTON	90B	CLEO	$\Upsilon(1S) \to \gamma K^0_S K^0_S$
< 8	90	[2] ALBRECHT	89	ARG	$\Upsilon(1S) \to \gamma\pi^+\pi^-$
<24	90	[3] SCHMITT	88	CBAL	$\Upsilon(1S) \to \gamma X$

OCCUR=2

OCCUR=2

[1] Assuming $B(f_0(1710) \to K\overline{K}) = 0.38$.

NODE=M049R53;LINKAGE=E

[2] Assuming $B(f_0(1710) \to \pi\pi) = 0.04$.

NODE=M049R53;LINKAGE=F

[3] Assuming $B(f_0(1710) \to \eta\eta) = 0.18$.

NODE=M049R53;LINKAGE=A

$\Gamma(\gamma f_0(1710) \to \gamma K^+K^-)/\Gamma_{total}$ — Γ_{107}/Γ

NODE=M049R50

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
1.01±0.26±0.18		[1] LEES	18A	BABR	$e^+e^- \to \Upsilon(1S) \to \gamma K^+K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.7	90	ATHAR	06	CLEO	$e^+e^- \to \Upsilon(1S) \to \gamma K^+K^-$

[1] LEES 18A quotes $B(\Upsilon(1S) \to \gamma f_0(1710) \to \gamma K\overline{K}) = (2.02 \pm 0.51 \pm 0.35) \times 10^{-5}$ assuming $B(K^0\overline{K}^0) = 1/2\ B(K\overline{K})$.

NODE=M049R50;LINKAGE=A

$\Gamma(\gamma f_0(1710) \to \gamma\pi^+\pi^-)/\Gamma_{total}$ — Γ_{108}/Γ

NODE=M049P28

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
0.53±0.17±0.11	[1] LEES	18A	BABR	$\Upsilon(1S) \to \gamma\pi^+\pi^-$

[1] LEES 18A quotes $B(\Upsilon(1S) \to \gamma f_0(1710) \to \gamma\pi\pi) = (0.79 \pm 0.26 \pm 0.17) \times 10^{-5}$ assuming $B(\pi^0\pi^0) = 1/3\ B(\pi\pi)$.

NODE=M049P28;LINKAGE=A

$\Gamma(\gamma f_0(1710) \to \gamma\pi^0\pi^0)/\Gamma_{total}$ — Γ_{109}/Γ

NODE=M049R45

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<1.4	90	BESSON	07A	CLEO	$e^+e^- \to \Upsilon(1S) \to \gamma\pi^0\pi^0$

$\Gamma(\gamma f_0(1710) \to \gamma\eta\eta)/\Gamma_{total}$ — Γ_{110}/Γ

NODE=M049R46

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<1.8	90	BESSON	07A	CLEO	$e^+e^- \to \Upsilon(1S) \to \gamma\eta\eta$

$\Gamma(\gamma f_4(2050))/\Gamma_{total}$ — Γ_{111}/Γ

NODE=M049R30

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<5.3	90	[1] ATHAR	06	CLE3	$\Upsilon(1S) \to \gamma\pi^+\pi^-$

[1] Assuming $B(f_4(2050) \to \pi\pi) = 0.17$.

NODE=M049R30;LINKAGE=AT

$\Gamma(\gamma f_0(2200) \to \gamma K^+ K^-)/\Gamma_{total}$ — Γ_{112}/Γ

NODE=M049R63

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

$\Gamma(\gamma f_J(2220) \to \gamma K^+ K^-)/\Gamma_{total}$ — Γ_{113}/Γ

NODE=M049R56

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
< 8	90	ATHAR	06	CLE3	$\Upsilon(1S) \to \gamma K^+ K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 160	90	MASEK	02	CLEO	$\Upsilon(1S) \to \gamma K^+ K^-$
< 150	90	FULTON	90B	CLEO	$\Upsilon(1S) \to \gamma K^+ K^-$
< 290	90	ALBRECHT	89	ARG	$\Upsilon(1S) \to \gamma K^+ K^-$
<2000	90	BARU	89	MD1	$\Upsilon(1S) \to \gamma K^+ K^-$

$\Gamma(\gamma f_J(2220) \to \gamma \pi^+ \pi^-)/\Gamma_{total}$ — Γ_{114}/Γ

NODE=M049R41

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
< 6	90	ATHAR	06	CLE3	$\Upsilon(1S) \to \gamma \pi^+ \pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<120	90	MASEK	02	CLEO	$\Upsilon(1S) \to \gamma \pi^+ \pi^-$

