$\psi(2S)$

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

See the Review on "$\psi(2S)$ and χ_c branching ratios" before the $\chi_{c0}(1P)$ Listings.

$\psi(2S)$ MASS

OUR FIT includes measurements of $m_{\psi(2S)}$, $m_{\psi(3770)}$, and $m_{\psi(3770)} - m_{\psi(2S)}$.

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
3686.097±0.025 OUR FIT	Error includes scale factor of 2.6.				
3686.097±0.010 OUR AVERAGE					
3686.099±0.004±0.009		[1] ANASHIN	15	KEDR	$e^+e^- \rightarrow$ hadrons
3686.12 ±0.06 ±0.10	4k	AAIJ	12H	LHCB	$pp \rightarrow J/\psi\pi^+\pi^- X$
3685.95 ±0.10	413	[2] ARTAMONOV	00	OLYA	$e^+e^- \rightarrow$ hadrons
3685.98 ±0.09 ±0.04		[3] ARMSTRONG	93B	E760	$\overline{p}p \rightarrow e^+e^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$3686.114\pm0.007{}^{+0.011}_{-0.016}$		[4] ANASHIN	12	KEDR	$e^+e^- \rightarrow$ hadrons
3686.111±0.025±0.009		AULCHENKO	03	KEDR	$e^+e^- \rightarrow$ hadrons
3686.00 ±0.10	413	[5] ZHOLENTZ	80	OLYA	e^+e^-

[1] Supersedes AULCHENKO 03 and ANASHIN 12.
[2] Reanalysis of ZHOLENTZ 80 using new electron mass (COHEN 87) and radiative corrections (KURAEV 85).
[3] Mass central value and systematic error recalculated by us according to Eq. (16) in ARMSTRONG 93B, using the value for the $J/\psi(1S)$ mass from AULCHENKO 03.
[4] From the scans in 2004 and 2006. ANASHIN 12 reports the value $3686.114 \pm 0.007 \pm 0.011{}^{+0.002}_{-0.012}$ MeV, where the third uncertainty is due to assumptions on the interference between the resonance and hadronic continuum. We combined the two systematic uncertainties.
[5] Superseded by ARTAMONOV 00.

$m_{\psi(2S)} - m_{J/\psi(1S)}$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
589.188±0.028 OUR AVERAGE				
589.194±0.027±0.011	[1] AULCHENKO	03	KEDR	$e^+e^- \rightarrow$ hadrons
589.7 ±1.2	LEMOIGNE	82	GOLI	185 π^- Be $\rightarrow \gamma\mu^+\mu^-$ A
589.07 ±0.13	[1] ZHOLENTZ	80	OLYA	e^+e^-
588.7 ±0.8	LUTH	75	MRK1	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
588 ±1	[2] BAI	98E	BES	e^+e^-

[1] Redundant with data in mass above.
[2] Systematic errors not evaluated.

$\psi(2S)$ WIDTH

VALUE (keV)	EVTS	DOCUMENT ID		TECN	COMMENT
296± 8 OUR FIT					
286±16 OUR AVERAGE					
358±88± 4		ABLIKIM	08B	BES2	$e^+e^- \rightarrow$ hadrons
290±25± 4	2.7k	ANDREOTTI	07	E835	$p\overline{p} \rightarrow e^+e^-$, $J/\psi X$
331±58± 2		ABLIKIM	06L	BES2	$e^+e^- \rightarrow$ hadrons
264±27		[1] BAI	02B	BES2	e^+e^-
287±37±16		[2] ARMSTRONG	93B	E760	$\overline{p}p \rightarrow e^+e^-$

[1] From a simultaneous fit to the hadronic and $\mu^+\mu^-$ cross section, assuming $\Gamma = \Gamma_h + \Gamma_e + \Gamma_\mu + \Gamma_\tau$ and lepton universality. Does not include vacuum polarization correction.

[2] The initial-state radiation correction reevaluated by ANDREOTTI 07 in its Ref. [4].

$\psi(2S)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	hadrons	(97.85 ±0.13) %	
Γ_2	virtual $\gamma \rightarrow$ hadrons	(1.73 ±0.14) %	S=1.5
Γ_3	ggg	(10.6 ±1.6) %	
Γ_4	γgg	(1.03 ±0.29) %	
Γ_5	light hadrons	(15.4 ±1.5) %	
Γ_6	e^+e^-	(7.89 ±0.17) $\times 10^{-3}$	
Γ_7	$\mu^+\mu^-$	(7.9 ±0.9) $\times 10^{-3}$	
Γ_8	$\tau^+\tau^-$	(3.1 ±0.4) $\times 10^{-3}$	
	Decays into $J/\psi(1S)$ and anything		
Γ_9	$J/\psi(1S)$ anything	(61.0 ±0.6) %	
Γ_{10}	$J/\psi(1S)$ neutrals	(25.14 ±0.33) %	
Γ_{11}	$J/\psi(1S)\pi^+\pi^-$	(34.49 ±0.30) %	
Γ_{12}	$J/\psi(1S)\pi^0\pi^0$	(18.16 ±0.31) %	
Γ_{13}	$J/\psi(1S)\eta$	(3.36 ±0.05) %	
Γ_{14}	$J/\psi(1S)\pi^0$	(1.268±0.032) $\times 10^{-3}$	
	Hadronic decays		
Γ_{15}	$\pi^0 h_c(1P)$	(8.6 ±1.3) $\times 10^{-4}$	
Γ_{16}	$3(\pi^+\pi^-)\pi^0$	(3.5 ±1.6) $\times 10^{-3}$	
Γ_{17}	$2(\pi^+\pi^-)\pi^0$	(2.9 ±1.0) $\times 10^{-3}$	S=4.7
Γ_{18}	$\rho a_2(1320)$	(2.6 ±0.9) $\times 10^{-4}$	
Γ_{19}	$p\overline{p}$	(2.88 ±0.09) $\times 10^{-4}$	
Γ_{20}	$\Delta^{++}\overline{\Delta}^{--}$	(1.28 ±0.35) $\times 10^{-4}$	
Γ_{21}	$\Lambda\overline{\Lambda}\pi^0$	< 2.9 $\times 10^{-6}$	CL=90%
Γ_{22}	$\Lambda\overline{\Lambda}\eta$	(2.5 ±0.4) $\times 10^{-5}$	
Γ_{23}	$\Lambda\overline{p}K^+$	(1.00 ±0.14) $\times 10^{-4}$	
Γ_{24}	$\Lambda\overline{p}K^+\pi^+\pi^-$	(1.8 ±0.4) $\times 10^{-4}$	
Γ_{25}	$\Lambda\overline{\Lambda}\pi^+\pi^-$	(2.8 ±0.6) $\times 10^{-4}$	

Γ_{26}	$\Lambda\overline{\Lambda}$	(3.57 ± 0.18) $\times 10^{-4}$		
Γ_{27}	$\Lambda\overline{\Sigma}^{+}\pi^{-}+$ c.c.	(1.40 ± 0.13) $\times 10^{-4}$		
Γ_{28}	$\Lambda\overline{\Sigma}^{-}\pi^{+}+$ c.c.	(1.54 ± 0.14) $\times 10^{-4}$		
Γ_{29}	$\Sigma^{0}\overline{p}K^{+}+$ c.c.	(1.67 ± 0.18) $\times 10^{-5}$		
Γ_{30}	$\Sigma^{+}\overline{\Sigma}^{-}$	(2.51 ± 0.21) $\times 10^{-4}$		
Γ_{31}	$\Sigma^{0}\overline{\Sigma}^{0}$	(2.32 ± 0.16) $\times 10^{-4}$		
Γ_{32}	$\Sigma(1385)^{+}\overline{\Sigma}(1385)^{-}$	(1.1 ± 0.4) $\times 10^{-4}$		
Γ_{33}	$\Xi^{-}\overline{\Xi}^{+}$	(2.64 ± 0.18) $\times 10^{-4}$		
Γ_{34}	$\Xi^{0}\overline{\Xi}^{0}$	(2.07 ± 0.23) $\times 10^{-4}$		
Γ_{35}	$\Xi(1530)^{0}\overline{\Xi}(1530)^{0}$	(5.2 $^{+3.2}_{-1.2}$) $\times 10^{-5}$		
Γ_{36}	$K^{-}\Lambda\overline{\Xi}^{+}+$ c.c.	(3.9 ± 0.4) $\times 10^{-5}$		
Γ_{37}	$\Xi(1690)^{-}\overline{\Xi}^{+}\to K^{-}\Lambda\overline{\Xi}^{+}+$ c.c.	(5.2 ± 1.6) $\times 10^{-6}$		
Γ_{38}	$\Xi(1820)^{-}\overline{\Xi}^{+}\to K^{-}\Lambda\overline{\Xi}^{+}+$ c.c.	(1.20 ± 0.32) $\times 10^{-5}$		
Γ_{39}	$K^{-}\Sigma^{0}\overline{\Xi}^{+}+$ c.c.	(3.7 ± 0.4) $\times 10^{-5}$		
Γ_{40}	$\Omega^{-}\overline{\Omega}^{+}$	(4.7 ± 1.0) $\times 10^{-5}$		
Γ_{41}	$\pi^{0}p\overline{p}$	(1.53 ± 0.07) $\times 10^{-4}$		
Γ_{42}	$N(940)\overline{p}+$ c.c. $\to \pi^{0}p\overline{p}$	(6.4 $^{+1.8}_{-1.3}$) $\times 10^{-5}$		
Γ_{43}	$N(1440)\overline{p}+$ c.c. $\to \pi^{0}p\overline{p}$	(7.3 $^{+1.7}_{-1.5}$) $\times 10^{-5}$	S=2.5	
Γ_{44}	$N(1520)\overline{p}+$ c.c. $\to \pi^{0}p\overline{p}$	(6.4 $^{+2.3}_{-1.8}$) $\times 10^{-6}$		
Γ_{45}	$N(1535)\overline{p}+$ c.c. $\to \pi^{0}p\overline{p}$	(2.5 ± 1.0) $\times 10^{-5}$		
Γ_{46}	$N(1650)\overline{p}+$ c.c. $\to \pi^{0}p\overline{p}$	(3.8 $^{+1.4}_{-1.7}$) $\times 10^{-5}$		
Γ_{47}	$N(1720)\overline{p}+$ c.c. $\to \pi^{0}p\overline{p}$	(1.79 $^{+0.26}_{-0.70}$) $\times 10^{-5}$		
Γ_{48}	$N(2300)\overline{p}+$ c.c. $\to \pi^{0}p\overline{p}$	(2.6 $^{+1.2}_{-0.7}$) $\times 10^{-5}$		
Γ_{49}	$N(2570)\overline{p}+$ c.c. $\to \pi^{0}p\overline{p}$	(2.13 $^{+0.40}_{-0.31}$) $\times 10^{-5}$		
Γ_{50}	$\pi^{0}f_{0}(2100)\to \pi^{0}p\overline{p}$	(1.1 ± 0.4) $\times 10^{-5}$		
Γ_{51}	$\eta p\overline{p}$	(6.0 ± 0.4) $\times 10^{-5}$		
Γ_{52}	$\eta f_{0}(2100)\to \eta p\overline{p}$	(1.2 ± 0.4) $\times 10^{-5}$		
Γ_{53}	$N(1535)\overline{p}\to \eta p\overline{p}$	(4.4 ± 0.7) $\times 10^{-5}$		
Γ_{54}	$\omega p\overline{p}$	(6.9 ± 2.1) $\times 10^{-5}$		
Γ_{55}	$\phi p\overline{p}$	$<$ 2.4 $\times 10^{-5}$	CL=90%	
Γ_{56}	$\pi^{+}\pi^{-}p\overline{p}$	(6.0 ± 0.4) $\times 10^{-4}$		
Γ_{57}	$p\overline{n}\pi^{-}$ or c.c.	(2.48 ± 0.17) $\times 10^{-4}$		
Γ_{58}	$p\overline{n}\pi^{-}\pi^{0}$	(3.2 ± 0.7) $\times 10^{-4}$		
Γ_{59}	$2(\pi^{+}\pi^{-}\pi^{0})$	(4.8 ± 1.5) $\times 10^{-3}$		
Γ_{60}	$\eta\pi^{+}\pi^{-}$	$<$ 1.6 $\times 10^{-4}$	CL=90%	
Γ_{61}	$\eta\pi^{+}\pi^{-}\pi^{0}$	(9.5 ± 1.7) $\times 10^{-4}$		
Γ_{62}	$2(\pi^{+}\pi^{-})\eta$	(1.2 ± 0.6) $\times 10^{-3}$		
Γ_{63}	$\eta'\pi^{+}\pi^{-}\pi^{0}$	(4.5 ± 2.1) $\times 10^{-4}$		

Γ_{64}	$\omega\pi^+\pi^-$	$(7.3 \pm 1.2) \times 10^{-4}$	S=2.1
Γ_{65}	$b_1^\pm\pi^\mp$	$(4.0 \pm 0.6) \times 10^{-4}$	S=1.1
Γ_{66}	$b_1^0\pi^0$	$(2.4 \pm 0.6) \times 10^{-4}$	
Γ_{67}	$\omega f_2(1270)$	$(2.2 \pm 0.4) \times 10^{-4}$	
Γ_{68}	$\pi^+\pi^-K^+K^-$	$(7.5 \pm 0.9) \times 10^{-4}$	S=1.9
Γ_{69}	$\rho^0K^+K^-$	$(2.2 \pm 0.4) \times 10^{-4}$	
Γ_{70}	$K^*(892)^0\overline{K}_2^*(1430)^0$	$(1.9 \pm 0.5) \times 10^{-4}$	
Γ_{71}	$K^+K^-\pi^+\pi^-\eta$	$(1.3 \pm 0.7) \times 10^{-3}$	
Γ_{72}	$K^+K^-2(\pi^+\pi^-)\pi^0$	$(1.00 \pm 0.31) \times 10^{-3}$	
Γ_{73}	$K^+K^-2(\pi^+\pi^-)$	$(1.9 \pm 0.9) \times 10^{-3}$	
Γ_{74}	$K_1(1270)^\pm K^\mp$	$(1.00 \pm 0.28) \times 10^{-3}$	
Γ_{75}	$K_S^0K_S^0\pi^+\pi^-$	$(2.2 \pm 0.4) \times 10^{-4}$	
Γ_{76}	$\rho^0p\overline{p}$	$(5.0 \pm 2.2) \times 10^{-5}$	
Γ_{77}	$K^+\overline{K}^*(892)^0\pi^- +$ c.c.	$(6.7 \pm 2.5) \times 10^{-4}$	
Γ_{78}	$2(\pi^+\pi^-)$	$(2.4 \pm 0.6) \times 10^{-4}$	S=2.2
Γ_{79}	$\rho^0\pi^+\pi^-$	$(2.2 \pm 0.6) \times 10^{-4}$	S=1.4
Γ_{80}	$K^+K^-\pi^+\pi^-\pi^0$	$(1.26 \pm 0.09) \times 10^{-3}$	
Γ_{81}	$\omega f_0(1710) \to \omega K^+K^-$	$(5.9 \pm 2.2) \times 10^{-5}$	
Γ_{82}	$K^*(892)^0K^-\pi^+\pi^0 +$ c.c.	$(8.6 \pm 2.2) \times 10^{-4}$	
Γ_{83}	$K^*(892)^+K^-\pi^+\pi^- +$ c.c.	$(9.6 \pm 2.8) \times 10^{-4}$	
Γ_{84}	$K^*(892)^+K^-\rho^0 +$ c.c.	$(7.3 \pm 2.6) \times 10^{-4}$	
Γ_{85}	$K^*(892)^0K^-\rho^+ +$ c.c.	$(6.1 \pm 1.8) \times 10^{-4}$	
Γ_{86}	ηK^+K^-, no $\eta\phi$	$(3.1 \pm 0.4) \times 10^{-5}$	
Γ_{87}	ωK^+K^-	$(1.62 \pm 0.11) \times 10^{-4}$	S=1.1
Γ_{88}	$\omega K^*(892)^+K^- +$ c.c.	$(2.07 \pm 0.26) \times 10^{-4}$	
Γ_{89}	$\omega K_2^*(1430)^+K^- +$ c.c.	$(6.1 \pm 1.2) \times 10^{-5}$	
Γ_{90}	$\omega\overline{K}^*(892)^0K^0$	$(1.68 \pm 0.30) \times 10^{-4}$	
Γ_{91}	$\omega\overline{K}_2^*(1430)^0K^0$	$(5.8 \pm 2.2) \times 10^{-5}$	
Γ_{92}	$\omega X(1440) \to \omega K_S^0K^-\pi^+ +$ c.c.	$(1.6 \pm 0.4) \times 10^{-5}$	
Γ_{93}	$\omega X(1440) \to \omega K^+K^-\pi^0$	$(1.09 \pm 0.26) \times 10^{-5}$	
Γ_{94}	$\omega f_1(1285) \to \omega K_S^0K^-\pi^+ +$ c.c.	$(3.0 \pm 1.0) \times 10^{-6}$	
Γ_{95}	$\omega f_1(1285) \to \omega K^+K^-\pi^0$	$(1.2 \pm 0.7) \times 10^{-6}$	
Γ_{96}	$3(\pi^+\pi^-)$	$(3.5 \pm 2.0) \times 10^{-4}$	S=2.8
Γ_{97}	$p\overline{p}\pi^+\pi^-\pi^0$	$(7.3 \pm 0.7) \times 10^{-4}$	
Γ_{98}	K^+K^-	$(7.5 \pm 0.5) \times 10^{-5}$	
Γ_{99}	$K_S^0K_L^0$	$(5.34 \pm 0.33) \times 10^{-5}$	
Γ_{100}	$\pi^+\pi^-\pi^0$	$(2.01 \pm 0.17) \times 10^{-4}$	S=1.7
Γ_{101}	$\rho(2150)\pi \to \pi^+\pi^-\pi^0$	$(1.9 {}^{+1.2}_{-0.4}) \times 10^{-4}$	
Γ_{102}	$\rho(770)\pi \to \pi^+\pi^-\pi^0$	$(3.2 \pm 1.2) \times 10^{-5}$	S=1.8
Γ_{103}	$\pi^+\pi^-$	$(7.8 \pm 2.6) \times 10^{-6}$	
Γ_{104}	$K_1(1400)^\pm K^\mp$	$< 3.1 \times 10^{-4}$	CL=90%

Γ_{105}	$K_2^*(1430)^\pm K^\mp$	$(7.1\ ^{+1.3}_{-0.9}) \times 10^{-5}$	
Γ_{106}	$K^+ K^- \pi^0$	$(4.07 \pm 0.31) \times 10^{-5}$	
Γ_{107}	$K^+ K^*(892)^- +$ c.c.	$(2.9 \pm 0.4) \times 10^{-5}$	S=1.2
Γ_{108}	$K^*(892)^0 \overline{K}^0 +$ c.c.	$(1.09 \pm 0.20) \times 10^{-4}$	
Γ_{109}	$\phi \pi^+ \pi^-$	$(1.17 \pm 0.29) \times 10^{-4}$	S=1.7
Γ_{110}	$\phi f_0(980) \to \pi^+ \pi^-$	$(6.8 \pm 2.5) \times 10^{-5}$	S=1.2
Γ_{111}	$2(K^+ K^-)$	$(6.0 \pm 1.4) \times 10^{-5}$	
Γ_{112}	$\phi K^+ K^-$	$(7.0 \pm 1.6) \times 10^{-5}$	
Γ_{113}	$2(K^+ K^-)\pi^0$	$(1.10 \pm 0.28) \times 10^{-4}$	
Γ_{114}	$\phi \eta$	$(3.10 \pm 0.31) \times 10^{-5}$	
Γ_{115}	$\phi \eta'$	$(3.1 \pm 1.6) \times 10^{-5}$	
Γ_{116}	$\omega \eta'$	$(3.2\ ^{+2.5}_{-2.1}) \times 10^{-5}$	
Γ_{117}	$\omega \pi^0$	$(2.1 \pm 0.6) \times 10^{-5}$	
Γ_{118}	$\rho \eta'$	$(1.9\ ^{+1.7}_{-1.2}) \times 10^{-5}$	
Γ_{119}	$\rho \eta$	$(2.2 \pm 0.6) \times 10^{-5}$	S=1.1
Γ_{120}	$\omega \eta$	$< 1.1 \times 10^{-5}$	CL=90%
Γ_{121}	$\phi \pi^0$	$< 4 \times 10^{-7}$	CL=90%
Γ_{122}	$\eta_c \pi^+ \pi^- \pi^0$	$< 1.0 \times 10^{-3}$	CL=90%
Γ_{123}	$p \overline{p} K^+ K^-$	$(2.7 \pm 0.7) \times 10^{-5}$	
Γ_{124}	$\overline{\Lambda} n K_S^0 +$ c.c.	$(8.1 \pm 1.8) \times 10^{-5}$	
Γ_{125}	$\phi f_2'(1525)$	$(4.4 \pm 1.6) \times 10^{-5}$	
Γ_{126}	$\Theta(1540)\overline{\Theta}(1540) \to K_S^0 p K^- \overline{n} +$ c.c.	$< 8.8 \times 10^{-6}$	CL=90%
Γ_{127}	$\Theta(1540) K^- \overline{n} \to K_S^0 p K^- \overline{n}$	$< 1.0 \times 10^{-5}$	CL=90%
Γ_{128}	$\Theta(1540) K_S^0 \overline{p} \to K_S^0 \overline{p} K^+ n$	$< 7.0 \times 10^{-6}$	CL=90%
Γ_{129}	$\overline{\Theta}(1540) K^+ n \to K_S^0 \overline{p} K^+ n$	$< 2.6 \times 10^{-5}$	CL=90%
Γ_{130}	$\overline{\Theta}(1540) K_S^0 p \to K_S^0 p K^- \overline{n}$	$< 6.0 \times 10^{-6}$	CL=90%
Γ_{131}	$K_S^0 K_S^0$	$< 4.6 \times 10^{-6}$	

