

**$h_b(1P)$** 

$$I^G(J^{PC}) = ??(1^{+-})$$

Quantum numbers are quark model predictions,  $C = -$  established by  $\eta_b \gamma$  decay.

 **$h_b(1P)$  MASS**

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>9899.3 ± 0.8 OUR AVERAGE</b>				
9899.3 ± 0.4 ± 1.0	112k	TAMPONI	15 BELL	$e^+ e^- \rightarrow \gamma \eta + \text{hadrons}$
9899.1 ± 0.4 ± 1.0	70k	MIZUK	12 BELL	$e^+ e^- \rightarrow \pi^+ \pi^- \text{ hadrons}$
9902 ± 4 ± 2	10.8k	LEES	11K BABR	$\Upsilon(3S) \rightarrow \eta_b \gamma \pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
9898.2 <sup>+1.1+1.0</sup> <sub>-1.0-1.1</sub>	50.0k	<sup>1</sup> ADACHI	12 BELL	10.86 $e^+ e^- \rightarrow \pi^+ \pi^- \text{ MM}$

<sup>1</sup>Superseded by MIZUK 12.

 **$h_b(1P)$  DECAY MODES**

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1 \quad \eta_b(1S)\gamma$	(52 <sup>+6</sup> <sub>-5</sub> ) %

 **$h_b(1P)$  BRANCHING RATIOS**

$\Gamma(\eta_b(1S)\gamma)/\Gamma_{\text{total}}$				$\Gamma_1/\Gamma$
VALUE (units $10^{-2}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>52<sup>+6</sup><sub>-5</sub> OUR AVERAGE</b>				
56 ± 8 ± 4	33.1k	<sup>1</sup> TAMPONI	15 BELL	$e^+ e^- \rightarrow \gamma \eta + \text{hadrons}$
49.2 ± 5.7 <sup>+5.6</sup> <sub>-3.3</sub>	24k	MIZUK	12 BELL	$e^+ e^- \rightarrow (\gamma)\pi^+ \pi^- \text{ hadrons}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
seen	10.8k	LEES	11K BABR	$\Upsilon(3S) \rightarrow \eta_b \gamma \pi^0$

<sup>1</sup>Using  $B(\eta \rightarrow 2\gamma) = (39.41 \pm 0.20)\%$ .

 **$h_b(1P)$  REFERENCES**

TAMPONI	15	PRL 115 142001	U. Tamponi <i>et al.</i>	(BELLE Collab.)
ADACHI	12	PRL 108 032001	I. Adachi <i>et al.</i>	(BELLE Collab.)
MIZUK	12	PRL 109 232002	R. Mizuk <i>et al.</i>	(BELLE Collab.)
LEES	11K	PR D84 091101	J.P. Lees <i>et al.</i>	(BABAR Collab.)