

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

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

$J$  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

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

## $\gamma$ ENERGY IN $\Upsilon(2S)$ DECAY

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>162.5 ± 0.4 OUR AVERAGE</b>			
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 ( $\Gamma_i/\Gamma$ )	Confidence level
$\Gamma_1 \quad \gamma \Upsilon(1S)$	< 6 %	90%

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

$\Gamma(\gamma \Upsilon(1S))/\Gamma_{\text{total}}$	CL%	DOCUMENT ID	TECN	COMMENT	$\Gamma_1/\Gamma$
<b>&lt; 0.06</b>	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+)