Radiative decays

Γ_{132}	$\gamma \chi_{c0}(1P)$	(9.99 ± 0.27) %	
Γ_{133}	$\gamma \chi_{c1}(1P)$	(9.55 ± 0.31) %	
Γ_{134}	$\gamma \chi_{c2}(1P)$	(9.11 ± 0.31) %	
Γ_{135}	$\gamma \eta_c(1S)$	$(3.4 \pm 0.5) \times 10^{-3}$	S=1.3
Γ_{136}	$\gamma \eta_c(2S)$	$(7 \pm 5) \times 10^{-4}$	
Γ_{137}	$\gamma \pi^0$	$(1.6 \pm 0.4) \times 10^{-6}$	
Γ_{138}	$\gamma \eta'(958)$	$(1.23 \pm 0.06) \times 10^{-4}$	
Γ_{139}	$\gamma f_2(1270)$	$(2.73\ ^{+0.29}_{-0.25}) \times 10^{-4}$	S=1.8
Γ_{140}	$\gamma f_0(1370) \to \gamma K \overline{K}$	$(3.1 \pm 1.7) \times 10^{-5}$	
Γ_{141}	$\gamma f_0(1500)$	$(9.2 \pm 1.9) \times 10^{-5}$	
Γ_{142}	$\gamma f_2'(1525)$	$(3.3 \pm 0.8) \times 10^{-5}$	

Γ_{143}	$\gamma f_0(1710)$			
Γ_{144}	$\quad \gamma f_0(1710) \to \gamma \pi \pi$		$(3.5 \pm 0.6) \times 10^{-5}$	
Γ_{145}	$\quad \gamma f_0(1710) \to \gamma K \overline{K}$		$(6.6 \pm 0.7) \times 10^{-5}$	
Γ_{146}	$\gamma f_0(2100) \to \gamma \pi \pi$		$(4.8 \pm 1.0) \times 10^{-6}$	
Γ_{147}	$\gamma f_0(2200) \to \gamma K \overline{K}$		$(3.2 \pm 1.0) \times 10^{-6}$	
Γ_{148}	$\gamma f_J(2220) \to \gamma \pi \pi$		$< 5.8 \times 10^{-6}$	CL=90%
Γ_{149}	$\gamma f_J(2220) \to \gamma K \overline{K}$		$< 9.5 \times 10^{-6}$	CL=90%
Γ_{150}	$\gamma \gamma$		$< 1.5 \times 10^{-4}$	CL=90%
Γ_{151}	$\gamma \eta$		$(1.4 \pm 0.5) \times 10^{-6}$	
Γ_{152}	$\gamma \eta \pi^+ \pi^-$		$(8.7 \pm 2.1) \times 10^{-4}$	
Γ_{153}	$\gamma \eta(1405)$			
Γ_{154}	$\quad \gamma \eta(1405) \to \gamma K \overline{K} \pi$		$< 9 \times 10^{-5}$	CL=90%
Γ_{155}	$\quad \gamma \eta(1405) \to \eta \pi^+ \pi^-$		$(3.6 \pm 2.5) \times 10^{-5}$	
Γ_{156}	$\gamma \eta(1475)$			
Γ_{157}	$\quad \gamma \eta(1475) \to K \overline{K} \pi$		$< 1.4 \times 10^{-4}$	CL=90%
Γ_{158}	$\quad \gamma \eta(1475) \to \eta \pi^+ \pi^-$		$< 8.8 \times 10^{-5}$	CL=90%
Γ_{159}	$\gamma 2(\pi^+ \pi^-)$		$(4.0 \pm 0.6) \times 10^{-4}$	
Γ_{160}	$\gamma K^{*0} K^+ \pi^- +$ c.c.		$(3.7 \pm 0.9) \times 10^{-4}$	
Γ_{161}	$\gamma K^{*0} \overline{K}^{*0}$		$(2.4 \pm 0.7) \times 10^{-4}$	
Γ_{162}	$\gamma K^0_S K^+ \pi^- +$ c.c.		$(2.6 \pm 0.5) \times 10^{-4}$	
Γ_{163}	$\gamma K^+ K^- \pi^+ \pi^-$		$(1.9 \pm 0.5) \times 10^{-4}$	
Γ_{164}	$\gamma p \overline{p}$		$(3.9 \pm 0.5) \times 10^{-5}$	S=2.0
Γ_{165}	$\quad \gamma f_2(1950) \to \gamma p \overline{p}$		$(1.20 \pm 0.22) \times 10^{-5}$	
Γ_{166}	$\quad \gamma f_2(2150) \to \gamma p \overline{p}$		$(7.2 \pm 1.8) \times 10^{-6}$	
Γ_{167}	$\quad \gamma X(1835) \to \gamma p \overline{p}$		$(4.6 {}^{+1.8}_{-4.0}) \times 10^{-6}$	
Γ_{168}	$\quad \gamma X \to \gamma p \overline{p}$	[a]	$< 2 \times 10^{-6}$	CL=90%
Γ_{169}	$\gamma \pi^+ \pi^- p \overline{p}$		$(2.8 \pm 1.4) \times 10^{-5}$	
Γ_{170}	$\gamma 2(\pi^+ \pi^-) K^+ K^-$		$< 2.2 \times 10^{-4}$	CL=90%
Γ_{171}	$\gamma 3(\pi^+ \pi^-)$		$< 1.7 \times 10^{-4}$	CL=90%
Γ_{172}	$\gamma K^+ K^- K^+ K^-$		$< 4 \times 10^{-5}$	CL=90%
Γ_{173}	$\gamma \gamma J/\psi$		$(3.1 {}^{+1.0}_{-1.2}) \times 10^{-4}$	

Other decays

Γ_{174}	invisible	< 1.6 %	CL=90%

[a] For a narrow resonance in the range $2.2 < M(X) < 2.8$ GeV.

CONSTRAINED FIT INFORMATION

A multiparticle fit to $\chi_{c1}(1P)$, $\chi_{c0}(1P)$, $\chi_{c2}(1P)$, and $\psi(2S)$ with 4 total widths, a partial width, 25 combinations of partial widths obtained from integrated cross section, and 84 branching ratios uses 240 measurements to determine 49 parameters. The overall fit has a $\chi^2 = 342.4$ for 191 degrees of freedom.

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

	x_6	x_7	x_8	x_{11}	x_{12}	x_{13}	x_{19}	x_{132}	x_{133}	x_{134}
x_7	3									
x_8	1	0								
x_{11}	30	8	2							
x_{12}	29	5	1	49						
x_{13}	13	3	1	36	16					
x_{19}	0	0	0	5	3	2				
x_{132}	1	0	0	3	1	1	0			
x_{133}	2	0	0	4	1	1	0	0		
x_{134}	1	0	0	4	1	1	0	0	0	
Γ	−81	−3	−1	−39	−35	−17	−9	−1	−2	−2

$\psi(2S)$ PARTIAL WIDTHS

$\Gamma(\text{hadrons})$ Γ_1

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
258±26	BAI	02B	BES2	e^+e^-
224±56	LUTH	75	MRK1	e^+e^-

$\Gamma(e^+e^-)$ Γ_6

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
2.34 ±0.04 OUR FIT				
2.30 ±0.06 OUR AVERAGE				
2.24 ±0.10 ±0.02	[1] ABLIKIM	15V	BES3	4.0–4.4 $e^+e^- \rightarrow \pi^+\pi^- J/\psi$
2.338±0.037±0.096	ABLIKIM	08B	BES2	$e^+e^- \rightarrow$ hadrons
2.330±0.036±0.110	ABLIKIM	06L	BES2	$e^+e^- \rightarrow$ hadrons
2.44 ±0.21	[2] BAI	02B	BES2	e^+e^-
2.14 ±0.21	ALEXANDER	89	RVUE	See Υ mini-review
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.0 ±0.3	BRANDELIK	79C	DASP	e^+e^-
2.1 ±0.3	[3] LUTH	75	MRK1	e^+e^-

[1] ABLIKIM 15V reports 2.213 ± 0.018 ± 0.099 keV from a measurement of [$\Gamma(\psi(2S) \to e^+e^-)$] × [B($\psi(2S) \to J/\psi(1S)\pi^+\pi^-$)] assuming B($\psi(2S) \to J/\psi(1S)\pi^+\pi^-$) = $(34.95 \pm 0.45) \times 10^{-2}$, which we rescale to our best value B($\psi(2S) \to J/\psi(1S)\pi^+\pi^-$) = $(34.49 \pm 0.30) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] From a simultaneous fit to e^+e^-, $\mu^+\mu^-$, and hadronic channel, assuming $\Gamma_e = \Gamma_\mu = \Gamma_\tau/0.38847$.

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

$\Gamma(\gamma\gamma)$ — Γ_{150}

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<43	90	BRANDELIK	79C	DASP	e^+e^-

$\psi(2S)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(total)$

This combination of a partial width with the partial width into e^+e^- and with the total width is obtained from the integrated cross section into channel(i) in the e^+e^- annihilation. We list only data that have not been used to determine the partial width Γ(i) or the branching ratio Γ(i)/total.

$\Gamma(\text{hadrons}) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_1\Gamma_6/\Gamma$

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
2.233±0.015±0.042	[1] ANASHIN	12	KEDR	$e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.2 ±0.4	ABRAMS	75	MRK1	e^+e^-

[1] ANASHIN 12 reports the value 2.233 ± 0.015 ± 0.037 ± 0.020 keV, where the third uncertainty is due to assumptions on the interference between the resonance and hadronic continuum. We combined the two systematic uncertainties.

$\Gamma(\tau^+\tau^-) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_8\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
9.0±2.6	79	[1] ANASHIN	07	KEDR	$e^+e^- \to \psi(2S) \to \tau^+\tau^-$

[1] Using $\psi(2S)$ total width of 337 ± 13 keV. Systematic errors not evaluated.

$\Gamma(J/\psi(1S)\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{11}\Gamma_6/\Gamma$

VALUE (keV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.807±0.013 OUR FIT					
0.837±0.025 OUR AVERAGE	Error includes scale factor of 1.3. See the ideogram below.				
0.837±0.028±0.005		[1] LEES	12E	BABR	10.6 $e^+e^- \to 2\pi^+2\pi^-\gamma$
0.852±0.010±0.026	19.5k	ADAM	06	CLEO	3.773 $e^+e^- \to \gamma\psi(2S)$
0.68 ±0.09		[2] BAI	98E	BES	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.88 ±0.08 ±0.03	256	[3] AUBERT	07AU	BABR	10.6 $e^+e^- \to J/\psi\pi^+\pi^-\gamma$
0.755±0.048±0.004	544	[4] AUBERT	05D	BABR	10.6 $e^+e^- \to \pi^+\pi^-\mu^+\mu^-\gamma$

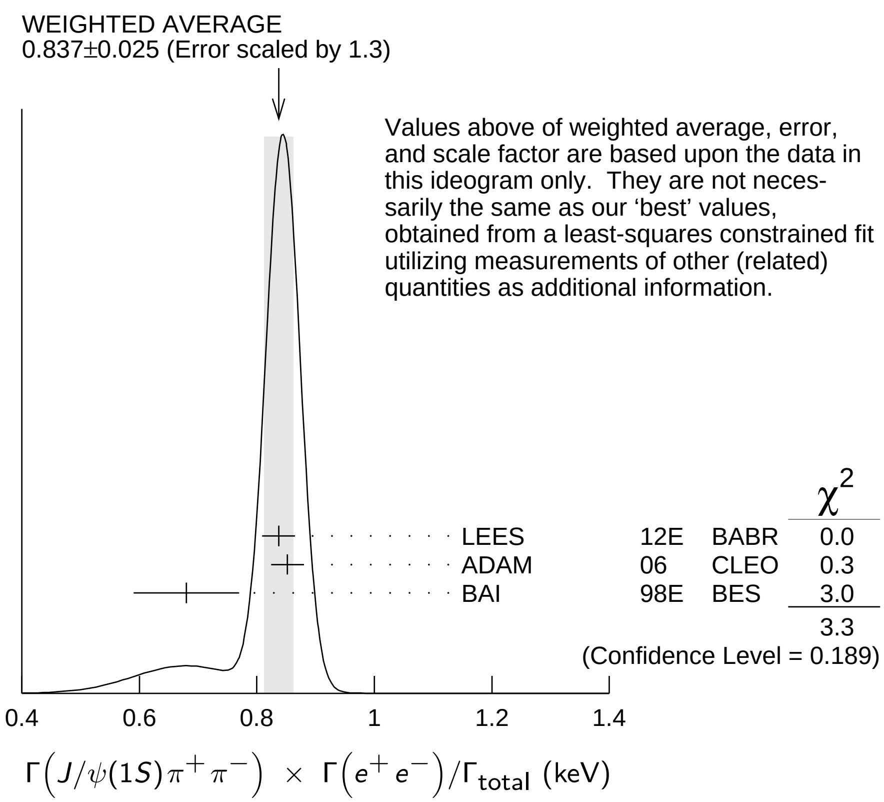
[1] LEES 12E reports [$\Gamma(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) \times \Gamma(\psi(2S) \to e^+e^-)/\Gamma_{total}$] × [B($J/\psi(1S) \to \mu^+\mu^-$)] = $(49.9 \pm 1.3 \pm 1.0) \times 10^{-3}$ keV which we divide by our

best value B($J/\psi(1S) \rightarrow \mu^+\mu^-$) = $(5.961 \pm 0.033) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] The value of $\Gamma(e^+e^-)$ quoted in BAI 98E is derived using B($\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-$)= $(32.4 \pm 2.6) \times 10^{-2}$ and B($J/\psi(1S) \rightarrow \ell^+\ell^-$)= 0.1203 ± 0.0038. Recalculated by us using B($J/\psi(1S) \rightarrow \ell^+\ell^-$)= 0.1181 ± 0.0020.

[3] AUBERT 07AU reports $[\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \times \Gamma(\psi(2S) \rightarrow e^+e^-)/\Gamma_{total}] \times [B(J/\psi(1S) \rightarrow \pi^+\pi^-\pi^0)] = 0.0186 \pm 0.0012 \pm 0.0011$ keV which we divide by our best value B($J/\psi(1S) \rightarrow \pi^+\pi^-\pi^0$) = $(2.11 \pm 0.07) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[4] AUBERT 05D reports $[\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \times \Gamma(\psi(2S) \rightarrow e^+e^-)/\Gamma_{total}] \times [B(J/\psi(1S) \rightarrow \mu^+\mu^-)] = 0.0450 \pm 0.0018 \pm 0.0022$ keV which we divide by our best value B($J/\psi(1S) \rightarrow \mu^+\mu^-$) = $(5.961 \pm 0.033) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Superseded by LEES 12E.



$\Gamma(J/\psi(1S)\pi^0\pi^0) \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{12}\Gamma_6/\Gamma$

VALUE (keV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.425±0.009 OUR FIT					
0.411±0.008±0.018	3.6k±96	ADAM	06	CLEO	3.773 $e^+e^- \rightarrow \gamma\psi(2S)$

$\Gamma(J/\psi(1S)\eta) \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{13}\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
78.6± 1.6 OUR FIT					
87 ± 9 OUR AVERAGE					
83 ±25 ±5	14	[1] AUBERT	07AU	BABR	10.6 $e^+e^- \rightarrow J/\psi\pi^+\pi^-\pi^0\gamma$
88 ± 6 ±7	291 ± 24	ADAM	06	CLEO	3.773 $e^+e^- \rightarrow \gamma\psi(2S)$

[1] AUBERT 07AU quotes $\Gamma_{ee}^{\psi(2S)} \cdot$ B($\psi(2S) \rightarrow J/\psi\eta$) $\cdot$ B($J/\psi \rightarrow \mu^+\mu^-$) $\cdot$ B($\eta \rightarrow \pi^+\pi^-\pi^0$) = 1.11 ± 0.33 ± 0.07 eV.

$\Gamma(J/\psi(1S)\pi^0) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{14}\Gamma_6/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<8	90	<37	ADAM	06	CLEO	3.773 $e^+e^- \rightarrow \gamma\psi(2S)$

$\Gamma(p\overline{p}) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{19}\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.674±0.023 OUR FIT					
0.64 ±0.04 OUR AVERAGE					
0.67 ±0.12 ±0.02	43	LEES	13O	BABR	$e^+e^- \rightarrow p\overline{p}\gamma$
0.74 ±0.07 ±0.04	142	LEES	13Y	BABR	$e^+e^- \rightarrow p\overline{p}\gamma$
0.579±0.038±0.036	2.7k	ANDREOTTI	07	E835	$p\overline{p} \rightarrow e^+e^-$, $J/\psi X$
0.70 ±0.17 ±0.03	22	AUBERT	06B		$e^+e^- \rightarrow p\overline{p}\gamma$

$\Gamma(\Lambda\overline{\Lambda}) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{26}\Gamma_6/\Gamma$

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
1.5±0.4±0.1	AUBERT	07BD	BABR	10.6 $e^+e^- \rightarrow \Lambda\overline{\Lambda}\gamma$

$\Gamma(2(\pi^+\pi^-\pi^0)) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{59}\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
11.2±3.3±1.3	43	AUBERT	06D	BABR	10.6 $e^+e^- \rightarrow 2(\pi^+\pi^-\pi^0)\gamma$

$\Gamma(K^+K^-2(\pi^+\pi^-)) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{73}\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
4.4±2.1±0.3	26	AUBERT	06D	BABR	10.6 $e^+e^- \rightarrow K^+K^-2(\pi^+\pi^-)\gamma$

$\Gamma(\pi^+\pi^-K^+K^-) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{68}\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
2.56±0.42±0.16	85	AUBERT	07AK	BABR	10.6 $e^+e^- \rightarrow \pi^+\pi^-K^+K^-\gamma$

$\Gamma(\phi f_0(980) \rightarrow \pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{110}\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.347±0.169±0.003	6 ± 3	[1] AUBERT	07AK	BABR	10.6 $e^+e^- \rightarrow \pi^+\pi^-K^+K^-\gamma$

[1] AUBERT 07AK reports [$\Gamma(\psi(2S) \rightarrow \phi f_0(980) \rightarrow \pi^+\pi^-) \times \Gamma(\psi(2S) \rightarrow e^+e^-)/\Gamma_{total}$] × [B($\phi(1020) \rightarrow K^+K^-$)] = 0.17 ± 0.08 ± 0.02 eV which we divide by our best value B($\phi(1020) \rightarrow K^+K^-$) = (48.9 ± 0.5) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\phi\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{109}\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
0.57±0.23±0.01	10	[1] AUBERT,BE	06D	BABR	10.6 $e^+e^- \rightarrow K^+K^-\pi^+\pi^-\gamma$

[1] AUBERT,BE 06D reports [$\Gamma(\psi(2S) \rightarrow \phi\pi^+\pi^-) \times \Gamma(\psi(2S) \rightarrow e^+e^-)/\Gamma_{total}$] × [B($\phi(1020) \rightarrow K^+K^-$)] = 0.28 ± 0.11 ± 0.02 eV which we divide by our best value B($\phi(1020) \rightarrow K^+K^-$) = (48.9 ± 0.5) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(2(\pi^+\pi^-)\pi^0) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{17}\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
29.7±2.2±1.8	410	AUBERT	07AU	BABR	10.6 $e^+e^- \to 2(\pi^+\pi^-)\pi^0\gamma$

$\Gamma(\omega\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{64}\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
3.01±0.84±0.02	37	[1] AUBERT	07AU	BABR	10.6 $e^+e^- \to \omega\pi^+\pi^-\gamma$

[1] AUBERT 07AU reports $[\Gamma(\psi(2S) \to \omega\pi^+\pi^-) \times \Gamma(\psi(2S) \to e^+e^-)/\Gamma_{total}] \times [B(\omega(782) \to \pi^+\pi^-\pi^0)] = 2.69 \pm 0.73 \pm 0.16$ eV which we divide by our best value $B(\omega(782) \to \pi^+\pi^-\pi^0) = (89.2 \pm 0.7) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(2(\pi^+\pi^-)\eta) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{62}\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
2.87±1.41±0.01	16	[1] AUBERT	07AU	BABR	10.6 $e^+e^- \to 2(\pi^+\pi^-)\eta\gamma$

[1] AUBERT 07AU reports $[\Gamma(\psi(2S) \to 2(\pi^+\pi^-)\eta) \times \Gamma(\psi(2S) \to e^+e^-)/\Gamma_{total}] \times [B(\eta \to 2\gamma)] = 1.13 \pm 0.55 \pm 0.08$ eV which we divide by our best value $B(\eta \to 2\gamma) = (39.41 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+K^-\pi^+\pi^-\pi^0) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{80}\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
4.4±1.3±0.3	32	AUBERT	07AU	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\pi^0\gamma$

$\Gamma(K^+K^-\pi^+\pi^-\eta) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{71}\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
3.04±1.79±0.02	7	[1] AUBERT	07AU	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\eta\gamma$

[1] AUBERT 07AU reports $[\Gamma(\psi(2S) \to K^+K^-\pi^+\pi^-\eta) \times \Gamma(\psi(2S) \to e^+e^-)/\Gamma_{total}] \times [B(\eta \to 2\gamma)] = 1.2 \pm 0.7 \pm 0.1$ eV which we divide by our best value $B(\eta \to 2\gamma) = (39.41 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+K^-) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{98}\Gamma_6/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.147±0.035±0.005	66	[1] LEES	15J	BABR	$e^+e^- \to K^+K^-\gamma$
0.197±0.035±0.005	66	[2] LEES	15J	BABR	$e^+e^- \to K^+K^-\gamma$
0.35 ±0.14 ±0.03	11	[3] LEES	13Q	BABR	$e^+e^- \to K^+K^-\gamma$

[1] $\sin\phi > 0$.
[2] $\sin\phi < 0$.
[3] Interference with non-resonant K^+K^- production not taken into account.