$\Gamma(\gamma f_J(2220) \to \gamma p \overline{p})/\Gamma_{total}$ — Γ_{115}/Γ

NODE=M049R42

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
< 11	90	ATHAR	06	CLE3	$\Upsilon(1S) \to \gamma p \overline{p}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<160	90	MASEK	02	CLEO	$\Upsilon(1S) \to \gamma p \overline{p}$

$\Gamma(\gamma \eta(2225) \to \gamma \phi \phi)/\Gamma_{total}$ — Γ_{116}/Γ

NODE=M049R62

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

$\Gamma(\gamma \eta_c(1S))/\Gamma_{total}$ — Γ_{117}/Γ

NODE=M049R38

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.9 \times 10^{-5}$	90	[1] KATRENKO	20	BELL	$e^+ e^- \to \gamma$ + hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<5.7 \times 10^{-5}$	90	SHEN	10A	BELL	$\Upsilon(1S) \to \gamma X$

[1] Using $\Upsilon(2S) \to \Upsilon(1S) \pi^+ \pi^-$ decays.

NODE=M049R38;LINKAGE=A

$\Gamma(\gamma \eta_c(2S))/\Gamma_{total}$ — Γ_{118}/Γ

NODE=M049P30

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4 \times 10^{-4}$	90	[1] KATRENKO	20	BELL	$e^+ e^- \to \gamma$ + hadrons

[1] Using $\Upsilon(2S) \to \Upsilon(1S) \pi^+ \pi^-$ decays.

NODE=M049P30;LINKAGE=A

$\Gamma(\gamma \chi_{c0})/\Gamma_{total}$ — Γ_{119}/Γ

NODE=M049R39

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<6.6 \times 10^{-5}$	90	[1] KATRENKO	20	BELL	$\Upsilon(1S) \to \gamma$ + hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<6.5 \times 10^{-4}$	90	SHEN	10A	BELL	$\Upsilon(1S) \to \gamma X$

[1] Using $\Upsilon(2S) \to \Upsilon(1S) \pi^+ \pi^-$ decays.

NODE=M049R39;LINKAGE=A

$\Gamma(\gamma \chi_{c1})/\Gamma_{total}$ — Γ_{120}/Γ

NODE=M049R40

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$4.7^{+2.4}_{-1.8}{}^{+0.4}_{-0.5}$		5	[1] KATRENKO	20	BELL	$\Upsilon(1S) \to \gamma$ + hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<2.3	90		SHEN	10A	BELL	$\Upsilon(1S) \to \gamma X$

[1] Using $\Upsilon(2S) \to \Upsilon(1S) \pi^+ \pi^-$ decays.

NODE=M049R40;LINKAGE=A

$\Gamma(\gamma \chi_{c2})/\Gamma_{total}$ — Γ_{121}/Γ

NODE=M049R48

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7.6 \times 10^{-6}$	90	SHEN	10A	BELL	$\Upsilon(1S) \to \gamma X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<3.3 \times 10^{-5}$	90	[1] KATRENKO	20	BELL	$\Upsilon(1S) \to \gamma$ + hadrons

[1] Using $\Upsilon(2S) \to \Upsilon(1S) \pi^+ \pi^-$ decays.

NODE=M049R48;LINKAGE=A

$\Gamma(\gamma\chi_{c1}(3872))/\Gamma_{total}$ Γ_{122}/Γ

NODE=M049P32
NODE=M049P32

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4 × 10^{-5}	90	[1] SHEN	10A	BELL	$\Upsilon(1S) \rightarrow \gamma X$

[1] SHEN 10A reports $[\Gamma(\Upsilon(1S) \rightarrow \gamma\chi_{c1}(3872))/\Gamma_{total}] \times [B(\chi_{c1}(3872) \rightarrow \pi^+\pi^- J/\psi(1S))] < 1.6 \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\chi_{c1}(3872) \rightarrow \pi^+\pi^- J/\psi(1S)) = 4.3 \times 10^{-2}$.

