$\chi_{b0}(1P)$

$I^G(J^{PC}) = 0^+(0^{++})$
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		TECN	COMMENT
9859.8±1.3 OUR AVERAGE				
9860.0±0.5±1.4	[1] ALBRECHT	85E	ARG	$\Upsilon(2S) \rightarrow$ conv.γX
9858.3±1.6±2.7	[1] NERNST	85	CBAL	$\Upsilon(2S) \rightarrow \gamma$X
9864.1±7 ±1	[1] HAAS	84	CLEO	$\Upsilon(2S) \rightarrow$ conv.γX
• • • We do not use the following data for averages, fits, limits, etc. • • •				
9872.8±0.7±5.0	[1] KLOPFEN...	83	CUSB	$\Upsilon(2S) \rightarrow \gamma$X

[1] From γ energy below, assuming $\Upsilon(2S)$ mass = 10023.4 MeV.

γ ENERGY IN $\Upsilon(2S)$ DECAY

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
162.3±1.3 OUR AVERAGE				
162.1±0.5±1.4	ALBRECHT	85E	ARG	$\Upsilon(2S) \rightarrow$ conv.γX
163.8±1.6±2.7	NERNST	85	CBAL	$\Upsilon(2S) \rightarrow \gamma$X
158.0±7 ±1	HAAS	84	CLEO	$\Upsilon(2S) \rightarrow$ conv.γX
• • • 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
Γ_1	$\gamma\,\Upsilon(1S)$	<6 %	90%

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

$\Gamma(\gamma\,\Upsilon(1S))/\Gamma_{total}$ **Γ_1/Γ**

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<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

WALK	86	PR D34 2611	+Zschorsch+	(Crystal Ball Collab.)
ALBRECHT	85E	PL 160B 331	+Drescher, Heller+	(ARGUS Collab.)
NERNST	85	PRL 54 2195	+Antreasyan, Aschman+	(Crystal Ball Collab.)
HAAS	84	PRL 52 799	+Jensen, Kagan, Kass, Behrends+	(CLEO Collab.)
KLOPFEN...	83	PRL 51 160	Klopfenstein, Horstkotte+	(CUSB Collab.)
PAUSS	83	PL 130B 439	+Dietl, Eigen+	(MPIM, COLU, CORN, LSU, STON)