

$\chi_{b2}(1P)$

$$J^G(J^{PC}) = 0^+(2^{++})$$

J needs confirmation.

Observed in radiative decay of the $\Upsilon(2S)$, therefore $C = +$. Branching ratio requires E1 transition, M1 is strongly disfavored, therefore $P = +$. $J = 2$ from SKWARNICKI 87.

 $\chi_{b2}(1P)$ MASSVALUE (MeV)DOCUMENT ID

9912.21 ± 0.26 ± 0.31 OUR EVALUATION From average γ energy below, using $\Upsilon(2S)$ mass = 10023.26 ± 0.31 MeV

 γ ENERGY IN $\Upsilon(2S)$ DECAYVALUE (MeV)DOCUMENT IDTECNCOMMENT

110.44 ± 0.29 OUR AVERAGE Error includes scale factor of 1.1.

110.58 ± 0.08 ± 0.30	ARTUSO	05	CLEO	$\Upsilon(2S) \rightarrow \gamma X$
110.8 ± 0.3 ± 0.6	EDWARDS	99	CLE2	$\Upsilon(2S) \rightarrow \gamma \chi(1P)$
107.0 ± 1.1 ± 1.3	WALK	86	CBAL	$\Upsilon(2S) \rightarrow \gamma \gamma \ell^+ \ell^-$
110.6 ± 0.3 ± 0.9	ALBRECHT	85E	ARG	$\Upsilon(2S) \rightarrow \text{conv.} \gamma X$
110.4 ± 0.8 ± 2.2	NERNST	85	CBAL	$\Upsilon(2S) \rightarrow \gamma X$
109.5 ± 0.7 ± 1.0	HAAS	84	CLEO	$\Upsilon(2S) \rightarrow \text{conv.} \gamma X$
108.2 ± 0.3 ± 2.0	KLOPFEN...	83	CUSB	$\Upsilon(2S) \rightarrow \gamma X$
108.8 ± 4.0	PAUSS	83	CUSB	$\Upsilon(2S) \rightarrow \gamma \gamma \ell^+ \ell^-$

 $\chi_{b2}(1P)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 \quad \gamma \Upsilon(1S)$	(22 ± 4) %

 $\chi_{b2}(1P)$ BRANCHING RATIOS

$\Gamma(\gamma \Upsilon(1S))/\Gamma_{\text{total}}$	Γ_1/Γ		
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.22 ± 0.04 OUR AVERAGE			
0.27 ± 0.06 ± 0.06	WALK	86	CBAL $\Upsilon(2S) \rightarrow \gamma \gamma \ell^+ \ell^-$
0.20 ± 0.05	KLOPFEN...	83	CUSB $\Upsilon(2S) \rightarrow \gamma \gamma \ell^+ \ell^-$

 $\chi_{b2}(1P)$ 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.)
SKWARNICKI	87	PRL 58 972	T. Skwarnicki <i>et al.</i>	(Crystal Ball Collab.) J
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+)