$\psi(2S)$ BRANCHING RATIOS

$\Gamma(\text{hadrons})/\Gamma_{\text{total}}$ — Γ_1/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.9785±0.0013 OUR AVERAGE				
0.9779±0.0015	[1] BAI	02B	BES2	e^+e^-
0.981 ±0.003	[1] LUTH	75	MRK1	e^+e^-

[1] Includes cascade decay into $J/\psi(1S)$.

$\Gamma(\text{virtual}\gamma \rightarrow \text{hadrons})/\Gamma_{\text{total}}$ — Γ_2/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.0173±0.0014 OUR AVERAGE	Error includes scale factor of 1.5.			
0.0166±0.0010	[1,2] SETH	04	RVUE	e^+e^-
0.0199±0.0019	[1] BAI	02B	BES2	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.029 ±0.004	[1] LUTH	75	MRK1	e^+e^-

[1] Included in $\Gamma(\text{hadrons})/\Gamma_{\text{total}}$.
[2] Using B($\psi(2S) \rightarrow \ell^+\ell^-$) = (0.73 ± 0.04)% from RPP-2002 and R = 2.28 ± 0.04 determined by a fit to data from BAI 00 and BAI 02C.

$\Gamma(ggg)/\Gamma_{\text{total}}$ — Γ_3/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
10.58±1.62	2.9 M	[1] LIBBY	09	CLEO	$\psi(2S) \rightarrow$ hadrons

[1] Calculated using $\Gamma(\gamma gg)/\Gamma(ggg) = 0.097 \pm 0.026 \pm 0.016$ from LIBBY 09, B($\psi(2S) \rightarrow X J/\psi$) relative and absolute branching fractions from MENDEZ 08, B($\psi(2S) \rightarrow \gamma\eta_c$) from MITCHELL 09, and B($\psi(2S) \rightarrow$ virtual $\gamma \rightarrow$ hadrons), B($\psi(2S) \rightarrow \gamma\chi_{cJ}$), and B($\psi(2S) \rightarrow \ell^+\ell^-$) from PDG 08. The statistical error is negligible and the systematic error is largely uncorrelated with that of $\Gamma(\gamma gg)/\Gamma_{\text{total}}$ LIBBY 09 measurement.

$\Gamma(\gamma gg)/\Gamma_{\text{total}}$ — Γ_4/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.025±0.288	200 k	[1] LIBBY	09	CLEO	$\psi(2S) \rightarrow \gamma +$ hadrons

[1] Calculated using $\Gamma(\gamma gg)/\Gamma(ggg) = 0.097 \pm 0.026 \pm 0.016$ from LIBBY 09. The statistical error is negligible and the systematic error is largely uncorrelated with that of $\Gamma(ggg)/\Gamma_{\text{total}}$ LIBBY 09 measurement.

$\Gamma(\gamma gg)/\Gamma(ggg)$ — Γ_4/Γ_3

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
9.7±2.6±1.6	2.9 M	LIBBY	09	CLEO	$\psi(2S) \rightarrow (\gamma +)$ hadrons

$\Gamma(\text{light hadrons})/\Gamma_{\text{total}}$ — Γ_5/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.154±0.015	[1] MENDEZ	08	CLEO	$e^+e^- \rightarrow \psi(2S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.169±0.026	[2] ADAM	05A	CLEO	$e^+e^- \rightarrow \psi(2S)$

[1] Uses B($\psi(2S) \rightarrow J/\psi X$) from MENDEZ 08 and other branching fractions from PDG 07.
[2] Uses B($J/\psi X$) from ADAM 05A, B($\chi_{cJ}\gamma$), B($\eta_c\gamma$) from ATHAR 04 and B($\ell^+\ell^-$) from PDG 04. Superseded by MENDEZ 08.

$\Gamma(e^+e^-)/\Gamma_{total}$ — Γ_6/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
78.9± 1.7 OUR FIT				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
88 ±13	[1] FELDMAN	77	RVUE	e^+e^-

[1] From an overall fit assuming equal partial widths for e^+e^- and $\mu^+\mu^-$. For a measurement of the ratio see the entry $\Gamma(\mu^+\mu^-)/\Gamma(e^+e^-)$ below. Includes LUTH 75, HILGER 75, BURMESTER 77.

$\Gamma(\mu^+\mu^-)/\Gamma_{total}$ — Γ_7/Γ

VALUE (units 10^{-4})	DOCUMENT ID
79±9 OUR FIT	

$\Gamma(\mu^+\mu^-)/\Gamma(e^+e^-)$ — Γ_7/Γ_6

VALUE	DOCUMENT ID		TECN	COMMENT
1.00±0.11 OUR FIT				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.89±0.16	BOYARSKI	75C	MRK1	e^+e^-

$\Gamma(\tau^+\tau^-)/\Gamma_{total}$ — Γ_8/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
31 ±4 OUR FIT				
30.8±2.1±3.8	[1] ABLIKIM	06W	BES	$e^+e^- \rightarrow \psi(2S)$

[1] Computed using PDG 02 value of B($\psi(2S) \rightarrow$ hadrons) = 0.9810 ± 0.0030 to estimate the total number of $\psi(2S)$ events.

DECAYS INTO $J/\psi(1S)$ AND ANYTHING

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.610 ±0.006 OUR FIT					
0.55 ±0.07 OUR AVERAGE					
0.51 ±0.12		BRANDELIK	79C	DASP	$e^+e^- \rightarrow \mu^+\mu^- X$
0.57 ±0.08		ABRAMS	75B	MRK1	$e^+e^- \rightarrow \mu^+\mu^- X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.6254±0.0016±0.0155	1.1M	[1] MENDEZ	08	CLEO	$\psi(2S) \rightarrow \ell^+\ell^- X$
0.5950±0.0015±0.0190	151k	ADAM	05A	CLEO	Repl. by MENDEZ 08

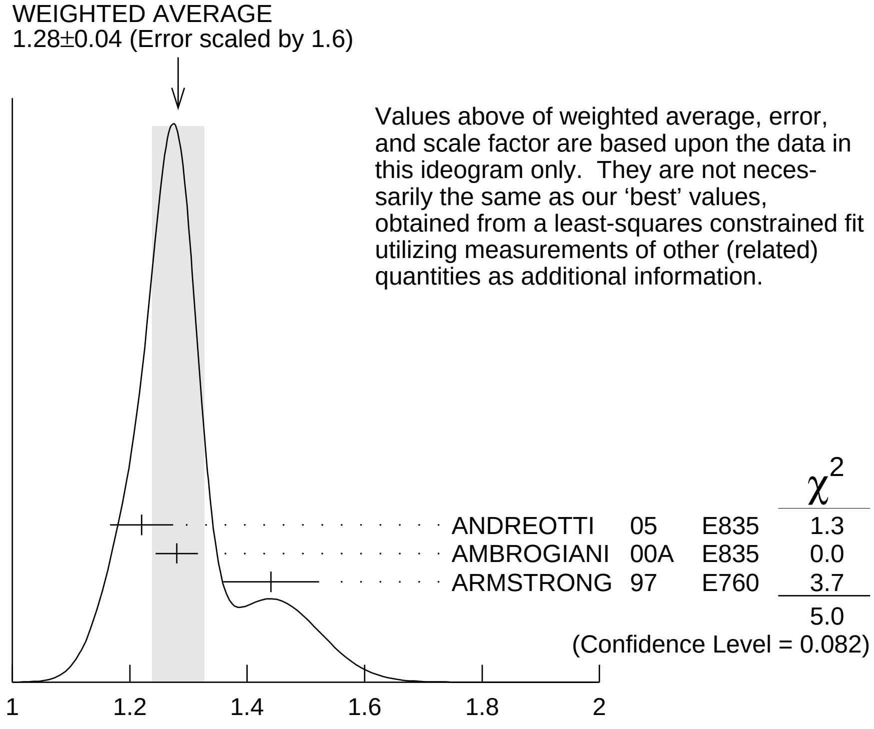
[1] Not independent from other measurements of MENDEZ 08.

$\Gamma(e^+e^-)/\Gamma(J/\psi(1S)\text{anything})$

$$\Gamma_6/\Gamma_9 = \Gamma_6/(\Gamma_{11}+\Gamma_{12}+\Gamma_{13}+0.339\Gamma_{133}+0.192\Gamma_{134})$$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
1.294±0.026 OUR FIT					
1.28 ±0.04 OUR AVERAGE Error includes scale factor of 1.6. See the ideogram below.					
1.22 ±0.02 ±0.05	5097 ± 73	[1] ANDREOTTI	05	E835	$p\overline{p} \rightarrow \psi(2S) \rightarrow e^+e^-$
1.28 ±0.03 ±0.02		[1] AMBROGIANI	00A	E835	$p\overline{p} \rightarrow \psi(2S)$
1.44 ±0.08 ±0.02		[1] ARMSTRONG	97	E760	$\overline{p}p \rightarrow \psi(2S)$

[1] Using B($J/\psi(1S) \rightarrow e^+e^-$) = 0.0593 ± 0.0010.



$\Gamma\big(\mu^+\mu^-\big)/\Gamma\big(J/\psi(1S)\,\text{anything}\big)$

$$\Gamma_7/\Gamma_9 = \Gamma_7/(\Gamma_{11}+\Gamma_{12}+\Gamma_{13}+0.339\Gamma_{133}+0.192\Gamma_{134})$$

VALUE	DOCUMENT ID		TECN	COMMENT
0.0130±0.0014 OUR FIT				
0.014 ±0.003	HILGER	75	SPEC	e^+e^-

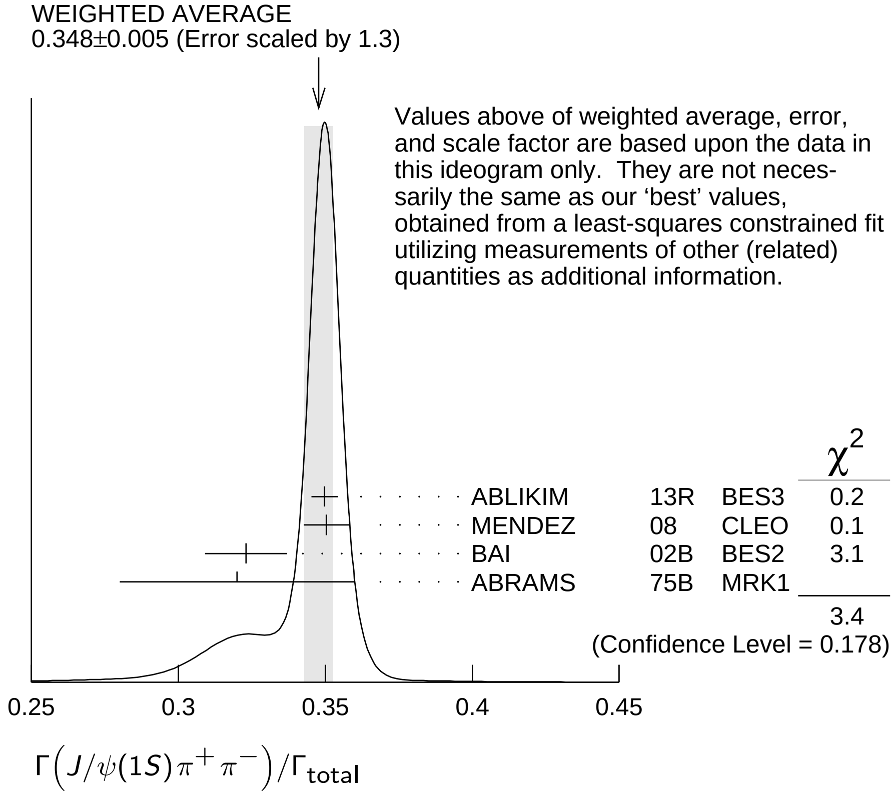
$\Gamma\big(J/\psi(1S)\,\text{neutrals}\big)/\Gamma_{\text{total}}$ — Γ_{10}/Γ

VALUE	DOCUMENT ID
0.2514±0.0033 OUR FIT	

$\Gamma\big(J/\psi(1S)\pi^+\pi^-\big)/\Gamma_{\text{total}}$ — Γ_{11}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.3449±0.0030 OUR FIT					
0.348 ±0.005 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below.					
0.3498±0.0002±0.0045	20M	ABLIKIM	13R	BES3	$\psi(2S) \to J/\psi\pi^+\pi^-$
0.3504±0.0007±0.0077	565k	MENDEZ	08	CLEO	$\psi(2S) \to \ell^+\ell^-\pi^+\pi^-$
0.323 ±0.014		BAI	02B	BES2	e^+e^-
0.32 ±0.04		ABRAMS	75B	MRK1	$e^+e^- \to J/\psi\pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.3354±0.0014±0.0110	60k	[1] ADAM	05A	CLEO	Repl. by MENDEZ 08

[1] Not independent from other values reported by ADAM 05A.



$\Gamma\big(e^+e^-\big)/\Gamma\big(J/\psi(1S)\pi^+\pi^-\big)$ — Γ_6/Γ_{11}

VALUE	DOCUMENT ID		TECN	COMMENT
0.0229±0.0005 OUR FIT				
0.0252±0.0028±0.0011	[1] AUBERT	02B	BABR	e^+e^-

[1] Using B($J/\psi(1S) \to e^+e^-$) = 0.0593 ± 0.0010.

$\Gamma\big(\mu^+\mu^-\big)/\Gamma\big(J/\psi(1S)\pi^+\pi^-\big)$ — Γ_7/Γ_{11}

VALUE	DOCUMENT ID		TECN	COMMENT
0.0229±0.0025 OUR FIT				
0.0224±0.0029 OUR AVERAGE				
0.0216±0.0026±0.0014	[1] AUBERT	02B	BABR	e^+e^-
0.0327±0.0077±0.0072	[1] GRIBUSHIN	96	FMPS	515 π^- Be $\to 2\mu X$

[1] Using B($J/\psi(1S) \to \mu^+\mu^-$) = 0.0588 ± 0.0010.

$\Gamma\big(\tau^+\tau^-\big)/\Gamma\big(J/\psi(1S)\pi^+\pi^-\big)$ — Γ_8/Γ_{11}

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
8.9 ±1.1 OUR FIT				
8.73±1.39±1.57	BAI	02	BES	e^+e^-

$\Gamma\big(J/\psi(1S)\pi^+\pi^-\big)/\Gamma\big(J/\psi(1S)\text{anything}\big)$ — Γ_{11}/Γ_9

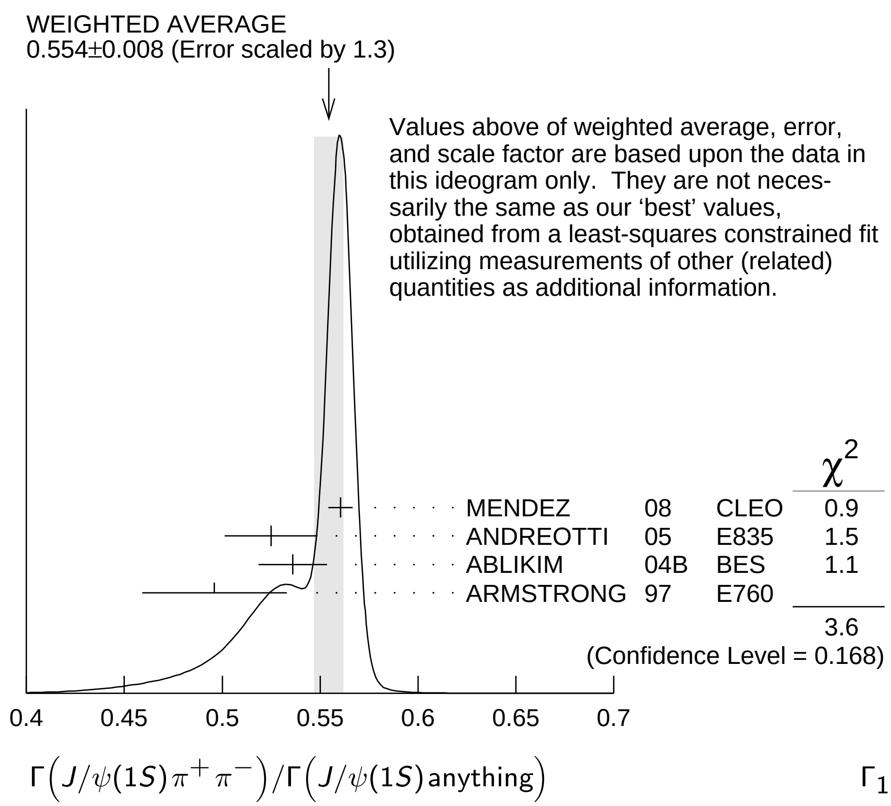
VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.5653±0.0026 OUR FIT					
0.554 ±0.008 OUR AVERAGE Error includes scale factor of 1.3. See the ideogram below.					
0.5604±0.0009±0.0062	565k	MENDEZ	08	CLEO	$\psi(2S) \to \ell^+\ell^-\pi^+\pi^-$
0.525 ±0.009 ±0.022	4k	ANDREOTTI	05	E835	$\psi(2S) \to J/\psi X$

0.536 $\pm$0.007 $\pm$0.016	20k	[1,2] ABLIKIM	04B	BES	$\psi(2S) \to J/\psi X$
0.496 $\pm$0.037		ARMSTRONG	97	E760	$\overline{p}p \to \psi(2S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.5637$\pm$0.0027$\pm$0.0046	60k	ADAM	05A	CLEO	Repl. by MENDEZ 08

[1] From a fit to the J/ψ recoil mass spectra.
[2] ABLIKIM 04B quotes B($\psi(2S) \to J/\psi X$) / B($\psi(2S) \to J/\psi \pi^+ \pi^-$).