NODE=M049P32;LINKAGE=A

$\Gamma(\gamma\chi_{c1}(3872),\ \chi_{c1} \rightarrow \pi^+\pi^-\pi^0 J/\psi)/\Gamma_{total}$ Γ_{123}/Γ

NODE=M049R68
NODE=M049R68

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.8 × 10^{-6}	90	SHEN	10A	BELL	$\Upsilon(1S) \rightarrow \gamma X$

$\Gamma(\gamma\chi_{c0}(3915) \rightarrow \omega J/\psi)/\Gamma_{total}$ Γ_{124}/Γ

NODE=M049R69
NODE=M049R69

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<3.0	90	SHEN	10A	BELL	$\Upsilon(1S) \rightarrow \gamma X$

$\Gamma(\gamma\chi_{c1}(4140) \rightarrow \phi J/\psi)/\Gamma_{total}$ Γ_{125}/Γ

NODE=M049R74
NODE=M049R74

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<2.2	90	SHEN	10A	BELL	$\Upsilon(1S) \rightarrow \gamma X$

$\Gamma(\gamma X\overline{X}(m_X < 3.1\ \mathrm{GeV}))/\Gamma_{total}$ Γ_{126}/Γ

NODE=M049R61

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

NODE=M049R61
NODE=M049R61

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

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

NODE=M049R61;LINKAGE=A

$\Gamma(\gamma X\overline{X}(m_X < 4.5\ \mathrm{GeV}))/\Gamma_{total}$ Γ_{127}/Γ

NODE=M049R01

X and $\overline{X}$ = zero spin with m < 4.5 GeV

NODE=M049R01
NODE=M049R01

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<24	90	[1] DEL-AMO-SA...	11J	BABR	$e^+e^- \rightarrow \gamma + X\overline{X}$

[1] For a noninteracting scalar X with mass m < 4.5 GeV.

NODE=M049R01;LINKAGE=DA

$\Gamma(\gamma X \rightarrow \gamma + \geq 4\ \mathrm{prongs})/\Gamma_{total}$ Γ_{128}/Γ

NODE=M049R64

(1.5 GeV < m_X < 5.0 GeV)

NODE=M049R64
NODE=M049R64

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<1.78	95	ROSNER	07A	CLEO	$e^+e^- \rightarrow \gamma X$

$\Gamma(\gamma A^0)/\Gamma_{total}$ Γ_{129}/Γ

NODE=M049R60

(A^0 = scalar with m < 8.0 GeV)

NODE=M049R60
NODE=M049R60

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<4.5 × 10^{-6}	90	[1] DEL-AMO-SA...	11J	BABR	$e^+e^- \rightarrow \gamma + X$
<3 × 10^{-5}	90	[2] BALEST	95	CLEO	$e^+e^- \rightarrow \gamma + X$
<5.6 × 10^{-5}	90	[2] ANTREASYAN	90C	CBAL	$e^+e^- \rightarrow \gamma + X$

[1] For a non-interacting scalar or pseudoscalar, A^0, with mass m_{A^0} < 8.0 GeV. 90% CL upper limits range from 1.9×10^{-6} to 4.5×10^{-6}.

NODE=M049R60;LINKAGE=DA

[2] For any non-interacting long-lived particle with mass < 7.2 GeV.

NODE=M049R60;LINKAGE=A

$\Gamma(\gamma A^0 \rightarrow \gamma\mu^+\mu^-)/\Gamma_{total}$ Γ_{130}/Γ

NODE=M049R65

(201 < M($\mu^+\mu^-$) < 3565 MeV)

NODE=M049R65
NODE=M049R65

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
< 9	90	[1] LOVE	08	CLEO	$e^+e^- \rightarrow \gamma A^0 \rightarrow \gamma\mu^+\mu^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<16	90	[2] JIA	22	BELL	$\Upsilon(2S) \rightarrow \gamma\mu^+\mu^-\pi^+\pi^-$
< 9.7	90	[3] LEES	13C	BABR	$e^+e^- \rightarrow \gamma A^0 \rightarrow \gamma\mu^+\mu^-$

[1] For a narrow scalar or pseudoscalar, A^0, with 201 < M($\mu^+\mu^-$) < 3565 MeV, excluding J/ψ. Measured 90% CL limits as a function of M($\mu^+\mu^-$) range from 1–9 × 10^{-6}.

NODE=M049R65;LINKAGE=LO

[2] For a narrow scalar or pseudoscalar, A^0, with 0.22 < M(A^0) < 9.2 GeV, resulting in 90% CL upper limits ranging from 3.1×10^{-7} at M(A^0) = 0.22 GeV to 1.6×10^{-5} at M(A^0) = 9.2 GeV.

NODE=M049R65;LINKAGE=A

[3] For a narrow scalar or pseudoscalar, A^0, with mass in the range 0.212–9.2 GeV, excluding J/ψ and $\psi(2S)$. Measured 90% CL limits as a function of m_{A^0} are in the range 0.28–9.7 × 10^{-6}.

