

# $\eta_c(2S)$

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

OMITTED FROM SUMMARY TABLE

Needs confirmation. Quantum numbers are quark model predictions.

## $\eta_c(2S)$ MASS

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>3594 ± 5</b>	<sup>1</sup> EDWARDS	82C CBAL	$e^+e^- \rightarrow \gamma X$

<sup>1</sup> 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 ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ hadrons	seen
$\Gamma_2$ $p\bar{p}$	
$\Gamma_3$ $\gamma\gamma$	

## $\eta_c(2S)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma^2(\text{total})$

$\Gamma(p\bar{p}) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}^2$	$\Gamma_2\Gamma_3/\Gamma^2$			
VALUE (units $10^{-8}$ )	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 5.6</b>	90	<sup>2,3,4</sup> AMBROGIANI 01	E835	$\bar{p}p \rightarrow \gamma\gamma$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
< 8.0	90	<sup>2,3,5</sup> AMBROGIANI 01	E835	$\bar{p}p \rightarrow \gamma\gamma$
<12.0	90	<sup>3,5</sup> AMBROGIANI 01	E835	$\bar{p}p \rightarrow \gamma\gamma$

<sup>2</sup> Including the measurements of of ARMSTRONG 95F in the AMBROGIANI 01 analysis.

<sup>3</sup> For a total width  $\Gamma=5$  MeV.

<sup>4</sup> For the resonance mass region 3589–3599 MeV/ $c^2$ .

<sup>5</sup> For the resonance mass region 3575–3660 MeV/ $c^2$ .

## $\eta_c(2S)$ BRANCHING RATIOS

$\Gamma(\text{hadrons})/\Gamma_{\text{total}}$	$\Gamma_1/\Gamma$		
VALUE	DOCUMENT ID	TECN	COMMENT
<b>seen</b>	EDWARDS	82C CBAL	$e^+e^- \rightarrow \gamma X$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
not seen	ABREU	980 DLPH	$e^+e^- \rightarrow e^+e^- + \text{hadrons}$

$\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$

$\Gamma_3/\Gamma$

VALUE                      CL%                      DOCUMENT ID                      TECN                      COMMENT

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

<0.01                      90                      LEE                      85                      CBAL                       $\psi' \rightarrow$  photons

### $\eta_c(2S)$ REFERENCES

AMBROGIANI	01	PR D64 052003	M. Ambrogiani <i>et al.</i>	(FNAL E835 Collab.)
ABREU	98O	PL B441 479	P. Abreu <i>et al.</i>	(DELPHI Collab.)
ARMSTRONG	95F	PR D52 4839	T.A. Armstrong <i>et al.</i>	(FNAL, FERR, GENO+)
LEE	85	SLAC 282	R.A. Lee	(SLAC)
EDWARDS	82C	PRL 48 70	C. Edwards <i>et al.</i>	(CIT, HARV, PRIN+)

### OTHER RELATED PAPERS

ACCIARRI	99T	PL B461 155	M. Acciarri <i>et al.</i>	(L3 Collab.)
OREGLIA	82	PR D25 2259	M.J. Oreglia <i>et al.</i>	(SLAC, CIT, HARV+)
PORTER	81	SLAC Summer Inst. 355	F.C. Porter <i>et al.</i>	(CIT, HARV, PRIN+)
BARTEL	78B	PL 79B 492	W. Bartel <i>et al.</i>	(DESY, HEIDP)