Γ_{11}/Γ_9

$\Gamma(J/\psi(1S)\text{neutrals})/\Gamma(J/\psi(1S)\pi^+\pi^-)$

$$\Gamma_{10}/\Gamma_{11} = (0.9761\Gamma_{12}+0.719\Gamma_{13}+0.339\Gamma_{133}+0.192\Gamma_{134})/\Gamma_{11}$$

VALUE	*DOCUMENT ID*	*TECN*	*COMMENT*
0.729$\pm$0.008 OUR FIT			
0.73 $\pm$0.09	TANENBAUM 76	MRK1	e^+e^-

$\Gamma(J/\psi(1S)\pi^0\pi^0)/\Gamma_{\text{total}}$ Γ_{12}/Γ

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.1816$\pm$0.0031 OUR FIT					

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.1769$\pm$0.0008$\pm$0.0053	61k	[1] MENDEZ	08	CLEO	$\psi(2S) \to \ell^+\ell^- 2\pi^0$
0.1652$\pm$0.0014$\pm$0.0058	13.4k	[2] ADAM	05A	CLEO	Repl. by MENDEZ 08

[1] Not independent from other measurements of MENDEZ 08.
[2] Not independent from other values reported by ADAM 05A.

$\Gamma(J/\psi(1S)\pi^0\pi^0)/\Gamma(J/\psi(1S)\text{anything})$ Γ_{12}/Γ_9

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.2977±0.0031 OUR FIT					
0.320 ±0.012 OUR AVERAGE					
0.300 ±0.008 ±0.022	1655 ± 44	ANDREOTTI	05	E835	$\psi(2S) \to J/\psi X$
0.328 ±0.013 ±0.008		AMBROGIANI	00A	E835	$p\overline{p} \to \psi(2S)$
0.323 ±0.033		ARMSTRONG	97	E760	$\overline{p}p \to \psi(2S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.2829±0.0012±0.0056	61k	MENDEZ	08	CLEO	$\psi(2S) \to \ell^+\ell^- 2\pi^0$
0.2776±0.0025±0.0043	13.4k	ADAM	05A	CLEO	Repl. by MENDEZ 08

$\Gamma(J/\psi(1S)\pi^0\pi^0)/\Gamma(J/\psi(1S)\pi^+\pi^-)$ Γ_{12}/Γ_{11}

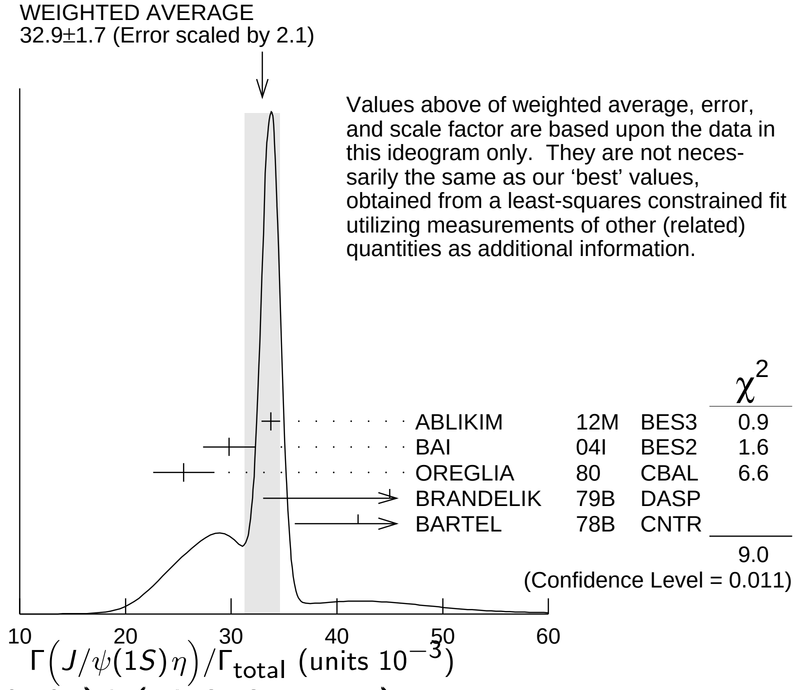
VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.527 ±0.008 OUR FIT					
0.513 ±0.022 OUR AVERAGE Error includes scale factor of 2.2.					
0.5047±0.0022±0.0102	61k	MENDEZ	08	CLEO	$\psi(2S) \to \ell^+\ell^- 2\pi^0$
0.570 ±0.009 ±0.026	14k	[1] ABLIKIM	04B	BES	$\psi(2S) \to J/\psi X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.4924±0.0047±0.0086	73k	[2,3] ADAM	05A	CLEO	Repl. by MENDEZ 08
0.571 ±0.018 ±0.044		[4] ANDREOTTI	05	E835	$\psi(2S) \to J/\psi X$
0.53 ±0.06		TANENBAUM	76	MRK1	e^+e^-
0.64 ±0.15		[5] HILGER	75	SPEC	e^+e^-

[1] From a fit to the J/ψ recoil mass spectra.
[2] Not independent from other values reported by ADAM 05A.
[3] Using 13,217 $J/\psi\pi^0\pi^0$ and 60,010 $J/\psi\pi^+\pi^-$ events.
[4] Not independent from other values reported by ANDREOTTI 05.
[5] Ignoring the $J/\psi(1S)\eta$ and $J/\psi(1S)\gamma\gamma$ decays.

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

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
33.6 ± 0.5 OUR FIT					
32.9 ± 1.7 OUR AVERAGE Error includes scale factor of 2.1. See the ideogram below.					
33.75± 0.17±0.86	68.2k	ABLIKIM	12M	BES3	$e^+e^- \to \ell^+\ell^- 2\gamma$
29.8 ± 0.9 ±2.3	5.7k	BAI	04I	BES2	$\psi(2S) \to J/\psi\gamma\gamma$
25.5 ± 2.9	386	[1] OREGLIA	80	CBAL	$e^+e^- \to J/\psi 2\gamma$
45 ±12	17	[2] BRANDELIK	79B	DASP	$e^+e^- \to J/\psi 2\gamma$
42 ± 6	164	[2] BARTEL	78B	CNTR	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
34.3 ± 0.4 ±0.9	18.4k	[3] MENDEZ	08	CLEO	$\psi(2S) \to \ell^+\ell^-\eta$
32.5 ± 0.6 ±1.1	2.8k	[4] ADAM	05A	CLEO	Repl. by MENDEZ 08
43 ± 8	44	TANENBAUM	76	MRK1	e^+e^-

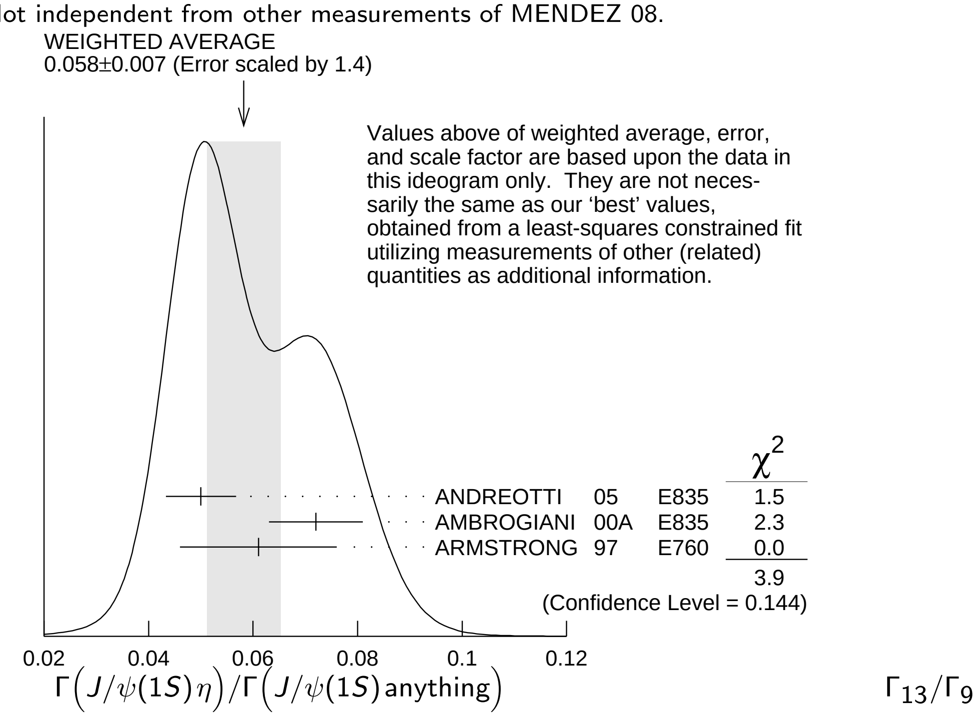
[1] Recalculated by us using $B(J/\psi(1S) \to \ell^+\ell^-) = 0.1181 \pm 0.0020$.
[2] Recalculated by us using $B(J/\psi(1S) \to \mu^+\mu^-) = 0.0588 \pm 0.0010$.
[3] Not independent from other measurements of MENDEZ 08.
[4] Not independent from other values reported by ADAM 05A.



$\Gamma\big(J/\psi(1S)\eta\big)/\Gamma\big(J/\psi(1S)\text{anything}\big)$ Γ_{13}/Γ_9

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.0551±0.0008 OUR FIT				
0.058 ±0.007 OUR AVERAGE Error includes scale factor of 1.4.See the ideogram below.				
0.050 ±0.006 ±0.003	298 ± 20	ANDREOTTI 05	E835	$\psi(2S) \rightarrow J/\psi X$
0.072 ±0.009		AMBROGIANI 00A	E835	$p\overline{p} \rightarrow \psi(2S)$
0.061 ±0.015		ARMSTRONG 97	E760	$\overline{p}p \rightarrow \psi(2S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.0549±0.0006±0.0009	18.4k	[1] MENDEZ 08	CLEO	$\psi(2S) \rightarrow \ell^+\ell^-\eta$
0.0546±0.0010±0.0007	2.8k	ADAM 05A	CLEO	Repl. by MENDEZ 08

[1] Not independent from other measurements of MENDEZ 08.



$\Gamma(J/\psi(1S)\eta)/\Gamma(J/\psi(1S)\pi^+\pi^-)$ Γ_{13}/Γ_{11}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0974±0.0014 OUR FIT					
0.0979±0.0018 OUR AVERAGE					
0.0979±0.0010±0.0015	18.4k	MENDEZ	08	CLEO	$\psi(2S) \to \ell^+\ell^-\eta$
0.098 ±0.005 ±0.010	2k	[1] ABLIKIM	04B	BES	$\psi(2S) \to J/\psi X$
0.091 ±0.021		[2] HIMEL	80	MRK2	$e^+e^- \to \psi(2S) X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0968±0.0019±0.0013	2.8k	[3] ADAM	05A	CLEO	Repl. by MENDEZ 08
0.095 ±0.007 ±0.007		[4] ANDREOTTI	05	E835	$\psi(2S) \to J/\psi X$

[1] From a fit to the J/ψ recoil mass spectra.
[2] The value for B($\psi(2S) \to J/\psi(1s)\eta$) reported in HIMEL 80 is derived using B(ψ(2S)) $\to$ $J/\psi(1S)\pi^+\pi^-$) = (33 ± 3))% and B($J/\psi(1S) \to \ell^+\ell^-$) = 0.138 ± 0.018. Calculated by us using B($J/\psi(1S) \to \ell^+\ell^-$) = (0.1181 ± 0.0020).
[3] Not independent from other values reported by ADAM 05A.
[4] Not independent from other values reported by ANDREOTTI 05.

$\Gamma(J/\psi(1S)\pi^0)/\Gamma_{total}$ Γ_{14}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
12.68±0.32 OUR AVERAGE					
12.6 ±0.2 ±0.3	4.1k	ABLIKIM	12M	BES3	$e^+e^- \to \ell^+\ell^- 2\gamma$
13.3 ±0.8 ±0.3	530	MENDEZ	08	CLEO	$\psi(2S) \to \ell^+\ell^- 2\gamma$
14.3 ±1.4 ±1.2	280	BAI	04I	BES2	$\psi(2S) \to J/\psi\gamma\gamma$
14 ±6	7	HIMEL	80	MRK2	e^+e^-
9 ±2 ±1	23	[1] OREGLIA	80	CBAL	$\psi(2S) \to J/\psi 2\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
13 ±1 ±1	88	ADAM	05A	CLEO	Repl. by MENDEZ 08

[1] Recalculated by us using B($J/\psi(1S) \to \ell^+\ell^-$) = 0.1181 ± 0.0020.

$\Gamma(J/\psi(1S)\pi^0)/\Gamma(J/\psi(1S)\text{anything})$
$\Gamma_{14}/\Gamma_9 = \Gamma_{14}/(\Gamma_{11}+\Gamma_{12}+\Gamma_{13}+0.339\Gamma_{133}+0.192\Gamma_{134})$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.213±0.012±0.003	527	[1] MENDEZ	08	CLEO	$e^+e^- \to J/\psi\gamma\gamma$
0.22 ±0.02 ±0.01		[2] ADAM	05A	CLEO	$e^+e^- \to \psi(2S) \to J/\psi\gamma\gamma$

[1] Not independent from other values reported by MENDEZ 08. Supersedes ADAM 05A.
[2] Not independent from other values reported by ADAM 05A.

$\Gamma(J/\psi(1S)\pi^0)/\Gamma(J/\psi(1S)\pi^+\pi^-)$ Γ_{14}/Γ_{11}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.380±0.022±0.005	527	[1] MENDEZ	08	CLEO	$e^+e^- \to J/\psi\gamma\gamma$
0.39 ±0.04 ±0.01		[2] ADAM	05A	CLEO	$e^+e^- \to \psi(2S) \to J/\psi\gamma\gamma$

[1] Not independent from other values reported by MENDEZ 08. Supersedes ADAM 05A.
[2] Not independent from other values reported by ADAM 05A.

HADRONIC DECAYS

$\Gamma(\pi^0 h_c(1P))/\Gamma_{total}$ — Γ_{15}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
8.6±1.3 OUR AVERAGE					
9.0±1.5±1.3	3k	[1] GE	11	CLEO	$\psi(2S) \to \pi^0$ anything
8.4±1.3±1.0	11k	ABLIKIM	10B	BES3	$\psi(2S) \to \pi^0 h_c$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	92^{+23}_{-22}	ADAMS	09	CLEO	$\psi(2S) \to 2\pi^+ 2\pi^- 2\pi^0$
seen	1282	DOBBS	08A	CLEO	$\psi(2S) \to \pi^0 \eta_c \gamma$
seen	168 ± 40	ROSNER	05	CLEO	$\psi(2S) \to \pi^0 \eta_c \gamma$

[1] Assuming a width $\Gamma(h_c(1P)) = 0.86$ MeV $\equiv \Gamma_0$, a measured dependence of the central value of $B = (7.6 + 1.4 \times \Gamma(h_c(1P)/\Gamma_0) \times 10^{-4}$, and with a systematic error that accounts for the width variation range 0.43–1.29 MeV.

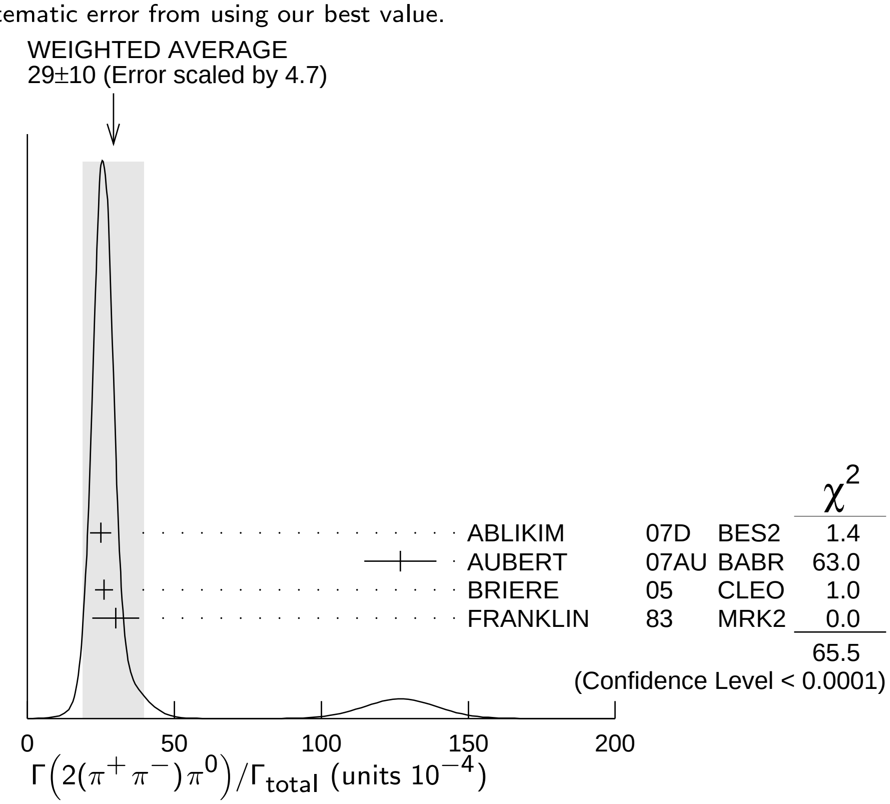
$\Gamma(3(\pi^+\pi^-)\pi^0)/\Gamma_{total}$ — Γ_{16}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
35±16	6	FRANKLIN	83	MRK2	$e^+e^- \to$ hadrons

$\Gamma(2(\pi^+\pi^-)\pi^0)/\Gamma_{total}$ — Γ_{17}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
29 ±10 OUR AVERAGE	Error includes scale factor of 4.7. See the ideogram below.				
24.9± 0.7±3.6	2173	ABLIKIM	07D	BES2	$e^+e^- \to \psi(2S)$
127 ±12 ±2	410	[1] AUBERT	07AU	BABR	10.6 $e^+e^- \to 2(\pi^+\pi^-)\pi^0\gamma$
26.1± 0.7±3.0	1703	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to 2(\pi^+\pi^-)\pi^0$
30 ± 8	42	FRANKLIN	83	MRK2	e^+e^-

[1] AUBERT 07AU reports $[\Gamma(\psi(2S) \to 2(\pi^+\pi^-)\pi^0)/\Gamma_{total}] \times [\Gamma(\psi(2S) \to e^+e^-)] = (297 \pm 22 \pm 18) \times 10^{-4}$ keV which we divide by our best value $\Gamma(\psi(2S) \to e^+e^-) = 2.34 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value.



$\Gamma(\rho a_2(1320))/\Gamma_{total}$ Γ_{18}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
2.55±0.73±0.47		112 ± 31	BAI	04C	BES2	$\psi(2S) \to 2(\pi^+\pi^-)\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<2.3	90		BAI	98J	BES	e^+e^-

$\Gamma(p\overline{p})/\Gamma_{total}$ Γ_{19}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.88±0.09 OUR FIT					
3.00±0.13 OUR AVERAGE	Error includes scale factor of 1.1.				
3.08±0.05±0.18	4.5k	[1] DOBBS	14		$e^+e^- \to \psi(2S) \to p\overline{p}$
3.36±0.09±0.25	1.6k	ABLIKIM	07C	BES	$e^+e^- \to \psi(2S) \to p\overline{p}$
2.87±0.12±0.15	557	PEDLAR	05	CLEO	$e^+e^- \to \psi(2S) \to p\overline{p}$
1.4 ±0.8	4	BRANDELIK	79C	DASP	$e^+e^- \to \psi(2S) \to p\overline{p}$
2.3 ±0.7		FELDMAN	77	MRK1	$e^+e^- \to \psi(2S) \to p\overline{p}$

[1] Using CLEO-c data but not authored by the CLEO Collaboration.

$\Gamma(p\overline{p})/\Gamma(J/\psi(1S)\pi^+\pi^-)$ Γ_{19}/Γ_{11}

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
8.35±0.28 OUR FIT				
6.98±0.49±0.97	BAI	01	BES	$e^+e^- \to \psi(2S) \to p\overline{p}$

$\Gamma(\Delta^{++}\overline{\Delta}^{--})/\Gamma_{total}$ Γ_{20}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
12.8±1.0±3.4	157	[1] BAI	01	BES	$e^+e^- \to \psi(2S) \to$ hadrons

[1] Estimated using B($\psi(2S) \to J/\psi\pi^+\pi^-$)= 0.310 ± 0.028.

$\Gamma(\Lambda\overline{\Lambda}\pi^0)/\Gamma_{total}$ Γ_{21}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
< 0.29	90	[1] ABLIKIM	13F	BES3	$\psi(2S) \to p\overline{p}\pi^+\pi^-\gamma\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<12	90	[2] ABLIKIM	07H	BES2	$e^+e^- \to \psi(2S)$

[1] Using B($\Lambda \to \pi^- p$) = 63.9% and B($\pi^0 \to \gamma\gamma$) = 98.8%.
[2] Using B($\Lambda \to \pi^- p$) = 63.9% and B($\eta \to \gamma\gamma$) = 39.4%.

