

$\chi_{b0}(1P)$

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

J needs confirmation.

Observed in radiative decay of the $\Upsilon(2S)$, therefore $C = +$. Branching ratio requires E1 transition, M1 is strongly disfavored, therefore $P = +$.

 $\chi_{b0}(1P)$ MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>
9859.44 ± 0.42 ± 0.31 OUR EVALUATION	From average γ energy below, using $\Upsilon(2S)$ mass = 10023.26 ± 0.31 MeV

 γ ENERGY IN $\Upsilon(2S)$ DECAY

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
162.5 ± 0.4 OUR AVERAGE			
162.56 ± 0.19 ± 0.42	ARTUSO	05	CLEO $\Upsilon(2S) \rightarrow \gamma X$
162.0 ± 0.8 ± 1.2	EDWARDS	99	CLE2 $\Upsilon(2S) \rightarrow \gamma \chi(1P)$
162.1 ± 0.5 ± 1.4	ALBRECHT	85E	ARG $\Upsilon(2S) \rightarrow \text{conv.} \gamma X$
163.8 ± 1.6 ± 2.7	NERNST	85	CBAL $\Upsilon(2S) \rightarrow \gamma X$
158.0 ± 7 ± 1	HAAS	84	CLEO $\Upsilon(2S) \rightarrow \text{conv.} \gamma X$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
149.4 ± 0.7 ± 5.0	KLOPFEN...	83	CUSB $\Upsilon(2S) \rightarrow \gamma X$

 $\chi_{b0}(1P)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)	Confidence level
$\Gamma_1 \quad \gamma \Upsilon(1S)$	< 6 %	90%

 $\chi_{b0}(1P)$ BRANCHING RATIOS

$\Gamma(\gamma \Upsilon(1S))/\Gamma_{\text{total}}$					Γ_1/Γ
<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
< 0.06	90	WALK	86	CBAL $\Upsilon(2S) \rightarrow \gamma \gamma \ell^+ \ell^-$	
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
< 0.11	90	PAUSS	83	CUSB $\Upsilon(2S) \rightarrow \gamma \gamma \ell^+ \ell^-$	

 $\chi_{b0}(1P)$ REFERENCES

ARTUSO	05	PRL 94 032001	M. Artuso <i>et al.</i>	(CLEO Collab.)
EDWARDS	99	PR D59 032003	K.W. Edwards <i>et al.</i>	(CLEO Collab.)
WALK	86	PR D34 2611	W.S. Walk <i>et al.</i>	(Crystal Ball Collab.)
ALBRECHT	85E	PL 160B 331	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
NERNST	85	PRL 54 2195	R. Nernst <i>et al.</i>	(Crystal Ball Collab.)
HAAS	84	PRL 52 799	J. Haas <i>et al.</i>	(CLEO Collab.)
KLOPFEN...	83	PRL 51 160	C. Klopfenstein <i>et al.</i>	(CUSB Collab.)
PAUSS	83	PL 130B 439	F. Pauss <i>et al.</i>	(MPIM, COLU, CORN, LSU+)