$c\overline{c}$ MESONS

$\eta_c(1S)$ or $\eta_c(2980)$

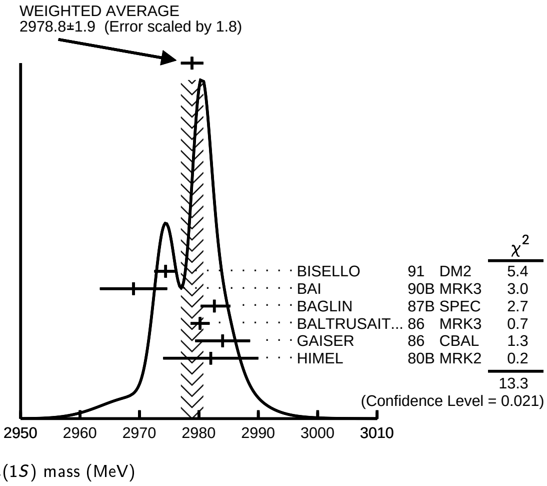
$I^G(J^{PC}) = 0^+(0^{-+})$

Observed in the inclusive γ spectrum generated from $\psi(2S)$ decay, therefore $C = +$. From the 4π decay $G = +$, therefore $I = 0$. From angular distribution in $J/\psi(1S) \rightarrow \eta_c\gamma$, $\eta_c \rightarrow \phi\phi$, $J^P = 0^-$ (BALTRUSAITIS 84).

$\eta_c(1S)$ MASS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
2978.8± 1.9 OUR AVERAGE		Error includes scale factor of 1.8. See the ideogram below.		
2974.4± 1.9		[1] BISELLO 91	DM2	$J/\psi \rightarrow \eta_c\gamma$
2969 ± 4 ± 4	80	BAI 90B	MRK3	$J/\psi \rightarrow \gamma K^+ K^- K^+ K^-$
$2982.6^{+2.7}_{-2.3}$	12	BAGLIN 87B	SPEC	$\overline{p}p \rightarrow \gamma\gamma$
2980.2± 1.6		[1] BALTRUSAIT...86	MRK3	$J/\psi \rightarrow \eta_c\gamma$
2984 ± 2.3± 4.0		GAISER 86	CBAL	$J/\psi \rightarrow \gamma X$, $\psi(2S) \rightarrow \gamma X$
2982 ± 8	18	[2] HIMEL 80B	MRK2	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2956 ±12 ±12		BAI 90B	MRK3	$J/\psi \rightarrow \gamma K^+ K^- K^0_S K^0_L$
2976 ± 8		[3] BALTRUSAIT...84	MRK3	$J/\psi \rightarrow 2\phi\gamma$
2980 ± 9		[2] PARTRIDGE 80B	CBAL	e^+e^-

[1] Average of several decay modes.
[2] Mass adjusted by us to correspond to $J/\psi(1S)$ mass = 3097 MeV.
[3] $\eta_c \rightarrow \phi\phi$.

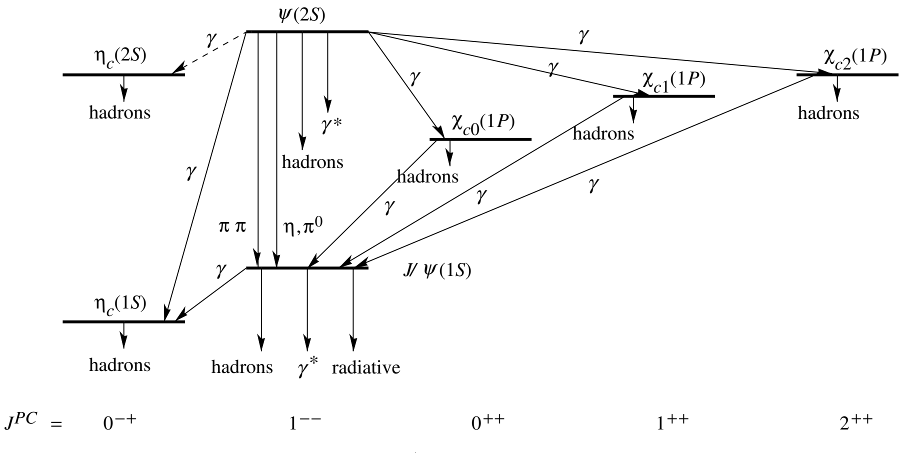


$\eta_c(1S)$ WIDTH

VALUE (MeV)	*CL%*	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
$\mathbf{10.3^{+3.8}_{-3.4}}$ **OUR AVERAGE**					
$7.0^{+7.5}_{-7.0}$		12	BAGLIN 87B	SPEC	$\overline{p}p \rightarrow \gamma\gamma$
$10.1^{+33.0}_{-8.2}$		23 ± 11	[4] BALTRUSAIT...86	MRK3	$J/\psi \rightarrow \gamma p\overline{p}$
11.5± 4.5			GAISER 86	CBAL	$J/\psi \rightarrow \gamma X$, $\psi(2S) \rightarrow \gamma X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<40	90	18	HIMEL 80B	MRK2	e^+e^-
<20	90		PARTRIDGE 80B	CBAL	e^+e^-

[4] Positive and negative errors correspond to 90% confidence level.

THE CHARMONIUM SYSTEM



The current state of knowledge of the charmonium system and transitions, as interpreted by the charmonium model. Uncertain states and transitions are indicated by dashed lines. The notation γ^* refers to decay processes involving intermediate virtual photons, including decays to e^+e^- and $\mu^+\mu^-$.