$\Gamma(\Lambda\overline{\Lambda}\eta)/\Gamma_{total}$ Γ_{22}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
2.48±0.34±0.19		60	[1] ABLIKIM	13F	BES3	$\psi(2S) \to p\overline{p}\pi^+\pi^-\gamma\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<4.9	90		[2] ABLIKIM	07H	BES2	$e^+e^- \to \psi(2S)$

[1] Using B($\Lambda \to \pi^- p$) = 63.9% and B($\eta \to \gamma\gamma$) = 39.31%.
[2] Using B($\Lambda \to \pi^- p$) = 63.9%.

$\Gamma(\Lambda\overline{p}K^+)/\Gamma_{total}$ Γ_{23}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.0±0.1±0.1	74.0	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to p\overline{p}K^+\pi^-$

$\Gamma(\Lambda\overline{p}K^+\pi^+\pi^-)/\Gamma_{total}$ Γ_{24}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.8±0.3±0.3	45.8	BRIERE	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow p\overline{p}K^+\pi^+\pi^-\pi^-$

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

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.8±0.4±0.5	73.4	BRIERE	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow p\overline{p}2(\pi^+\pi^-)$

$\Gamma(\Lambda\overline{\Lambda})/\Gamma_{total}$ Γ_{26}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
3.57±0.18 OUR AVERAGE						
3.75±0.09±0.23		1.9k	[1] DOBBS	14		$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
3.39±0.20±0.32		337	ABLIKIM	07C	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
6.4 ±1.8 ±0.1			[2] AUBERT	07BD	BABR	10.6 $e^+e^- \rightarrow \Lambda\overline{\Lambda}\gamma$
3.28±0.23±0.25		208	PEDLAR	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1.81±0.20±0.27		80	[3] BAI	01	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
$<$ 4	90		FELDMAN	77	MRK1	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons

[1] Using CLEO-c data but not authored by the CLEO Collaboration.

[2] AUBERT 07BD reports $[\Gamma(\psi(2S) \rightarrow \Lambda\overline{\Lambda})/\Gamma_{total}] \times [\Gamma(\psi(2S) \rightarrow e^+e^-)] = (15 \pm 4 \pm 1) \times 10^{-4}$ keV which we divide by our best value $\Gamma(\psi(2S) \rightarrow e^+e^-) = 2.34 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] Estimated using $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.310 \pm 0.028$.

$\Gamma(\Lambda\overline{\Sigma}^+\pi^- + c.c.)/\Gamma_{total}$ Γ_{27}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.40±0.03±0.13	2.8k	ABLIKIM	13W	BES3	$\psi(2S) \rightarrow$ hadrons

$\Gamma(\Lambda\overline{\Sigma}^-\pi^+ + c.c.)/\Gamma_{total}$ Γ_{28}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.54±0.04±0.13	2.8k	ABLIKIM	13W	BES3	$\psi(2S) \rightarrow$ hadrons

$\Gamma(\Sigma^0\overline{p}K^+ + c.c.)/\Gamma_{total}$ Γ_{29}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
1.67±0.13±0.12	276	[1] ABLIKIM	13D	BES3	$\psi(2S) \rightarrow \gamma\Lambda\overline{p}K^+$

[1] Using $B(\Lambda \rightarrow p\pi^-) = 63.9\%$, and $B(\Sigma^0 \rightarrow \Lambda\gamma) = 100\%$.

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

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.51±0.21 OUR AVERAGE					
2.51±0.15±0.16	281	[1] DOBBS	14		$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
2.57±0.44±0.68	35	PEDLAR	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons

[1] Using CLEO-c data but not authored by the CLEO Collaboration.

$\Gamma(\Sigma^0\overline{\Sigma}^0)/\Gamma_{total}$ — Γ_{31}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.32±0.16 OUR AVERAGE					
2.25±0.11±0.16	439	[1] DOBBS	14		$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
2.35±0.36±0.32	59	ABLIKIM	07C	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
2.63±0.35±0.21	58	PEDLAR	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.2 ±0.4 ±0.4	8	[2] BAI	01	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons

[1] Using CLEO-c data but not authored by the CLEO Collaboration.
[2] Estimated using B($\psi(2S) \rightarrow J/\psi\pi^+\pi^-$)= 0.310 ± 0.028.

$\Gamma(\Sigma(1385)^+\overline{\Sigma}(1385)^-)/\Gamma_{total}$ — Γ_{32}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
11±3±3	14	[1] BAI	01	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons

[1] Estimated using B($\psi(2S) \rightarrow J/\psi\pi^+\pi^-$)= 0.310 ± 0.028.

$\Gamma(\Xi^-\overline{\Xi}^+)/\Gamma_{total}$ — Γ_{33}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
2.64±0.18 OUR AVERAGE						
2.66±0.12±0.20		548	[1] DOBBS	14		$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
3.03±0.40±0.32		67	ABLIKIM	07C	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
2.38±0.30±0.21		63	PEDLAR	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •						
0.94±0.27±0.15		12	[2] BAI	01	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
<2	90		FELDMAN	77	MRK1	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons

[1] Using CLEO-c data but not authored by the CLEO Collaboration.
[2] Estimated using B($\psi(2S) \rightarrow J/\psi\pi^+\pi^-$)= 0.310 ± 0.028.

$\Gamma(\Xi^0\overline{\Xi}^0)/\Gamma_{total}$ — Γ_{34}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.07±0.23 OUR AVERAGE					
2.02±0.19±0.15	112	[1] DOBBS	14		$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
2.75±0.64±0.61	19	PEDLAR	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons

[1] Using CLEO-c data but not authored by the CLEO Collaboration.

$\Gamma(\Xi(1530)^0\overline{\Xi}(1530)^0)/\Gamma_{total}$ — Γ_{35}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$5.2\pm0.3^{+3.2}_{-1.2}$		527	[1] ABLIKIM	13S	BES3	$\psi(2S) \rightarrow \eta p\overline{p}$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<32	90		PEDLAR	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons
< 8.1	90		[2] BAI	01	BES	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadrons

[1] With $N(1535)$ decaying to $p\eta$.
[2] Estimated using B($\psi(2S) \rightarrow J/\psi\pi^+\pi^-$)= 0.310 ± 0.028.

$\Gamma(K^- \Lambda \Xi^+ + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{36}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
3.86±0.27±0.32	236	ABLIKIM	15I	BES3	$e^+e^- \to \psi(2S) \to K^- \Lambda \Xi^+ +$ c.c.

$\Gamma(\Xi(1690)^- \Xi^+ \to K^- \Lambda \Xi^+ + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{37}/Γ

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
5.21±1.48±0.57	74	ABLIKIM	15I	BES3	$e^+e^- \to \psi(2S) \to K^- \Lambda \Xi^+ +$ c.c.

$\Gamma(\Xi(1820)^- \Xi^+ \to K^- \Lambda \Xi^+ + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{38}/Γ

VALUE (units 10^{-6})	EVTS	DOCUMENT ID		TECN	COMMENT
12.03±2.94±1.22	136	ABLIKIM	15I	BES3	$e^+e^- \to \psi(2S) \to K^- \Lambda \Xi^+ +$ c.c.

$\Gamma(K^- \Sigma^0 \Xi^+ + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{39}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
3.67±0.33±0.28	142	ABLIKIM	15I	BES3	$e^+e^- \to \psi(2S) \to K^- \Sigma^0 \Xi^+ +$ c.c.

$\Gamma(\Omega^- \overline{\Omega}^+)/\Gamma_{\text{total}}$ Γ_{40}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.47±0.09±0.05		27	[1] DOBBS	14		$e^+e^- \to \psi(2S) \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<1.5	90		ABLIKIM	12Q	BES2	$e^+e^- \to \psi(2S) \to$ hadrons
<1.6	90		PEDLAR	05	CLEO	$e^+e^- \to \psi(2S) \to$ hadrons
<0.73	90		[2] BAI	01	BES	$e^+e^- \to \psi(2S) \to$ hadrons

[1] Using CLEO-c data but not authored by the CLEO Collaboration.
[2] Estimated using B($\psi(2S) \to J/\psi \pi^+ \pi^-$)= 0.310 ± 0.028.

$\Gamma(\pi^0 p \overline{p})/\Gamma_{\text{total}}$ Γ_{41}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.53±0.07 OUR AVERAGE					
1.65±0.03±0.15	4.5k	ABLIKIM	13A	BES3	$\psi(2S) \to p\overline{p}\pi^0$
1.54±0.06±0.06	948	ALEXANDER	10	CLEO	$\psi(2S) \to \pi^0 p\overline{p}$
1.32±0.10±0.15	256	[1] ABLIKIM	05E	BES2	$e^+e^- \to \psi(2S) \to p\overline{p}\gamma\gamma$
1.4 ±0.5	9	FRANKLIN	83	MRK2	e^+e^-

[1] Computed using B($\pi^0 \to \gamma\gamma$) = (98.80 ± 0.03)%.

$\Gamma(N(940)\overline{p} + \text{c.c.} \to \pi^0 p \overline{p})/\Gamma_{\text{total}}$ Γ_{42}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
$6.42\pm0.20^{+1.78}_{-1.28}$	1.9k	[1] ABLIKIM	13A	BES3	$\psi(2S) \to p\overline{p}\pi^0$

[1] From a fit of $\pi^0 p\overline{p}$ data to eight distinct intermediate $N\overline{p}$ resonant states.

$\Gamma\big(N(1440)\overline{p}+\text{c.c.}\to\pi^0 p\overline{p}\big)/\Gamma_{\text{total}}$ Γ_{43}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
7.3 $^{+1.7}_{-1.5}$ OUR AVERAGE Error includes scale factor of 2.5.					
$3.58\pm0.25^{+1.59}_{-0.84}$	1.1k	[1] ABLIKIM	13A	BES3	$\psi(2S)\to p\overline{p}\pi^0$
$8.1\pm0.7\pm0.3$	474	[2] ALEXANDER	10	CLEO	$\psi(2S)\to\pi^0 p\overline{p}$

[1] From a fit of $\pi^0 p\overline{p}$ data to eight distinct intermediate $N\overline{p}$ resonant states.
[2] From a fit of the $p\overline{p}$ and $p\pi^0$ mass distributions to a combination of $N(1440)\overline{p}$, $\pi^0 f_0(2100)$, and two other broad, unestablished resonances.

$\Gamma\big(N(1520)\overline{p}+\text{c.c.}\to\pi^0 p\overline{p}\big)/\Gamma_{\text{total}}$ Γ_{44}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.64\pm0.05^{+0.22}_{-0.17}}$	0.2k	[1] ABLIKIM	13A	BES3	$\psi(2S)\to p\overline{p}\pi^0$

[1] From a fit of $\pi^0 p\overline{p}$ data to eight distinct intermediate $N\overline{p}$ resonant states.

$\Gamma\big(N(1535)\overline{p}+\text{c.c.}\to\pi^0 p\overline{p}\big)/\Gamma_{\text{total}}$ Γ_{45}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{2.47\pm0.28^{+0.99}_{-0.97}}$	0.7k	[1] ABLIKIM	13A	BES3	$\psi(2S)\to p\overline{p}\pi^0$

[1] From a fit of $\pi^0 p\overline{p}$ data to eight distinct intermediate $N\overline{p}$ resonant states.

$\Gamma\big(N(1650)\overline{p}+\text{c.c.}\to\pi^0 p\overline{p}\big)/\Gamma_{\text{total}}$ Γ_{46}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{3.76\pm0.28^{+1.37}_{-1.66}}$	1.1k	[1] ABLIKIM	13A	BES3	$\psi(2S)\to p\overline{p}\pi^0$

[1] From a fit of $\pi^0 p\overline{p}$ data to eight distinct intermediate $N\overline{p}$ resonant states.

$\Gamma\big(N(1720)\overline{p}+\text{c.c.}\to\pi^0 p\overline{p}\big)/\Gamma_{\text{total}}$ Γ_{47}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.79\pm0.10^{+0.24}_{-0.71}}$	0.5k	[1] ABLIKIM	13A	BES3	$\psi(2S)\to p\overline{p}\pi^0$

[1] From a fit of $\pi^0 p\overline{p}$ data to eight distinct intermediate $N\overline{p}$ resonant states.

$\Gamma\big(N(2300)\overline{p}+\text{c.c.}\to\pi^0 p\overline{p}\big)/\Gamma_{\text{total}}$ Γ_{48}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{2.62\pm0.28^{+1.12}_{-0.64}}$	0.9k	[1] ABLIKIM	13A	BES3	$\psi(2S)\to p\overline{p}\pi^0$

[1] From a fit of $\pi^0 p\overline{p}$ data to eight distinct intermediate $N\overline{p}$ resonant states.

$\Gamma\big(N(2570)\overline{p}+\text{c.c.}\to\pi^0 p\overline{p}\big)/\Gamma_{\text{total}}$ Γ_{49}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{2.13\pm0.08^{+0.40}_{-0.30}}$	0.8k	[1] ABLIKIM	13A	BES3	$\psi(2S)\to p\overline{p}\pi^0$

[1] From a fit of $\pi^0 p\overline{p}$ data to eight distinct intermediate $N\overline{p}$ resonant states.

$\Gamma(\pi^0 f_0(2100) \to \pi^0 p\overline{p})/\Gamma_{total}$ — Γ_{50}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
1.1±0.4±0.1	76	[1] ALEXANDER	10	CLEO	$\psi(2S) \to \pi^0 p\overline{p}$

[1] From a fit of the $p\overline{p}$ and $p\pi^0$ mass distributions to a combination of $N_1^*(1440)\overline{p}$, $\pi^0 f_0(2100)$, and two other broad, unestablished resonances.

$\Gamma(\eta p\overline{p})/\Gamma_{total}$ — Γ_{51}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
6.0±0.4 OUR AVERAGE					
6.4±0.2±0.6	679	[1] ABLIKIM	13S	BES3	$\psi(2S) \to \eta p\overline{p}$
5.6±0.6±0.3	154	[1] ALEXANDER	10	CLEO	$\psi(2S) \to \eta p\overline{p}$
5.8±1.1±0.7	44.8 ± 8.5	[2] ABLIKIM	05E	BES2	$e^+e^- \to \psi(2S) \to p\overline{p}\gamma\gamma$
8 ±3 ±3	9.8	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to p\overline{p}\pi^+\pi^-\pi^0$

[1] With $N(1535)$ decaying to $p\eta$.
[2] Computed using B($\eta \to \gamma\gamma$) = (39.43 ± 0.26)%.

$\Gamma(\eta f_0(2100) \to \eta p\overline{p})/\Gamma_{total}$ — Γ_{52}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
1.2±0.4±0.1	31	[1] ALEXANDER	10	CLEO	$\psi(2S) \to \eta p\overline{p}$

[1] From a fit of the $p\overline{p}$ and $p\eta$ distributions to a combination of $N^*(1535)\overline{p}$ and $\eta f_0(2100)$.

$\Gamma(N(1535)\overline{p} \to \eta p\overline{p})/\Gamma_{total}$ — Γ_{53}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
4.4±0.6±0.3	123	[1] ALEXANDER	10	CLEO	$\psi(2S) \to \eta p\overline{p}$

[1] From a fit of the $p\overline{p}$ and $p\eta$ distributions to a combination of $N^*(1535)\overline{p}$ and $\eta f_0(2100)$.

$\Gamma(\omega p\overline{p})/\Gamma_{total}$ — Γ_{54}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.69±0.21 OUR AVERAGE					
0.6 ±0.2 ±0.2	21.2	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to p\overline{p}\pi^+\pi^-\pi^0$
0.8 ±0.3 ±0.1	14.9 ± 0.1	[1] BAI	03B	BES	$\psi(2S) \to p\overline{p}\pi^+\pi^-\pi^0$

[1] Normalized to B($\psi(2S) \to J/\psi\pi^+\pi^-$) = 0.305 ± 0.016.

$\Gamma(\phi p\overline{p})/\Gamma_{total}$ — Γ_{55}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<0.24	90	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to p\overline{p}K^+K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.26	90	[1] BAI	03B	BES	$\psi(2S) \to K^+K^-p\overline{p}$

[1] Normalized to B($\psi(2S) \to J/\psi\pi^+\pi^-$) = 0.305 ± 0.016.

$\Gamma(\pi^+\pi^- p\overline{p})/\Gamma_{total}$ — Γ_{56}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
6.0±0.4 OUR AVERAGE					
5.9±0.2±0.4	904.5	BRIERE	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow p\overline{p}\pi^+\pi^-$
8 ±2		[1] TANENBAUM	78	MRK1	e^+e^-

[1] Assuming entirely strong decay.

$\Gamma(p\overline{n}\pi^-$ or c.c.$)/\Gamma_{total}$ — Γ_{57}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.48±0.17 OUR AVERAGE					
2.45±0.11±0.21	851	ABLIKIM	06I	BES2	$e^+e^- \rightarrow p\pi^- X$
2.52±0.12±0.22	849	ABLIKIM	06I	BES2	$e^+e^- \rightarrow \overline{p}\pi^+ X$

$\Gamma(p\overline{n}\pi^-\pi^0)/\Gamma_{total}$ — Γ_{58}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
3.18±0.50±0.50	135 ± 21	ABLIKIM	06I	BES2	$e^+e^- \rightarrow p\pi^-\pi^0 X$

$\Gamma(\eta\pi^+\pi^-)/\Gamma_{total}$ — Γ_{60}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<1.6	90	BRIERE	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow 2(\pi^+\pi^-)\pi^0$

$\Gamma(\eta\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{61}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
9.5±0.7±1.5		[1] BRIERE	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadr
• • • We do not use the following data for averages, fits, limits, etc. • • •					
10.3±0.8±1.4	201.7	[2] BRIERE	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow \eta 3\pi(\eta \rightarrow \gamma\gamma)$
8.1±1.4±1.6	50.0	[2] BRIERE	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow \eta 3\pi(\eta \rightarrow 3\pi)$

[1] Average of $\eta \rightarrow \gamma\gamma$ and $\eta \rightarrow 3\pi$.
[2] Not independent from other values reported by BRIERE 05.

$\Gamma(2(\pi^+\pi^-)\eta)/\Gamma_{total}$ — Γ_{62}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.2±0.6±0.1	16	[1] AUBERT	07AU	BABR	10.6 $e^+e^- \rightarrow 2(\pi^+\pi^-)\eta\gamma$

[1] AUBERT 07AU quotes $\Gamma_{ee}^{\psi(2S)} \cdot B(\psi(2S) \rightarrow 2(\pi^+\pi)\eta) \cdot B(\eta \rightarrow \gamma\gamma) = 1.2 \pm 0.7 \pm 0.1$ eV.