NODE=M049R65;LINKAGE=LE

$\Gamma(\gamma A^0 \to \gamma \tau^+ \tau^-)/\Gamma_{total}$ Γ_{131}/Γ

NODE=M049R66

($2m_\tau < M(\tau^+\tau^-) < 9.2$ GeV)

NODE=M049R66
NODE=M049R66

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<130	90	[1] LEES	13R	BABR	$\Upsilon(2S) \to \gamma \tau^+ \tau^- \pi^+ \pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<150	90	[2] JIA	22	BELL	$\Upsilon(2S) \to \gamma \tau^+ \tau^- \pi^+ \pi^-$
< 50	90	[3] LOVE	08	CLEO	$e^+ e^- \to \gamma A^0 \to \gamma \tau^+ \tau^-$

[1] For a narrow scalar or pseudoscalar, A^0, with $2m_\tau < M(A^0) < 9.2$ GeV, resulting in 90% CL upper limits of 0.9×10^{-5} at $M(A^0) = 2m_\tau$, $\approx 1.5 \times 10^{-5}$ at $M(A^0) = 7.5$ GeV, and 13×10^{-5} at $M(A^0) = 9.2$ GeV.

NODE=M049R66;LINKAGE=A

[2] For a narrow scalar or pseudoscalar, A^0, with $2m_\tau < M(A^0) < 9.2$ GeV, resulting in 90% CL upper limits ranging from 3.8×10^{-6} at $M(A^0) = 2m_\tau$ to 1.5×10^{-4} at $M(A^0) = 9.2$ GeV.

NODE=M049R66;LINKAGE=B

[3] For a narrow scalar or pseudoscalar, A^0, with $2m_\tau < M(A^0) < 7.5$ GeV, resulting in 90% CL limits ranging from 1×10^{-5} at $M(A^0)=2m_\tau$ to 5×10^{-5} at $M(A^0)=7.5$ GeV.

NODE=M049R66;LINKAGE=LO

$\Gamma(\gamma A^0 \to \gamma g g)/\Gamma_{total}$ Γ_{132}/Γ

NODE=M049R03

(0.5 GeV $< m < 9.0$ GeV)

NODE=M049R03
NODE=M049R03

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1 \times 10^{-2}$	90	[1] LEES	13L	BABR	$\Upsilon(1S) \to \gamma X$

[1] For a narrow, *CP*-odd pseudoscalar, A^0, searched for in 26 hadronic decay modes with invariant mass 0.5 GeV $< m_{A^0} <$ 9.0 GeV. Measured 90% CL limits as a function of m_{A^0} range from 10^{-6} to 10^{-2}.

NODE=M049R03;LINKAGE=A

$\Gamma(\gamma A^0 \to \gamma s \bar{s})/\Gamma_{total}$ Γ_{133}/Γ

NODE=M049R04

(0.5 GeV $< m < 9.0$ GeV)

NODE=M049R04
NODE=M049R04

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1 \times 10^{-3}$	90	[1] LEES	13L	BABR	$\Upsilon(1S) \to \gamma X$

[1] For a narrow, *CP*-odd pseudoscalar, A^0, searched for in 14 hadronic decay modes with invariant mass 1.5 GeV $< m_{A^0} <$ 9.0 GeV. Measured 90% CL limits as a function of m_{A^0} range from 10^{-5} to 10^{-3}.

NODE=M049R04;LINKAGE=A

LEPTON FAMILY NUMBER (*LF*) VIOLATING MODES

NODE=M049230

$\Gamma(e^\pm \mu^\mp)/\Gamma_{total}$ Γ_{134}/Γ

NODE=M049P33
NODE=M049P33

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
<3.9	90	PATRA	22	BELL	$\Upsilon(2S) \to \pi^+ \pi^- e^\pm \mu^\mp$

$\Gamma(\mu^\pm \tau^\mp)/\Gamma_{total}$ Γ_{135}/Γ

NODE=M049R67
NODE=M049R67

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.7 \times 10^{-6}$	90	PATRA	22	BELL	$\Upsilon(2S) \to \pi^+ \pi^- \mu^\pm \tau^\mp$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<6.0 \times 10^{-6}$	95	LOVE	08A	CLEO	$e^+ e^- \to \mu^\pm \tau^\mp$

$\Gamma(e^\pm \tau^\mp)/\Gamma_{total}$ Γ_{136}/Γ

NODE=M049P34
NODE=M049P34

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<2.7	90	PATRA	22	BELL	$\Upsilon(2S) \to \pi^+ \pi^- e^\pm \tau^\mp$

