

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

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

$J$  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>	<u>TECN</u>	<u>COMMENT</u>
<b>9859.9 ± 1.0 OUR AVERAGE</b>			
9860.0 ± 0.8 ± 1.2	<sup>1</sup> EDWARDS	99 CLE2	$\Upsilon(2S) \rightarrow \gamma\chi(1P)$
9859.9 ± 0.5 ± 1.4	<sup>1</sup> ALBRECHT	85E ARG	$\Upsilon(2S) \rightarrow \text{conv.}\gamma X$
9858.1 ± 1.6 ± 2.7	<sup>1</sup> NERNST	85 CBAL	$\Upsilon(2S) \rightarrow \gamma X$
9864.0 ± 7 ± 1	<sup>1</sup> HAAS	84 CLEO	$\Upsilon(2S) \rightarrow \text{conv.}\gamma X$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
9872.8 ± 0.7 ± 5.0	<sup>1</sup> KLOPFEN...	83 CUSB	$\Upsilon(2S) \rightarrow \gamma X$
<sup>1</sup> From $\gamma$ energy below, assuming $\Upsilon(2S)$ mass = 10023.3 MeV.			

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

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>162.1 ± 1.0 OUR AVERAGE</b>			
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

$\Gamma(\gamma \Upsilon(1S))/\Gamma_{\text{total}}$					$\Gamma_1/\Gamma$
<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<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

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+)

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