$\Gamma(\eta'\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{63}/Γ

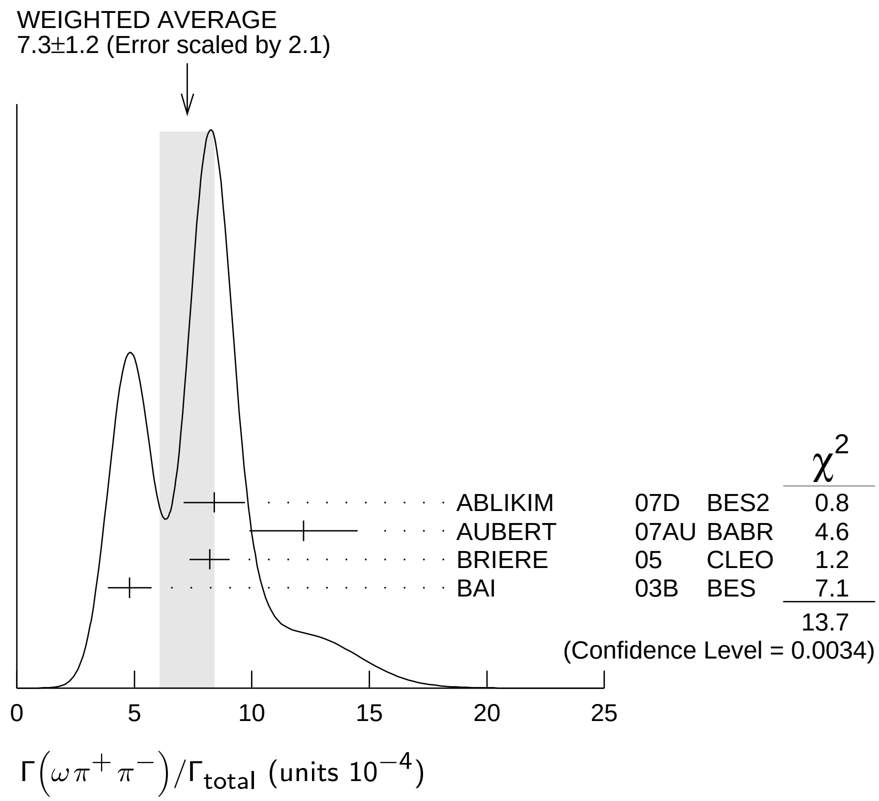
VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
4.5±1.6±1.3	12.8	BRIERE	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow$ hadr

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

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
7.3±1.2 OUR AVERAGE	Error includes scale factor of 2.1. See the ideogram below.			
8.4±0.5±1.2	386	ABLIKIM 07D	BES2	$e^+e^- \to \psi(2S)$
12.2±2.2±0.7	37	[1] AUBERT 07AU	BABR	10.6 $e^+e^- \to \omega\pi^+\pi^-\gamma$
8.2±0.5±0.7	391	BRIERE 05	CLEO	$e^+e^- \to \psi(2S) \to 2(\pi^+\pi^-)\pi^0$
4.8±0.6±0.7	100 ± 22	[2] BAI 03B	BES	$\psi(2S) \to 2(\pi^+\pi^-)\pi^0$

[1] AUBERT 07AU quotes $\Gamma_{ee}^{\psi(2S)} \cdot B(\psi(2S) \to \omega\pi^+\pi^-) \cdot B(\omega \to 3\pi) = 2.69 \pm 0.73 \pm 0.16$ eV.

[2] Normalized to $B(\psi(2S) \to J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.



$\Gamma(b_1^\pm\pi^\mp)/\Gamma_{total}$ Γ_{65}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
4.0 ±0.6 OUR AVERAGE	Error includes scale factor of 1.1.			
5.1 ±0.6 ±0.8	202	ABLIKIM 07D	BES2	$e^+e^- \to \psi(2S)$
$4.18^{+0.43}_{-0.42}\pm0.92$	170	ADAM 05	CLEO	$e^+e^- \to \psi(2S)$
3.2 ±0.6 ±0.5	61 ± 11	[1,2] BAI 03B	BES	$\psi(2S) \to 2(\pi^+\pi^-)\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
5.2 ±0.8 ±1.0		[1] BAI 99C	BES	Repl. by BAI 03B

[1] Assuming $B(b_1 \to \omega\pi)$=1.

[2] Normalized to $B(\psi(2S) \to J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.

$\Gamma\big(b_1^0\pi^0\big)/\Gamma_{\text{total}}$ Γ_{66}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
$2.35^{+0.47}_{-0.42}\pm0.40$	45	ADAM	05	CLEO	$e^+e^- \to \psi(2S)$

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

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
2.2 ±0.4 OUR AVERAGE						
2.3 ±0.5 ±0.4		57	ABLIKIM	07D	BES2	$e^+e^- \to \psi(2S)$
2.05±0.41±0.38		62±12	BAI	04C	BES2	$\psi(2S) \to 2(\pi^+\pi^-)\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<1.5	90		[1] BAI	03B	BES	$\psi(2S) \to 2(\pi^+\pi^-)\pi^0$
<1.7	90		BAI	98J	BES	Repl. by BAI 03B

[1] Normalized to B($\psi(2S) \to J/\psi\pi^+\pi^-$) = 0.305 ± 0.016.

$\Gamma\big(\pi^+\pi^-K^+K^-\big)/\Gamma_{\text{total}}$ Γ_{68}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
7.5±0.9 OUR AVERAGE	Error includes scale factor of 1.9.				
10.9±1.9±0.2	85	[1] AUBERT	07AK	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$
7.1±0.3±0.4	817.2	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to K^+K^-\pi^+\pi^-$
16 ±4		[2] TANENBAUM	78	MRK1	e^+e^-

[1] AUBERT 07AK reports $[\Gamma(\psi(2S) \to \pi^+\pi^-K^+K^-)/\Gamma_{\text{total}}] \times [\Gamma(\psi(2S) \to e^+e^-)] = (2.56 \pm 0.42 \pm 0.16) \times 10^{-3}$ keV which we divide by our best value $\Gamma(\psi(2S) \to e^+e^-) = 2.34 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Assuming entirely strong decay.

$\Gamma\big(\rho^0K^+K^-\big)/\Gamma_{\text{total}}$ Γ_{69}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.2±0.2±0.4	223.8	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to K^+K^-\pi^+\pi^-$

$\Gamma\big(K^*(892)^0\overline{K}{}^*_2(1430)^0\big)/\Gamma_{\text{total}}$ Γ_{70}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.86±0.32±0.43		93 ± 16	BAI	04C		$\psi(2S) \to K^+K^-\pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<1.2	90		BAI	98J	BES	e^+e^-

$\Gamma\big(K^+K^-\pi^+\pi^-\eta\big)/\Gamma_{\text{total}}$ Γ_{71}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.3±0.7±0.1	7	[1] AUBERT	07AU	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\eta\gamma$

[1] AUBERT 07AU quotes $\Gamma_{ee}^{\psi(2S)} \cdot B(\psi(2S) \to 2(\pi^+\pi)\eta) \cdot B(\eta \to \gamma\gamma) = 1.2\pm0.7\pm0.1$ eV.

$\Gamma\big(K^+K^-2(\pi^+\pi^-)\pi^0\big)/\Gamma_{\text{total}}$ Γ_{72}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
10.0±2.5±1.8	65	ABLIKIM	07D	BES2	$e^+e^- \to \psi(2S)$

$\Gamma(K_1(1270)^{\pm}K^{\mp})/\Gamma_{total}$ — Γ_{74}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
10.0±1.8±2.1	[1] BAI	99C	BES	e^+e^-

[1] Assuming B($K_1(1270) \to K\rho$)=0.42 ± 0.06

$\Gamma(K^0_S K^0_S \pi^+\pi^-)/\Gamma_{total}$ — Γ_{75}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.20±0.25±0.37	83 ± 9	ABLIKIM	05O	BES2	$e^+e^- \to \psi(2S)$

$\Gamma(\rho^0 p\overline{p})/\Gamma_{total}$ — Γ_{76}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.5±0.1±0.2	61.1	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to p\overline{p}\pi^+\pi^-$

$\Gamma(K^+\overline{K}^*(892)^0\pi^- + c.c.)/\Gamma_{total}$ — Γ_{77}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
6.7±2.5	TANENBAUM	78	MRK1	e^+e^-

$\Gamma(2(\pi^+\pi^-))/\Gamma_{total}$ — Γ_{78}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.4±0.6 OUR AVERAGE	Error includes scale factor of 2.2.				
2.2±0.2±0.2	308	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to 2(\pi^+\pi^-)$
4.5±1.0		TANENBAUM	78	MRK1	e^+e^-

$\Gamma(\rho^0\pi^+\pi^-)/\Gamma_{total}$ — Γ_{79}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.2±0.6 OUR AVERAGE	Error includes scale factor of 1.4.				
2.0±0.2±0.4	285.5	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to 2(\pi^+\pi^-)$
4.2±1.5		TANENBAUM	78	MRK1	e^+e^-

$\Gamma(K^+K^-\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{80}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
12.6±0.9 OUR AVERAGE					
18.8±5.7±0.3	32	[1] AUBERT	07AU	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\pi^0\gamma$
11.7±1.0±1.5	597	ABLIKIM	06G	BES2	$\psi(2S) \to K^+K^-\pi^+\pi^-\pi^0$
12.7±0.5±1.0	711.6	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to K^+K^-\pi^+\pi^-\pi^0$

[1] AUBERT 07AU reports $[\Gamma(\psi(2S) \to K^+K^-\pi^+\pi^-\pi^0)/\Gamma_{total}] \times [\Gamma(\psi(2S) \to e^+e^-)] = (44 \pm 13 \pm 3) \times 10^{-4}$ keV which we divide by our best value $\Gamma(\psi(2S) \to e^+e^-) = 2.34 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\omega f_0(1710) \to \omega K^+K^-)/\Gamma_{total}$ — Γ_{81}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
5.9±2.0±0.9	19	ABLIKIM	06G	BES2	$\psi(2S) \to K^+K^-\pi^+\pi^-\pi^0$

$\Gamma(K^*(892)^0 K^- \pi^+ \pi^0 + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{82}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
8.6±1.3±1.8	238	ABLIKIM	06G	BES2	$\psi(2S) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$

$\Gamma(K^*(892)^+ K^- \pi^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{83}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
9.6±2.2±1.7	133	ABLIKIM	06G	BES2	$\psi(2S) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$

$\Gamma(K^*(892)^+ K^- \rho^0 + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{84}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
7.3±2.2±1.4	78	ABLIKIM	06G	BES2	$\psi(2S) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$

$\Gamma(K^*(892)^0 K^- \rho^+ + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{85}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
6.1±1.3±1.2	125	ABLIKIM	06G	BES2	$\psi(2S) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$

$\Gamma(\eta K^+ K^-, \text{no } \eta\phi)/\Gamma_{\text{total}}$ — Γ_{86}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
3.08±0.29±0.25		0.3k	[1] ABLIKIM	12L	BES3	$\psi(2S) \rightarrow K^+ K^- \gamma\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<13	90		BRIERE	05	CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$

[1] Excluding $\eta\phi$.

$\Gamma(\omega K^+ K^-)/\Gamma_{\text{total}}$ — Γ_{87}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.62±0.11 OUR AVERAGE	Error includes scale factor of 1.1.				
1.56±0.04±0.11	2.8k	ABLIKIM	14G	BES3	$\psi(2S) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$
2.38±0.37±0.29	78	ABLIKIM	06G	BES2	$\psi(2S) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$
1.9 ±0.3 ±0.3	76.8	BRIERE	05	CLEO	$e^+ e^- \rightarrow \psi(2S) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$
1.5 ±0.3 ±0.2	23	[1] BAI	03B	BES	$\psi(2S) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0$

[1] Normalized to $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = 0.305 \pm 0.016$.

$\Gamma(\omega K^*(892)^+ K^- + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{88}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
20.7±2.6 OUR AVERAGE					
18.9±2.9±2.2	396	ABLIKIM	13M	BES3	$\psi(2S) \rightarrow \omega K^0_S K^- \pi^+$
22.6±3.0±2.4	535	ABLIKIM	13M	BES3	$\psi(2S) \rightarrow \omega K^+ K^- \pi^0$

$\Gamma(\omega K_2^*(1430)^+ K^- + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{89}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
6.1 ±1.2 OUR AVERAGE					
6.39±1.50±0.78	128	ABLIKIM	13M	BES3	$\psi(2S) \rightarrow \omega K^0_S K^- \pi^+$
5.86±1.61±0.83	143	ABLIKIM	13M	BES3	$\psi(2S) \rightarrow \omega K^+ K^- \pi^0$

$\Gamma(\omega \overline{K}^*(892)^0 K^0)/\Gamma_{total}$ — Γ_{90}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
16.8±2.5±1.6	356	ABLIKIM	13M	BES3	$\psi(2S) \to \omega K^0_S K^- \pi^+$

$\Gamma(\omega \overline{K}^*_2(1430)^0 K^0)/\Gamma_{total}$ — Γ_{91}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
5.82±2.08±0.72	116	ABLIKIM	13M	BES3	$\psi(2S) \to \omega K^0_S K^- \pi^+$

$\Gamma(\omega X(1440) \to \omega K^0_S K^- \pi^+ + \text{c.c.})/\Gamma_{total}$ — Γ_{92}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
1.60±0.27±0.24	109	[1] ABLIKIM	13M	BES3	$\psi(2S) \to \omega K^0_S K^- \pi^+$

[1] $X(1440)$ compatible with $\eta(1405)$ and $\eta(1475)$. A $f_1(1420)$ is also possible.

$\Gamma(\omega X(1440) \to \omega K^+ K^- \pi^0)/\Gamma_{total}$ — Γ_{93}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
1.09±0.20±0.16	82	[1] ABLIKIM	13M	BES3	$\psi(2S) \to \omega K^+ K^- \pi^0$

[1] $X(1440)$ compatible with $\eta(1405)$ and $\eta(1475)$. A $f_1(1420)$ is also possible.

$\Gamma(\omega f_1(1285) \to \omega K^0_S K^- \pi^+ + \text{c.c.})/\Gamma_{total}$ — Γ_{94}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
0.302±0.098±0.027	22	[1] ABLIKIM	13M	BES3	$\psi(2S) \to \omega K^0_S K^- \pi^+$

[1] Statistical signficance 4.5 σ. This measurement is equivalent to a limit of $< 0.478 \times 10^{-5}$ at 90% C.L.

$\Gamma(\omega f_1(1285) \to \omega K^+ K^- \pi^0)/\Gamma_{total}$ — Γ_{95}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
0.125±0.070±0.013	10	[1] ABLIKIM	13M	BES3	$\psi(2S) \to \omega K^+ K^- \pi^0$

[1] Statistical signficance 3.2 σ. This measurement is equivalent to a limit of $< 0.221 \times 10^{-5}$ at 90% C.L.

$\Gamma(3(\pi^+\pi^-))/\Gamma_{total}$ — Γ_{96}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
3.5 ±2.0 OUR AVERAGE Error includes scale factor of 2.8.					
5.45±0.42±0.87	671	ABLIKIM	05H	BES2	$e^+ e^- \to \psi(2S) \to 3(\pi^+\pi^-)$
1.5 ±1.0		[1] TANENBAUM	78	MRK1	$e^+ e^-$

[1] Assuming entirely strong decay.

$\Gamma(p\overline{p}\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{97}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
7.3±0.4±0.6	434.9	BRIERE	05	CLEO	$e^+ e^- \to \psi(2S) \to p\overline{p}\pi^+\pi^-\pi^0$

$\Gamma(K^+K^-)/\Gamma_{total}$ — Γ_{98}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
7.48±0.23±0.39		1.3k	[1] METREVELI	12		$\psi(2S) \to K^+K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
6.2 ±1.5 ±0.2		66	[2,3] LEES	15J	BABR	$e^+e^- \to K^+K^-\gamma$
8.3 ±1.5 ±0.2		66	[3,4] LEES	15J	BABR	$e^+e^- \to K^+K^-\gamma$
6.3 ±0.6 ±0.3			[5] DOBBS	06A	CLEO	e^+e^-
10 ±7			[5] BRANDELIK	79C	DASP	e^+e^-
< 5	90		FELDMAN	77	MRK1	e^+e^-

[1] Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration.
[2] $\sin\phi > 0$.
[3] Using $\Gamma(\psi(2S) \to e^+e^-) = (2.37 \pm 0.04)$ keV.
[4] $\sin\phi < 0$.
[5] Interference with non-resonant K^+K^- production not taken into account.

$\Gamma(K^0_S K^0_L)/\Gamma_{total}$ — Γ_{99}/Γ

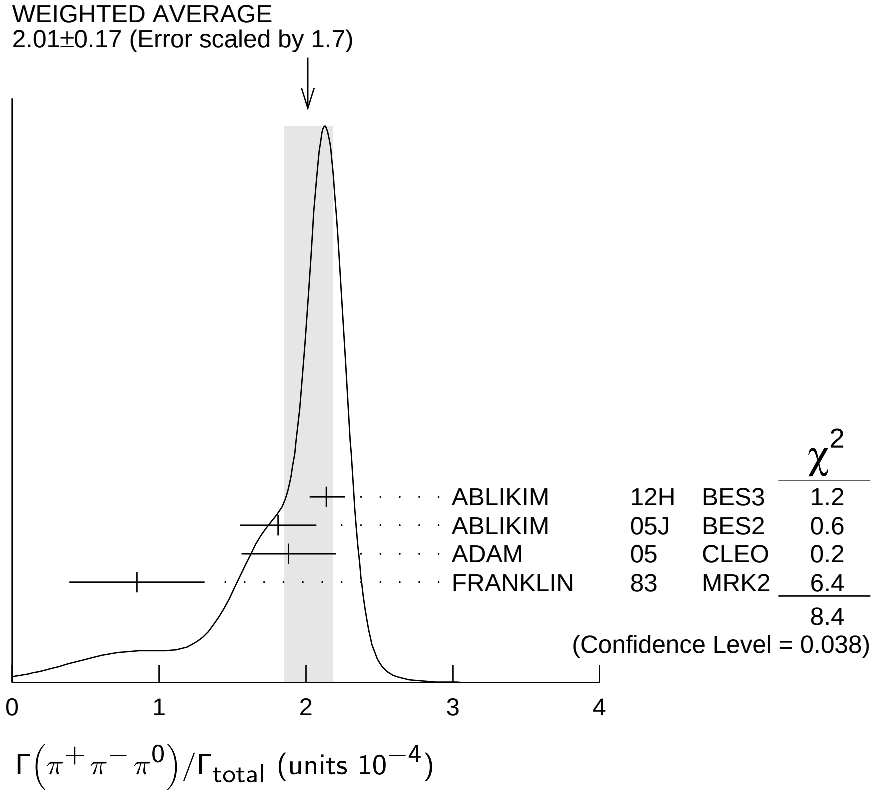
VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
5.34±0.33 OUR AVERAGE					
5.28±0.25±0.34	478 ± 23	[1] METREVELI	12		$\psi(2S) \to K^0_S K^0_L$
5.8 ±0.8 ±0.4		DOBBS	06A	CLEO	e^+e^-
5.24±0.47±0.48	156 ± 14	[2] BAI	04B	BES2	$\psi(2S) \to K^0_S K^0_L \to \pi^+\pi^- X$

[1] Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration.
[2] Using $B(K^0_S \to \pi^+\pi^-) = 0.6860 \pm 0.0027$.

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{100}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.01±0.17 OUR AVERAGE	Error includes scale factor of 1.7. See the ideogram below.				
$2.14\pm0.03^{+0.12}_{-0.11}$	7k	[1] ABLIKIM	12H	BES3	$e^+e^- \to \psi(2S)$
1.81±0.18±0.19	260 ± 19	[2] ABLIKIM	05J	BES2	$e^+e^- \to \psi(2S)$
$1.88^{+0.16}_{-0.15}\pm0.28$	194	ADAM	05	CLEO	$e^+e^- \to \psi(2S)$
0.85±0.46	4	FRANKLIN	83	MRK2	$e^+e^- \to$ hadrons

[1] From $\psi(2S) \to \pi^+\pi^-\pi^0$ events directly. The quoted systematic error includes a contribution of 4% (added in quadrature) from the uncertainty on the number of $\psi(2S)$ events.
[2] From a PW analysis of $\psi(2S) \to \pi^+\pi^-\pi^0$.



$\Gamma(\rho(2150)\pi \to \pi^+\pi^-\pi^0)/\Gamma_{total}$ Γ_{101}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.94 \pm 0.25^{+1.15}_{-0.34}}$	[1] ABLIKIM	05J	BES2	$\psi(2S) \to \rho(2150)\pi \to \pi^+\pi^-\pi^0$

[1] From a PW analysis of $\psi(2S) \to \pi^+\pi^-\pi^0$.

$\Gamma(\rho(770)\pi \to \pi^+\pi^-\pi^0)/\Gamma_{total}$ Γ_{102}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.32±0.12 OUR AVERAGE Error includes scale factor of 1.8.						
$0.51 \pm 0.07 \pm 0.11$			[1] ABLIKIM	05J	BES2	$\psi(2S) \to \rho(770)\pi \to \pi^+\pi^-\pi^0$
$0.24^{+0.08}_{-0.07} \pm 0.02$		22	ADAM	05	CLEO	$e^+e^- \to \psi(2S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.83	90	1	FRANKLIN	83	MRK2	e^+e^-
<10	90		BARTEL	76	CNTR	e^+e^-
<10	90		[2] ABRAMS	75	MRK1	e^+e^-

[1] From a PW analysis of $\psi(2S) \to \pi^+\pi^-\pi^0$.
[2] Final state $\rho^0\pi^0$.

$\Gamma(\pi^+\pi^-)/\Gamma_{total}$ Γ_{103}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.78±0.26 OUR AVERAGE						
$0.76 \pm 0.25 \pm 0.06$		30	[1] METREVELI	12		$\psi(2S) \to \pi^+\pi^-$
8 ±5			BRANDELIK	79C	DASP	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •						

<2.1	90		DOBBS	06A	CLEO	$e^+e^- \rightarrow \psi(2S)$
<5	90		FELDMAN	77	MRK1	e^+e^-

[1] Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration. Using $\psi(3770) \rightarrow \pi^+\pi^-$ for continuum subtraction.