$\Gamma(\gamma e^\pm \mu^\mp)/\Gamma_{total}$ Γ_{137}/Γ

NODE=M049P35
NODE=M049P35

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
<4.2	90	PATRA	22	BELL	$\Upsilon(2S) \to \pi^+ \pi^- \gamma e^\pm \mu^\mp$

$\Gamma(\gamma \mu^\pm \tau^\mp)/\Gamma_{total}$ Γ_{138}/Γ

NODE=M049P36
NODE=M049P36

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<6.1	90	PATRA	22	BELL	$\Upsilon(2S) \to \pi^+ \pi^- \gamma \mu^\pm \tau^\mp$

$\Gamma(\gamma e^\pm \tau^\mp)/\Gamma_{total}$ Γ_{139}/Γ

NODE=M049P37
NODE=M049P37

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<6.5	90	PATRA	22	BELL	$\Upsilon(2S) \to \pi^+ \pi^- \gamma e^\pm \tau^\mp$

OTHER DECAYS

NODE=M049235

$\Gamma(\text{invisible})/\Gamma_{\text{total}}$ Γ_{140}/Γ

NODE=M049R10
NODE=M049R10

VALUE (units 10^{-4})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
< 3.0	90	AUBERT	09AX	BABR	$\Upsilon(3S) \to \pi^+\pi^-\Upsilon(1S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<39	90	RUBIN	07	CLEO	$\Upsilon(2S) \to \pi^+\pi^-\Upsilon(1S)$
<25	90	TAJIMA	07	BELL	$\Upsilon(3S) \to \pi^+\pi^-\Upsilon(1S)$

