$\chi_{c2}(1P)$ REFERENCES

DOMINICK	94	PR D50 4265	+Sanghera+	(CLEO Collab.)
ARMSTRONG	93	PRL 70 2988	+Bettoni, Bharadwaj+	(FNAL E760 Collab.)
BAUER	93	PL B302 345	+Belcinski+	(TPC Collab.)
ARMSTRONG	92	NP B373 35	+Bettoni+	(FNAL, FERR, GENO, UCI, NWES+)
Also	92B	PRL 68 1468	Armstrong, Bettoni+	(FNAL, FERR, GENO, UCI, NWES+)
UEHARA	91	PL B266 188	+Abe+	(VENUS Collab.)
CHEN	90B	PL B243 169	+McIlwain+	(CLEO Collab.)
AIHARA	88D	PRL 60 2355	+Alston-Garnjost+	(TPC Collab.)
BAGLIN	87B	PL B187 191	+Baird, Bassompierre, Borreani+	(R704 Collab.)
BAGLIN	86B	PL B172 455		(LAPP, CERN, GENO, LYON, OSLO, ROMA+)
GAISER	86	PR D34 711	+Bloom, Bulos, Godfrey+	(Crystal Ball Collab.)
LEE	85	SLAC 282		(SLAC)
LEMOIGNE	82	PL 113B 509	+Barate, Astbury+	(SACL, LOIC, SHMP, IND)
OREGLIA	82	PR D25 2259	+Partridge+	(SLAC, CIT, HARV, PRIN, STAN)
Also	82B	Private Comm.	Oreglia	(EFI)
BARATE	81	PR D24 2994	+Astbury+	(SACL, LOIC, SHMP, CERN, IND)
HIMEL	80	PRL 44 920	+Abrams, Alam, Blocker+	(LBL, SLAC)
Also	82	Private Comm.	Trilling	(LBL, UCB)
BRANDELIK	79B	NP B160 426	+Cords+	(DASP Collab.)
BRANDELIK	79C	ZPHY C1 233	+Cords+	(DASP Collab.)
BARTEL	78B	PL 79B 492	+Dittmann, Duinker, Olsson, O'Neill+	(DESY, HEIDP)
SPITZER	78	Kyoto Sum. Inst. 47		(HAMB)
TANENBAUM	78	PR D17 1731	+Alam, Boyarski+	(SLAC, LBL)
Also	82	Private Comm.	Trilling	(LBL, UCB)
BIDDICK	77	PRL 38 1324	+Burnett+	(UCSD, UMD, PAVI, PRIN, SLAC, STAN)
FELDMAN	77	PRPL 33C 285	+Perl	(LBL, SLAC)
YAMADA	77	Hamburg Conf. 69		(DASP Collab.)
TRILLING	76	Stanford Symp. 437		(LBL)
WHITAKER	76	PRL 37 1596	+Tanenbaum, Abrams, Alam+	(SLAC, LBL)

OTHER RELATED PAPERS

BARATE	83	PL 121B 449	+Bareyre, Bonamy+	(SACL, LOIC, SHMP, IND)
FELDMAN	75B	PRL 35 821	+Jean-Marie, Sadoulet, Vannucci+	(LBL, SLAC)
Also Erratum.	75C	PRL 35 1189	Feldman	
TANENBAUM	75	PRL 35 1323	+Whitaker, Abrams+	(LBL, SLAC)

$\eta_c(2S)$ or $\eta_c(3590)$

$I^G(J^{PC}) = ?^?(?^?+)$

OMITTED FROM SUMMARY TABLE

Our latest mini-review on this particle can be found in the 1984 edition. Needs confirmation.

$\eta_c(2S)$ MASS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
3594.0±5.0	[1] EDWARDS	82C	CBAL	$e^+e^- \rightarrow \gamma X$

[1] Assuming mass of $\psi(2S)$ = 3686 MeV.

$\eta_c(2S)$ WIDTH

VALUE (MeV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<8.0	95	EDWARDS	82C	CBAL	$e^+e^- \rightarrow \gamma X$

$\eta_c(2S)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	hadrons	seen
Γ_2	$\gamma\gamma$	

$\eta_c(2S)$ BRANCHING RATIOS

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

VALUE	DOCUMENT ID		TECN	COMMENT
seen	EDWARDS	82C	CBAL	$e^+e^- \rightarrow \gamma X$

$\Gamma(\gamma\gamma)/\Gamma_{total}$ — Γ_2/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.01	90	LEE	85	CBAL	$\psi' \rightarrow$ photons

$\eta_c(2S)$ REFERENCES

LEE	85	SLAC 282		(SLAC)
EDWARDS	82C	PRL 48 70	+Partridge, Peck+	(CIT, HARV, PRIN, STAN, SLAC)

OTHER RELATED PAPERS

OREGLIA	82	PR D25 2259	+Partridge+	(SLAC, CIT, HARV, PRIN, STAN)
PORTER	81	SLAC Summer Inst. 355	+Edwards+	(CIT, HARV, PRIN, STAN, SLAC)
BARTEL	78B	PL 79B 492	+Dittmann, Duinker, Olsson, O'Neill+	(DESY, HEIDP)

$\psi(2S)$ or $\psi(3685)$

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

$\psi(2S)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
3686.00±0.09 OUR AVERAGE					
3686.02±0.09±0.27		ARMSTRONG	93B	SPEC	$\overline{p}p \rightarrow e^+e^-$
3686.00±0.10	413	ZHOLENTZ	80	OLYA	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3683 ±5	77	ANTONIAZZI	94	E705	300 $\pi^\pm$, pLi $\rightarrow J/\psi\pi^+\pi^-$X

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

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
589.07±0.13 OUR AVERAGE				
589.7 ±1.2	LEMOIGNE	82	GOLI	190 GeV π^- Be $\rightarrow 2\mu$
589.07±0.13	[1] ZHOLENTZ	80	OLYA	e^+e^-
588.7 ±0.8	LUTH	75	MRK1	

[1] Redundant with data in mass above.

$\psi(2S)$ WIDTH

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
277±31 OUR AVERAGE Error includes scale factor of 1.1.				
306±36±16	ARMSTRONG	93B	SPEC	$\overline{p}p \rightarrow e^+e^-$
243±43	[2] PDG	92	RVUE	

[2] Uses $\Gamma(ee)$ from ALEXANDER 89 and $B(ee) = (88 \pm 13) \times 10^{-4}$ from FELDMAN 77.

$\psi(2S)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	hadrons	(98.10±0.30) %	
Γ_2	virtual $\gamma \rightarrow$ hadrons	(2.9 ±0.4) %	
Γ_3	e^+e^-	(8.8 ±1.3) $\times 10^{-3}$	
Γ_4	$\mu^+\mu^-$	(7.7 ±1.7) $\times 10^{-3}$	
	Decays into $J/\psi(1S)$ and anything		
Γ_5	$J/\psi(1S)$anything	(57 ±4) %	
Γ_6	$J/\psi(1S)$neutrals	(23.2 ±2.6) %	
Γ_7	$J/\psi(1S)\pi^+\pi^-$	(32.4 ±2.6) %	
Γ_8	$J/\psi(1S)\pi^0\pi^0$	(18.4 ±2.7) %	
Γ_9	$J/\psi(1S)\eta$	(2.7 ±0.4) %	S=1.7
Γ_{10}	$J/\psi(1S)\pi^0$	(9.7 ±2.1) $\times 10^{-4}$	