$\Gamma(K_1(1400)^{\pm} K^{\mp})/\Gamma_{total}$ — Γ_{104}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<3.1	90	[1] BAI	99C	BES	e^+e^-

[1] Assuming B($K_1(1400) \rightarrow K^*\pi$)=0.94 ± 0.06

$\Gamma(K_2^*(1430)^{\pm} K^{\mp})/\Gamma_{total}$ — Γ_{105}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{7.12 \pm 0.62^{+1.13}_{-0.61}}$	251 ± 22	ABLIKIM	12L	BES3	$e^+e^- \rightarrow \psi(2S)$

$\Gamma(K^+ K^- \pi^0)/\Gamma_{total}$ — Γ_{106}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
4.07±0.16±0.26		0.9k	ABLIKIM	12L	BES3	$e^+e^- \rightarrow \psi(2S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<8.9	90	1	FRANKLIN	83	MRK2	$e^+e^- \rightarrow$ hadrons

$\Gamma(K^+ K^*(892)^- + \text{c.c.})/\Gamma_{total}$ — Γ_{107}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
2.9 ±0.4 OUR AVERAGE Error includes scale factor of 1.2.						
$3.18 \pm 0.30^{+0.26}_{-0.31}$		0.2k	ABLIKIM	12L	BES3	$e^+e^- \rightarrow \psi(2S)$
$2.9\ ^{+1.3}_{-1.7} \pm 0.4$		9.6 ± 4.2	ABLIKIM	05I	BES2	$e^+e^- \rightarrow \psi(2S)$
$1.3\ ^{+1.0}_{-0.7} \pm 0.3$		7	ADAM	05	CLEO	$e^+e^- \rightarrow \psi(2S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<5.4	90		FRANKLIN	83	MRK2	$e^+e^- \rightarrow$ hadrons

$\Gamma(K^*(892)^0 \overline{K}^0 + \text{c.c.})/\Gamma_{total}$ — Γ_{108}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
10.9±2.0 OUR AVERAGE					
$13.3^{+2.4}_{-2.8} \pm 1.7$	65.6 ± 9.0	ABLIKIM	05I	BES2	$e^+e^- \rightarrow \psi(2S)$
$9.2^{+2.7}_{-2.2} \pm 0.9$	25	ADAM	05	CLEO	$e^+e^- \rightarrow \psi(2S)$

$\Gamma(K^+ K^*(892)^- + \text{c.c.})/\Gamma(K^*(892)^0 \overline{K}^0 + \text{c.c.})$ — $\Gamma_{107}/\Gamma_{108}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.16±0.06 OUR AVERAGE				
$0.22^{+0.10}_{-0.14}$	ABLIKIM	05I	BES2	$e^+e^- \rightarrow \psi(2S)$
$0.14^{+0.08}_{-0.06}$	ADAM	05	CLEO	$e^+e^- \rightarrow \psi(2S)$

$\Gamma(\phi\pi^+\pi^-)/\Gamma_{total}$ — Γ_{109}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.17±0.29 OUR AVERAGE	Error includes scale factor of 1.7.				
2.44±0.96±0.04	10 ± 4	[1,2] AUBERT	07AK	BABR	10.6 $e^+e^- \rightarrow \pi^+\pi^-K^+K^-\gamma$
0.9 ±0.2 ±0.1	47.6	BRIERE	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow K^+K^-\pi^+\pi^-$
1.5 ±0.2 ±0.2	51.5 ± 8.3	[3] BAI	03B	BES	$\psi(2S) \rightarrow K^+K^-\pi^+\pi^-$

[1] AUBERT 07AK reports $[\Gamma(\psi(2S) \rightarrow \phi\pi^+\pi^-)/\Gamma_{total}] \times [\Gamma(\psi(2S) \rightarrow e^+e^-)] = (0.57 \pm 0.22 \pm 0.04) \times 10^{-3}$ keV which we divide by our best value $\Gamma(\psi(2S) \rightarrow e^+e^-) = 2.34 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Using $B(\phi \rightarrow K^+K^-) = (49.3 \pm 0.6)\%$.

[3] Normalized to $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.

$\Gamma(\phi f_0(980) \rightarrow \pi^+\pi^-)/\Gamma_{total}$ — Γ_{110}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.68±0.25 OUR AVERAGE	Error includes scale factor of 1.2.				
1.45±0.70±0.02	6 ± 3	[1,2] AUBERT	07AK	BABR	10.6 $e^+e^- \rightarrow \pi^+\pi^-K^+K^-\gamma$
0.6 ±0.2 ±0.1	18.4 ± 6.4	[3] BAI	03B	BES	$\psi(2S) \rightarrow K^+K^-\pi^+\pi^-$

[1] AUBERT 07AK reports $[\Gamma(\psi(2S) \rightarrow \phi f_0(980) \rightarrow \pi^+\pi^-)/\Gamma_{total}] \times [\Gamma(\psi(2S) \rightarrow e^+e^-)] = (0.34 \pm 0.16 \pm 0.04) \times 10^{-3}$ keV which we divide by our best value $\Gamma(\psi(2S) \rightarrow e^+e^-) = 2.34 \pm 0.04$ keV. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Using $B(\phi \rightarrow K^+K^-) = (49.3 \pm 0.6)\%$.

[3] Normalized to $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.

$\Gamma(2(K^+K^-))/\Gamma_{total}$ — Γ_{111}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.6±0.1±0.1	59.2	BRIERE	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow 2(K^+K^-)$

$\Gamma(\phi K^+K^-)/\Gamma_{total}$ — Γ_{112}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.70±0.16 OUR AVERAGE					
0.8 ±0.2 ±0.1	36.8	BRIERE	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow 2(K^+K^-)$
0.6 ±0.2 ±0.1	16.1 ± 5.0	[1] BAI	03B	BES	$\psi(2S) \rightarrow 2(K^+K^-)$

[1] Normalized to $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.

$\Gamma(2(K^+K^-)\pi^0)/\Gamma_{total}$ — Γ_{113}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.1±0.2±0.2	44.7	BRIERE	05	CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow 2(K^+K^-)\pi^0$

$\Gamma(\phi\eta)/\Gamma_{total}$ Γ_{114}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
3.10±0.31 OUR AVERAGE					
$3.14\pm0.23\pm0.23$	0.2k	ABLIKIM	12L	BES3	$e^+e^- \to \psi(2S)$
$2.0\ ^{+1.5}_{-1.1}\ \pm0.4$	6	ADAM	05	CLEO	$e^+e^- \to \psi(2S)$
$3.3\ \pm1.1\ \pm0.5$	17	ABLIKIM	04K	BES	$e^+e^- \to \psi(2S)$

$\Gamma(\phi\eta')/\Gamma_{total}$ Γ_{115}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
3.1±1.4±0.7	8	[1] ABLIKIM	04K	BES	$e^+e^- \to \psi(2S)$

[1] Calculated combining $\eta' \to \gamma\rho$ and $\eta\pi^+\pi^-$ channels.

$\Gamma(\omega\eta')/\Gamma_{total}$ Γ_{116}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{3.2^{+2.4}_{-2.0}\pm0.7}$	4	[1] ABLIKIM	04K	BES	$e^+e^- \to \psi(2S)$

[1] Calculated combining $\eta' \to \gamma\rho$ and $\eta\pi^+\pi^-$ channels.

$\Gamma(\omega\pi^0)/\Gamma_{total}$ Γ_{117}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
2.1 ±0.6 OUR AVERAGE					
$2.5\ ^{+1.2}_{-1.0}\ \pm0.2$	14	ADAM	05	CLEO	$e^+e^- \to \psi(2S)$
$1.87^{+0.68}_{-0.62}\pm0.28$	14	ABLIKIM	04L	BES	$e^+e^- \to \psi(2S)$

$\Gamma(\rho\eta')/\Gamma_{total}$ Γ_{118}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.87^{+1.64}_{-1.11}\pm0.33}$	2	ABLIKIM	04L	BES	$e^+e^- \to \psi(2S)$

$\Gamma(\rho\eta)/\Gamma_{total}$ Γ_{119}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
2.2 ±0.6 OUR AVERAGE Error includes scale factor of 1.1.					
$3.0\ ^{+1.1}_{-0.9}\ \pm0.2$	18	ADAM	05	CLEO	$e^+e^- \to \psi(2S)$
$1.78^{+0.67}_{-0.62}\pm0.17$	13	ABLIKIM	04L	BES	$e^+e^- \to \psi(2S)$

$\Gamma(\omega\eta)/\Gamma_{total}$ Γ_{120}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<1.1	90	ADAM	05	CLEO	$e^+e^- \to \psi(2S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<3.1	90	ABLIKIM	04K	BES	$e^+e^- \to \psi(2S)$

$\Gamma(\phi\pi^0)/\Gamma_{total}$ — Γ_{121}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<0.04	90	ABLIKIM	12L	BES3	$e^+e^- \to \psi(2S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.7	90	ADAM	05	CLEO	$e^+e^- \to \psi(2S)$
<0.4	90	ABLIKIM	04K	BES	$e^+e^- \to \psi(2S)$

$\Gamma(\eta_c\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{122}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<1.0	90	PEDLAR	07	CLEO	$e^+e^- \to \psi(2S)$

$\Gamma(p\overline{p}K^+K^-)/\Gamma_{total}$ — Γ_{123}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
2.7±0.6±0.4	30.1	BRIERE	05	CLEO	$e^+e^- \to \psi(2S) \to p\overline{p}K^+K^-$

$\Gamma(\overline{\Lambda}nK^0_S + \text{c.c.})/\Gamma_{total}$ — Γ_{124}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.81±0.11±0.14	50	[1] ABLIKIM	08C	BES2	$e^+e^- \to J/\psi$

[1] Using B($\overline{\Lambda} \to \overline{p}\pi^+$) = 63.9% and B($K^0_S \to \pi^+\pi^-$) = 69.2%.

$\Gamma(\phi f_2'(1525))/\Gamma_{total}$ — Γ_{125}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.44±0.12±0.11		20 ± 6	BAI	04C		$\psi(2S) \to 2(K^+K^-)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.45	90		BAI	98J	BES	$e^+e^- \to 2(K^+K^-)$

$\Gamma(\Theta(1540)\overline{\Theta}(1540) \to K^0_S pK^-\overline{n} + \text{c.c.})/\Gamma_{total}$ — Γ_{126}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<0.88	90	BAI	04G	BES2	e^+e^-

$\Gamma(\Theta(1540)K^-\overline{n} \to K^0_S pK^-\overline{n})/\Gamma_{total}$ — Γ_{127}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<1.0	90	BAI	04G	BES2	e^+e^-

$\Gamma(\Theta(1540)K^0_S\overline{p} \to K^0_S\overline{p}K^+n)/\Gamma_{total}$ — Γ_{128}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<0.70	90	BAI	04G	BES2	e^+e^-

$\Gamma(\overline{\Theta}(1540)K^+n \to K^0_S\overline{p}K^+n)/\Gamma_{total}$ — Γ_{129}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<2.6	90	BAI	04G	BES2	e^+e^-

$\Gamma(\overline{\Theta}(1540)K^0_S p \to K^0_S pK^-\overline{n})/\Gamma_{total}$ — Γ_{130}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<0.60	90	BAI	04G	BES2	e^+e^-

$\Gamma(K^0_S K^0_S)/\Gamma_{total}$ Γ_{131}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
<0.046	[1] BAI	04D	BES	$e^+ e^-$

[1] Forbidden by *CP*.

RADIATIVE DECAYS

$\Gamma(\gamma\chi_{c0}(1P))/\Gamma_{total}$ Γ_{132}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
9.99±0.27 OUR FIT					
9.2 ±0.4 OUR AVERAGE					
9.22±0.11±0.46	72600	ATHAR	04	CLEO	$e^+ e^- \rightarrow \gamma X$
9.9 ±0.5 ±0.8		[1] GAISER	86	CBAL	$e^+ e^- \rightarrow \gamma X$
7.2 ±2.3		[1] BIDDICK	77	CNTR	$e^+ e^- \rightarrow \gamma X$
7.5 ±2.6		[1] WHITAKER	76	MRK1	$e^+ e^-$

[1] Angular distribution ($1+\cos^2\theta$) assumed.

$\Gamma(\gamma\chi_{c1}(1P))/\Gamma_{total}$ Γ_{133}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
9.55±0.31 OUR FIT					
8.9 ±0.5 OUR AVERAGE					
9.07±0.11±0.54	76700	ATHAR	04	CLEO	$e^+ e^- \rightarrow \gamma X$
9.0 ±0.5 ±0.7		[1] GAISER	86	CBAL	$e^+ e^- \rightarrow \gamma X$
7.1 ±1.9		[2] BIDDICK	77	CNTR	$e^+ e^- \rightarrow \gamma X$

[1] Angular distribution ($1-0.189\cos^2\theta$) assumed.
[2] Valid for isotropic distribution of the photon.

$\Gamma(\gamma\chi_{c2}(1P))/\Gamma_{total}$ Γ_{134}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
9.11±0.31 OUR FIT					
8.8 ±0.5 OUR AVERAGE Error includes scale factor of 1.1.					
9.33±0.14±0.61	79300	ATHAR	04	CLEO	$e^+ e^- \rightarrow \gamma X$
8.0 ±0.5 ±0.7		[1] GAISER	86	CBAL	$e^+ e^- \rightarrow \gamma X$
7.0 ±2.0		[2] BIDDICK	77	CNTR	$e^+ e^- \rightarrow \gamma X$

[1] Angular distribution ($1-0.052\cos^2\theta$) assumed.
[2] Valid for isotropic distribution of the photon.

$\left[\Gamma(\gamma\chi_{c0}(1P))+\Gamma(\gamma\chi_{c1}(1P))+\Gamma(\gamma\chi_{c2}(1P))\right]/\Gamma_{total}$ $(\Gamma_{132}+\Gamma_{133}+\Gamma_{134})/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
27.6±0.3±2.0	[1] ATHAR	04	CLEO	$e^+ e^- \rightarrow \gamma X$

[1] Not independent from ATHAR 04 measurements of B($\gamma\chi_{cJ}$).

$\Gamma(\gamma\chi_{c0}(1P))/\Gamma(\gamma\chi_{c1}(1P))$ $\Gamma_{132}/\Gamma_{133}$

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.02±0.01±0.07	[1] ATHAR	04	CLEO	$e^+ e^- \rightarrow \gamma X$

[1] Not independent from ATHAR 04 measurements of B($\gamma\chi_{cJ}$).

$\Gamma(\gamma\chi_{c2}(1P))/\Gamma(\gamma\chi_{c1}(1P))$ $\Gamma_{134}/\Gamma_{133}$

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.03\pm0.02\pm0.03$	[1] ATHAR	04	CLEO	$e^+e^- \rightarrow \gamma X$

[1] Not independent from ATHAR 04 measurements of $B(\gamma\chi_{cJ})$.

$\Gamma(\gamma\chi_{c0}(1P))/\Gamma(\gamma\chi_{c2}(1P))$ $\Gamma_{132}/\Gamma_{134}$

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.99\pm0.02\pm0.08$	[1] ATHAR	04	CLEO	$e^+e^- \rightarrow \gamma X$

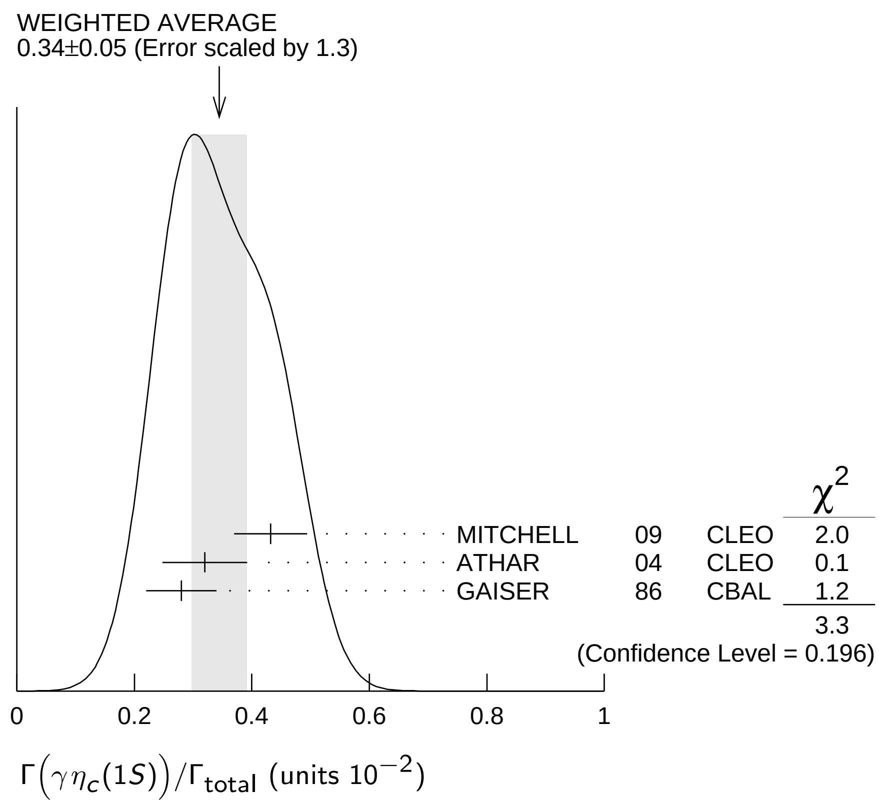
[1] Not independent from ATHAR 04 measurements of $B(\gamma\chi_{cJ})$.

$\Gamma(\gamma\eta_c(1S))/\Gamma_{total}$ Γ_{135}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
0.34 ±0.05 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.			
$0.432\pm0.016\pm0.060$		MITCHELL	09	CLEO	$e^+e^- \rightarrow \gamma X$
$0.32\pm0.04\pm0.06$	2560	[1] ATHAR	04	CLEO	$e^+e^- \rightarrow \gamma X$
0.28 ± 0.06		[2] GAISER	86	CBAL	$e^+e^- \rightarrow \gamma X$

[1] ATHAR 04 used $\Gamma_{\eta_c(1S)} = 24.8 \pm 4.9$ MeV to obtain this result.

[2] GAISER 86 used $\Gamma_{\eta_c(1S)} = 11.5 \pm 4.5$ MeV to obtain this result.



$\Gamma(\gamma\eta_c(2S))/\Gamma_{total}$ Γ_{136}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
7±2±4		[1] ABLIKIM	12G	BES3	$\psi(2S) \to \gamma K^0 K\pi$, $K K \pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<8	90	[2] CRONIN-HEN...	10	CLEO	$\psi(2S) \to \gamma K\overline{K}\pi$
<20	90	ATHAR	04	CLEO	$e^+e^- \to \gamma X$
20–130	95	EDWARDS	82C	CBAL	$e^+e^- \to \gamma X$

[1] ABLIKIM 12G reports $[\Gamma(\psi(2S) \to \gamma\eta_c(2S))/\Gamma_{total}] \times [B(\eta_c(2S) \to K\overline{K}\pi)] = (1.30 \pm 0.20 \pm 0.30) \times 10^{-5}$ which we divide by our best value $B(\eta_c(2S) \to K\overline{K}\pi) = (1.9 \pm 1.2) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] CRONIN-HENNESSY 10 reports $[\Gamma(\psi(2S) \to \gamma\eta_c(2S))/\Gamma_{total}] \times [B(\eta_c(2S) \to K\overline{K}\pi)] < 14.5 \times 10^{-6}$ which we divide by our best value $B(\eta_c(2S) \to K\overline{K}\pi) = 1.9 \times 10^{-2}$. This measurement assumes $\Gamma(\eta_c(2S)) = 14$ MeV. CRONIN-HENNESSY 10 gives the analytic dependence of limits on width.

$\Gamma(\gamma\pi^0)/\Gamma_{total}$ Γ_{137}/Γ

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.58±0.40±0.13		37	ABLIKIM	10F	BES3	$\psi(2S) \to \gamma\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<5	90		PEDLAR	09	CLE3	$\psi(2S) \to \gamma X$
<5400	95		[1] LIBERMAN	75	SPEC	e^+e^-
$<1 \times 10^4$	90		WIIK	75	DASP	e^+e^-

[1] Restated by us using $B(\psi(2S) \to \mu^+\mu^-) = 0.0077$.