$\Upsilon(1S)$ REFERENCES

NODE=M049

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
SHAMOV	23	PL B839 137766	A.G. Shamov, O.L. Rezanova	(NOVO, NOVOU)	REFID=62012
JIA	22	PRL 128 081804	S. Jia *et al.*	(BELLE Collab.)	REFID=61657
PATRA	22	JHEP 2205 095	S. Patra *et al.*	(BELLE Collab.)	REFID=61653
KATRENKO	20	PRL 124 122001	P. Katrenko *et al.*	(BELLE Collab.)	REFID=60544
JIA	18	PR D97 112004	S. Jia *et al.*	(BELLE Collab.)	REFID=58949
LEES	18A	PR D97 112006	J.P. Lees *et al.*	(BABAR Collab.)	REFID=58950
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
SHEN	16	PR D93 112013	C.P. Shen *et al.*	(BELLE Collab.)	REFID=57515
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
LEES	13C	PR D87 031102	J.P. Lees *et al.*	(BABAR Collab.)	REFID=54949
LEES	13L	PR D88 031701	J.P. Lees *et al.*	(BABAR Collab.)	REFID=55167
LEES	13R	PR D88 071102	J.P. Lees *et al.*	(BABAR Collab.)	REFID=55451
SHEN	13	PR D88 011102	C.P. Shen *et al.*	(BELLE Collab.)	REFID=55395
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
BESSON	11	PR D83 037101	D. Besson *et al.*	(CLEO Collab.)	REFID=16737
DEL-AMO-SA...	11J	PRL 107 021804	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=16495
AUBERT	10C	PR D81 011102	B. Aubert *et al.*	(BABAR Collab.)	REFID=53211
DEL-AMO-SA...	10C	PRL 104 191801	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53354
SHEN	10A	PR D82 051504	C.P. Shen *et al.*	(BELLE Collab.)	REFID=53545
AUBERT	09AX	PRL 103 251801	B. Aubert *et al.*	(BABAR Collab.)	REFID=53201
LOVE	08	PRL 101 151802	W. Love *et al.*	(CLEO Collab.)	REFID=52565
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
ATHAR	07A	PR D76 072003	S.B. Athar *et al.*	(CLEO Collab.)	REFID=51945
BESSON	07	PRL 98 052002	D. Besson *et al.*	(CLEO Collab.)	REFID=51620
BESSON	07A	PR D75 072001	D. Besson *et al.*	(CLEO Collab.)	REFID=51638
ROSNER	07A	PR D76 117102	J.L. Rosner *et al.*	(CLEO Collab.)	REFID=52079
RUBIN	07	PR D75 031104	P. Rubin *et al.*	(CLEO Collab.)	REFID=51629
TAJIMA	07	PRL 98 132001	O. Tajima *et al.*	(BELLE Collab.)	REFID=51645
AQUINES	06A	PR D74 092006	O. Aquines *et al.*	(CLEO Collab.)	REFID=51510
ATHAR	06	PR D73 032001	S.B. Athar *et al.*	(CLEO Collab.)	REFID=50993
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
BRIERE	04	PR D70 072001	R.A. Briere *et al.*	(CLEO Collab.)	REFID=50183
ARTUSO	03	PR D67 052003	M. Artuso *et al.*	(CLEO Collab.)	REFID=49395
MASEK	02	PR D65 072002	G. Masek *et al.*	(CLEO Collab.)	REFID=48846
RICHICHI	01B	PRL 87 141801	S.J. Richichi *et al.*	(CLEO Collab.)	REFID=48345
ARTAMONOV	00	PL B474 427	A.S. Artamonov *et al.*		REFID=47424
ANASTASSOV	99	PRL 82 286	A. Anastassov *et al.*	(CLEO Collab.)	REFID=46609
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
BALEST	95	PR D51 2053	R. Balest *et al.*	(CLEO Collab.)	REFID=44146
CINABRO	94B	PL B340 129	D. Cinabro *et al.*	(CLEO Collab.)	REFID=44102
ALBRECHT	92J	ZPHY C55 25	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=42167
BARU	92	ZPHY C54 229	S.E. Baru *et al.*	(NOVO)	REFID=41860
BARU	92B	ZPHY C56 547	S.E. Baru *et al.*	(NOVO)	REFID=42168
KOBEL	92	ZPHY C53 193	M. Kobel *et al.*	(Crystal Ball Collab.)	REFID=41861
ANTREASYAN	90C	PL B251 204	D. Antreasyan *et al.*	(Crystal Ball Collab.)	REFID=41455
BLINOV	90	PL B245 311	A.E. Blinov *et al.*	(NOVO)	REFID=41361
FULTON	90B	PR D41 1401	R. Fulton *et al.*	(CLEO Collab.)	REFID=41012
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
ALEXANDER	89	NP B320 45	J.P. Alexander *et al.*	(LBL, MICH, SLAC)	REFID=40345
BARU	89	ZPHY C42 505	S.E. Baru *et al.*	(NOVO)	REFID=40917
CHEN	89B	PR D39 3528	W.Y. Chen *et al.*	(CLEO Collab.)	REFID=40919
FULTON	89	PL B224 445	R. Fulton *et al.*	(CLEO Collab.)	REFID=40918
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
SCHMITT	88	ZPHY C40 199	P. Schmitt *et al.*	(Crystal Ball Collab.)	REFID=40582
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
BARU	86	ZPHY C30 551	S.E. Baru *et al.*	(NOVO)	REFID=22284
ALBRECHT	85C	PL 154B 452	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=22282
KURAEV	85	SJNP 41 466	E.A. Kuraev, V.S. Fadin	(NOVO)	REFID=40033
		Translated from YAF 41 733.			
ARTAMONOV	84	PL 137B 272	A.S. Artamonov *et al.*	(NOVO)	REFID=22278
BESSON	84	PR D30 1433	D. Besson *et al.*	(CLEO Collab.)	REFID=22279
GILES	84B	PR D29 1285	R. Giles *et al.*	(CLEO Collab.)	REFID=22280
MACKAY	84	PR D29 2483	W.W. MacKay *et al.*	(CUSB Collab.)	REFID=22281
ANDREWS	83	PRL 50 807	D.E. Andrews *et al.*	(CLEO Collab.)	REFID=22273
GILES	83	PRL 50 877	R. Giles *et al.*	(HARV, OSU, ROCH, RUTG+)	REFID=22274
NICZYPORUK	83	ZPHY C17 197	B. Niczyporuk *et al.*	(LENA Collab.)	REFID=12488
ALBRECHT	82	PL 116B 383	H. Albrecht *et al.*	(DESY, DORT, HEIDH+)	REFID=22270
ARTAMONOV	82	PL 118B 225	A.S. Artamonov *et al.*	(NOVO)	REFID=22271
NICZYPORUK	82	ZPHY C15 299	B. Niczyporuk *et al.*	(LENA Collab.)	REFID=22272
BERGER	80C	PL 93B 497	C. Berger *et al.*	(PLUTO Collab.)	REFID=22263
BOCK	80	ZPHY C6 125	P. Bock *et al.*	(HEIDP, MPIM, DESY, HAMB)	REFID=22264
BERGER	79	ZPHY C1 343	C. Berger *et al.*	(PLUTO Collab.)	REFID=22259