$\Gamma(\gamma\eta'(958))/\Gamma_{total}$ Γ_{138}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.23±0.06 OUR AVERAGE						
1.26±0.03±0.08		2226	[1] ABLIKIM	10F	BES3	$\psi(2S) \to 3\gamma\pi^+\pi^-$, $2\gamma\pi^+\pi^-$
1.19±0.08±0.03			PEDLAR	09	CLE3	$\psi(2S) \to \gamma X$
1.24±0.27±0.15		23	ABLIKIM	06R	BES2	$e^+e^- \to \psi(2S)$
1.54±0.31±0.20		~ 43	BAI	98F	BES	$\psi(2S) \to \pi^+\pi^- 2\gamma$, $\pi^+\pi^- 3\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<60	90		[2] BRAUNSCH...	77	DASP	e^+e^-
<11	90		[3] BARTEL	76	CNTR	e^+e^-

[1] Combining the results from $\eta' \to \pi^+\pi^-\eta$ and $\eta' \to \pi^+\pi^-\gamma$ decay modes.

[2] Restated by us using total decay width 228 keV.

[3] The value is normalized to the branching ratio for $\Gamma(J/\psi(1S)\eta)/\Gamma_{total}$.

$\Gamma(\gamma f_2(1270))/\Gamma_{total}$ — Γ_{139}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$2.73^{+0.29}_{-0.25}$ OUR AVERAGE Error includes scale factor of 1.8.				
$2.84 \pm 0.15 ^{+0.03}_{-0.10}$	1.9k	[1,2] DOBBS	15	$\psi(2S) \rightarrow \gamma\pi\pi$
$2.12 \pm 0.19 \pm 0.32$		[3,4] BAI	03C BES	$\psi(2S) \rightarrow \gamma\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$2.08 \pm 0.19 \pm 0.33$	200.6 ± 18.8	[3] BAI	03C BES	$\psi(2S) \rightarrow \gamma\pi^+\pi^-$
$2.90 \pm 1.08 \pm 1.07$	29.9 ± 11.1	[3] BAI	03C BES	$\psi(2S) \rightarrow \gamma\pi^0\pi^0$

[1] Using CLEO-c data but not authored by the CLEO Collaboration.
[2] DOBBS 15 reports $[\Gamma(\psi(2S) \rightarrow \gamma f_2(1270))/\Gamma_{total}] \times [B(f_2(1270) \rightarrow \pi\pi)] = (2.39 \pm 0.09 \pm 0.09) \times 10^{-4}$ which we divide by our best value $B(f_2(1270) \rightarrow \pi\pi) = (84.2^{+2.9}_{-0.9}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.
[3] Normalized to $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.
[4] Combining the results from $\pi^+\pi^-$ and $\pi^0\pi^0$ decay modes.

$\Gamma(\gamma f_0(1370) \rightarrow \gamma K\overline{K})/\Gamma_{total}$ — Γ_{140}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		COMMENT
$3.1 \pm 1.0 \pm 1.4$	175	[1] DOBBS	15	$\psi(2S) \rightarrow \gamma K\overline{K}$

[1] Using CLEO-c data but not authored by the CLEO Collaboration.

$\Gamma(\gamma f_0(1500))/\Gamma_{total}$ — Γ_{141}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		COMMENT
$9.2 \pm 1.8 \pm 0.6$	274	[1,2] DOBBS	15	$\psi(2S) \rightarrow \gamma\pi\pi$

[1] DOBBS 15 reports $[\Gamma(\psi(2S) \rightarrow \gamma f_0(1500))/\Gamma_{total}] \times [B(f_0(1500) \rightarrow \pi\pi)] = (3.2 \pm 0.6 \pm 0.2) \times 10^{-5}$ which we divide by our best value $B(f_0(1500) \rightarrow \pi\pi) = (34.9 \pm 2.3) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.
[2] Using CLEO-c data but not authored by the CLEO Collaboration.

$\Gamma(\gamma f'_2(1525))/\Gamma_{total}$ — Γ_{142}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		COMMENT
$3.3 \pm 0.8 \pm 0.1$	136	[1,2] DOBBS	15	$\psi(2S) \rightarrow \gamma K\overline{K}$

[1] DOBBS 15 reports $[\Gamma(\psi(2S) \rightarrow \gamma f'_2(1525))/\Gamma_{total}] \times [B(f'_2(1525) \rightarrow K\overline{K})] = (2.9 \pm 0.6 \pm 0.3) \times 10^{-5}$ which we divide by our best value $B(f'_2(1525) \rightarrow K\overline{K}) = (88.7 \pm 2.2) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.
[2] Using CLEO-c data but not authored by the CLEO Collaboration.

$\Gamma(\gamma f_0(1710) \rightarrow \gamma\pi\pi)/\Gamma_{total}$ — Γ_{144}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
3.5 ± 0.6 OUR AVERAGE				
$3.6 \pm 0.4 \pm 0.5$	290	[1] DOBBS	15	$\psi(2S) \rightarrow \gamma\pi\pi$
$3.01 \pm 0.41 \pm 1.24$	35.6 ± 4.8	[2] BAI	03C BES	$\psi(2S) \rightarrow \gamma\pi^+\pi^-$

[1] Using CLEO-c data but not authored by the CLEO Collaboration.
[2] Normalized to $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = 0.305 \pm 0.016$.

$\Gamma(\gamma f_0(1710) \to \gamma K\overline{K})/\Gamma_{total}$ — Γ_{145}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
6.6 ±0.7 OUR AVERAGE					
6.7 ±0.6 ±0.6		375	[1] DOBBS 15		$\psi(2S) \to \gamma K\overline{K}$
6.04±0.90±1.32		39.6 ± 5.9	[2,3] BAI 03C	BES	$\psi(2S) \to \gamma K^+K^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 15.6	90	6.8 ± 3.1	[2,3] BAI 03C	BES	$\psi(2S) \to \gamma K^0_S K^0_S$

[1] Using CLEO-c data but not authored by the CLEO Collaboration.
[2] Includes unknown branching fractions to K^+K^- or $K^0_S K^0_S$. We have multiplied the K^+K^- result by a factor of 2 and the $K^0_S K^0_S$ result by a factor of 4 to obtain the $K\overline{K}$ result.
[3] Normalized to B($\psi(2S) \to J/\psi \pi^+\pi^-$) = 0.305 ± 0.016.

$\Gamma(\gamma f_0(2100) \to \gamma\pi\pi)/\Gamma_{total}$ — Γ_{146}/Γ

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	COMMENT
4.8±0.5±0.9	373	[1] DOBBS 15	$\psi(2S) \to \gamma\pi\pi$

[1] Using CLEO-c data but not authored by the CLEO Collaboration.

$\Gamma(\gamma f_0(2200) \to \gamma K\overline{K})/\Gamma_{total}$ — Γ_{147}/Γ

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	COMMENT
3.2±0.6±0.8	207	[1] DOBBS 15	$\psi(2S) \to \gamma K\overline{K}$

[1] Using CLEO-c data but not authored by the CLEO Collaboration.

$\Gamma(\gamma f_J(2220) \to \gamma\pi\pi)/\Gamma_{total}$ — Γ_{148}/Γ

VALUE	CL%	DOCUMENT ID	COMMENT
<5.8 × 10^{-6}	90	[1,2] DOBBS 15	$\psi(2S) \to \gamma\pi\pi$

[1] Using CLEO-c data but not authored by the CLEO Collaboration.
[2] For Γ = 20/50 MeV, the 90% CL upper limits for $\pi^+\pi^-$ and $\pi^0\pi^0$ are 3.2/4.3 × 10^{-6} and 2.6/4.0 × 10^{-6}, respectively.

$\Gamma(\gamma f_J(2220) \to \gamma K\overline{K})/\Gamma_{total}$ — Γ_{149}/Γ

VALUE	CL%	DOCUMENT ID	COMMENT
<9.5 × 10^{-6}	90	[1,2] DOBBS 15	$\psi(2S) \to \gamma K\overline{K}$

[1] Using CLEO-c data but not authored by the CLEO Collaboration.
[2] For Γ = 20/50 MeV, the 90% CL upper limits for K^+K^- and $K^0_S K^0_S$ are 2.1/4.3×10^{-6} and 3.7/5.5 × 10^{-6}, respectively.

$\Gamma(\gamma\eta)/\Gamma_{total}$ — Γ_{151}/Γ

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
1.38±0.48±0.09		13	[1] ABLIKIM 10F	BES3	$\psi(2S) \to \gamma\pi^+\pi^-\pi^0$, $\gamma 3\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 2	90		PEDLAR 09	CLE3	$\psi(2S) \to \gamma X$
< 90	90		BAI 98F	BES	$\psi(2S) \to \pi^+\pi^- 3\gamma$
<200	90		YAMADA 77	DASP	$e^+e^- \to 3\gamma$

[1] Combining the results from $\eta \to \pi^+\pi^-\pi^0$ and $\eta \to 3\pi^0$ decay modes.

$\Gamma(\gamma\eta\pi^+\pi^-)/\Gamma_{total}$ — Γ_{152}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
8.71±1.25±1.64	418	ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\eta\pi^+\pi^-$

$\Gamma(\gamma\eta(1405) \to \gamma K\overline{K}\pi)/\Gamma_{total}$ — Γ_{154}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<0.9	90	ABLIKIM	06R	BES2	$\psi(2S) \to \gamma K^0_S K^+\pi^- +$ c.c.
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.3	90	ABLIKIM	06R	BES2	$\psi(2S) \to \gamma K^+K^-\pi^0$
<1.2	90	[1] SCHARRE	80	MRK1	e^+e^-

[1] Includes unknown branching fraction $\eta(1405) \to K\overline{K}\pi$.

$\Gamma(\gamma\eta(1405) \to \eta\pi^+\pi^-)/\Gamma_{total}$ — Γ_{155}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.36±0.25±0.05	10	ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\eta\pi^+\pi^-$

$\Gamma(\gamma\eta(1475) \to K\overline{K}\pi)/\Gamma_{total}$ — Γ_{157}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<1.4	90	ABLIKIM	06R	BES2	$\psi(2S) \to \gamma K^+K^-\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.5	90	ABLIKIM	06R	BES2	$\psi(2S) \to \gamma K^0_S K^+\pi^- +$ c.c.

$\Gamma(\gamma\eta(1475) \to \eta\pi^+\pi^-)/\Gamma_{total}$ — Γ_{158}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<0.88	90	ABLIKIM	06R	BES2	$\psi(2S) \to \gamma\eta\pi^+\pi^-$

$\Gamma(\gamma 2(\pi^+\pi^-))/\Gamma_{total}$ — Γ_{159}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
39.6±2.8±5.0	583	ABLIKIM	07D	BES2	$e^+e^- \to \psi(2S)$

$\Gamma(\gamma K^{*0}K^+\pi^- +$ c.c.$)/\Gamma_{total}$ — Γ_{160}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
37.0±6.1±7.2	237	ABLIKIM	07D	BES2	$e^+e^- \to \psi(2S)$

$\Gamma(\gamma K^{*0}\overline{K}^{*0})/\Gamma_{total}$ — Γ_{161}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
24.0±4.5±5.0	41	ABLIKIM	07D	BES2	$e^+e^- \to \psi(2S)$

$\Gamma(\gamma K^0_S K^+\pi^- +$ c.c.$)/\Gamma_{total}$ — Γ_{162}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
25.6±3.6±3.6	115	ABLIKIM	07D	BES2	$e^+e^- \to \psi(2S)$

$\Gamma(\gamma K^+K^-\pi^+\pi^-)/\Gamma_{total}$ — Γ_{163}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
19.1±2.7±4.3	132	ABLIKIM	07D	BES2	$e^+e^- \to \psi(2S)$

$\Gamma(\gamma p \overline{p})/\Gamma_{total}$ — Γ_{164}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
3.9 ±0.5 OUR AVERAGE Error includes scale factor of 2.0.					
4.18±0.26±0.18	348	[1] ALEXANDER	10	CLEO	$\psi(2S) \to \gamma p \overline{p}$
2.9 ±0.4 ±0.4	142	ABLIKIM	07D	BES2	$e^+ e^- \to \psi(2S)$

[1] From a fit of the $p\overline{p}$ mass distribution to a combination of $\gamma f_2(1950)$, $\gamma f_2(2150)$, and $\gamma p \overline{p}$ phase space, for $M(p\overline{p} < 2.85$ GeV, and accounting for backgrounds from $\psi(2S) \to \pi^0 p \overline{p}$ and continuum.

$\Gamma(\gamma f_2(1950) \to \gamma p \overline{p})/\Gamma_{total}$ — Γ_{165}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
1.2±0.2±0.1	111	[1] ALEXANDER	10	CLEO	$\psi(2S) \to \gamma p \overline{p}$

[1] From a fit of the $p\overline{p}$ mass distribution to a combination of $\gamma f_2(1950)$, $\gamma f_2(2150)$, and $\gamma p \overline{p}$ phase space, for $M(p\overline{p} < 2.85$ GeV, and accounting for backgrounds from $\psi(2S) \to \pi^0 p \overline{p}$ and continuum.

$\Gamma(\gamma f_2(2150) \to \gamma p \overline{p})/\Gamma_{total}$ — Γ_{166}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
0.72±0.18±0.03	73	[1] ALEXANDER	10	CLEO	$\psi(2S) \to \gamma p \overline{p}$

[1] From a fit of the $p\overline{p}$ mass distribution to a combination of $\gamma f_2(1950)$, $\gamma f_2(2150)$, and $\gamma p \overline{p}$ phase space, for $M(p\overline{p} < 2.85$ GeV, and accounting for backgrounds from $\psi(2S) \to \pi^0 p \overline{p}$ and continuum.

$\Gamma(\gamma X(1835) \to \gamma p \overline{p})/\Gamma_{total}$ — Γ_{167}/Γ

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
$\mathbf{4.57 \pm 0.36^{+1.77}_{-4.26}}$		ABLIKIM	12D	BES3	$J/\psi \to \gamma p \overline{p}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.6	90	ALEXANDER	10	CLEO	$\psi(2S) \to \gamma p \overline{p}$
<5.4	90	ABLIKIM	07D	BES	$\psi(2S) \to \gamma p \overline{p}$

$\Gamma(\gamma X \to \gamma p \overline{p})/\Gamma_{total}$ — Γ_{168}/Γ

For a narrow resonance in the range $2.2 < M(X) < 2.8$ GeV.

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
<2	90	ALEXANDER	10	CLEO	$\psi(2S) \to \gamma p \overline{p}$

$\Gamma(\gamma \pi^+ \pi^- p \overline{p})/\Gamma_{total}$ — Γ_{169}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
2.8±1.2±0.7	17	ABLIKIM	07D	BES2	$e^+ e^- \to \psi(2S)$

$\Gamma(\gamma 2(\pi^+ \pi^-) K^+ K^-)/\Gamma_{total}$ — Γ_{170}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<22	90	ABLIKIM	07D	BES2	$e^+ e^- \to \psi(2S)$

$\Gamma(\gamma 3(\pi^+ \pi^-))/\Gamma_{total}$ — Γ_{171}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<17	90	ABLIKIM	07D	BES2	$e^+ e^- \to \psi(2S)$

$\Gamma(\gamma K^+ K^- K^+ K^-)/\Gamma_{total}$ — Γ_{172}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<4	90	ABLIKIM	07D	BES2	$e^+ e^- \rightarrow \psi(2S)$

$\Gamma(\gamma\gamma J/\psi)/\Gamma_{total}$ — Γ_{173}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{3.1 \pm 0.6^{+0.8}_{-1.0}}$	1.1k	ABLIKIM	12O	BES3	$e^+ e^- \rightarrow \psi(2S)$

OTHER DECAYS

$\Gamma(\text{invisible})/\Gamma(e^+ e^-)$ — Γ_{174}/Γ_6

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.0	90	LEES	13I	BABR	$B \rightarrow K^{(*)} \psi(2S)$

$\psi(2S)$ CROSS-PARTICLE BRANCHING RATIOS

For measurements involving $B(\psi(2S) \rightarrow \gamma \chi_{cJ}(1P)) \times B(\chi_{cJ}(1P) \rightarrow X)$ see the corresponding entries in the $\chi_{cJ}(1P)$ sections.

MULTIPOLE AMPLITUDE RATIOS IN RADIATIVE DECAYS $\psi(2S) \rightarrow \gamma \chi_{cJ}(1P)$ and $\chi_{cJ} \rightarrow \gamma J/\psi(1S)$

$a_2(\chi_{c1})/a_2(\chi_{c2})$ Magnetic quadrupole transition amplitude ratio

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{67^{+19}_{-13}}$	59k	[1] ARTUSO	09	CLEO	$\psi(2S) \rightarrow \gamma\gamma \ell^+ \ell^-$

[1] Statistical and systematic errors combined. Using values from fits with floating $M2$ amplitudes $a_2(\chi_{c1})$, $a_2(\chi_{c2})$, $b_2(\chi_{c1})$, $b_2(\chi_{c2})$ and fixed $E3$ amplitudes of $a_3(\chi_{c2}) = b_3(\chi_{c2}) = 0$. Not independent of values for $a_2(\chi_{c1}(1P))$ and $a_2(\chi_{c2}(1P))$ from ARTUSO 09.

$b_2(\chi_{c2})/b_2(\chi_{c1})$ Magnetic quadrupole transition amplitude ratio

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{37^{+53}_{-47}}$	59k	[1] ARTUSO	09	CLEO	$\psi(2S) \rightarrow \gamma\gamma \ell^+ \ell^-$

[1] Statistical and systematic errors combined. Using values from fits with floating $M2$ amplitudes $a_2(\chi_{c1})$, $a_2(\chi_{c2})$, $b_2(\chi_{c1})$, $b_2(\chi_{c2})$ and fixed $E3$ amplitudes of $a_3(\chi_{c2}) = b_3(\chi_{c2}) = 0$. Not independent of values for $b_2(\chi_{c1}(1P))$ and $b_2(\chi_{c2}(1P))$ from ARTUSO 09.

$\psi(2S)$ REFERENCES

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ABLIKIM	15V	PL B749 414	M. Ablikim et al.	(BES III Collab.)
ANASHIN	15	PL B749 50	V.V. Anashin et al.	(KEDR Collab.)
DOBBS	15	PR D91 052006	S. Dobbs et al.	(NWES)
LEES	15J	PR D92 072008	J.P. Lees et al.	(BABAR Collab.)
ABLIKIM	14G	PR D89 112006	M. Ablikim et al.	(BES III Collab.)
DOBBS	14	PL B739 90	S. Dobbs et al.	(NWES, WAYN)
ABLIKIM	13A	PRL 110 022001	M. Ablikim et al.	(BES III Collab.)
ABLIKIM	13D	PR D87 012007	M. Ablikim et al.	(BES III Collab.)
ABLIKIM	13F	PR D87 052007	M. Ablikim et al.	(BES III Collab.)

ABLIKIM	13M	PR D87 092006	M. Ablikim *et al.*	(BES III Collab.)
ABLIKIM	13R	PR D88 032007	M. Ablikim *et al.*	(BES III Collab.)
ABLIKIM	13S	PR D88 032010	M. Ablikim *et al.*	(BES III Collab.)
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LEES	13I	PR D87 112005	J.P. Lees *et al.*	(BABAR Collab.)
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ABLIKIM	12D	PRL 108 112003	M. Ablikim *et al.*	(BES III Collab.)
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LEES	12E	PR D85 112009	J.P. Lees *et al.*	(BABAR Collab.)
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MITCHELL	09	PRL 102 011801	R.E. Mitchell *et al.*	(CLEO Collab.)
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ABLIKIM	08B	PL B659 74	M. Ablikim *et al.*	(BES Collab.)
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DOBBS	08A	PRL 101 182003	S. Dobbs *et al.*	(CLEO Collab.)
MENDEZ	08	PR D78 011102	H. Mendez *et al.*	(CLEO Collab.)
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ABLIKIM	07D	PRL 99 011802	M. Ablikim *et al.*	(BES II Collab.)
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ABLIKIM	06I	PR D74 012004	M. Ablikim *et al.*	(BES Collab.)
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ABLIKIM	06W	PR D74 112003	M. Ablikim *et al.*	(BES Collab.)
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ABLIKIM	05I	PL B614 37	M. Ablikim *et al.*	(BES Collab.)
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LEMOIGNE	82	PL 113B 509	Y. Lemoigne *et al.*	(SACL, LOIC, SHMP+)
HIMEL	80	PRL 44 920	T. Himel *et al.*	(LBL, SLAC)
OREGLIA	80	PRL 45 959	M.J. Oreglia *et al.*	(SLAC, CIT, HARV+)
SCHARRE	80	PL 97B 329	D.L. Scharre *et al.*	(SLAC, LBL)
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