

$$h_b(2P)$$

$$J^{PC} = 0^-(1^{+-})$$

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

$h_b(2P)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
$10259.8 \pm 0.5 \pm 1.1$	90k	¹ MIZUK	12 BELL	$e^+e^- \rightarrow \pi^+\pi^-$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$10259.8 \pm 0.6^{+1.4}_{-1.0}$	83.9k	² ADACHI	12 BELL	$10.86 e^+e^- \rightarrow \pi^+\pi^-$ MM
¹ Observed with 9 standard deviations significance.				
² Superseded by MIZUK 12.				

$h_b(2P)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1 hadrons	not seen	
Γ_2 $\eta_b(1S)\gamma$	$(22 \pm 5) \%$	
Γ_3 $\eta_b(2S)\gamma$	$(48 \pm 13) \%$	
Γ_4 $\Upsilon(1S)\eta$	$(7.1^{+4.0}_{-3.3}) \times 10^{-3}$	
Γ_5 $\Upsilon(1S)\pi^0$	$< 1.8 \times 10^{-3}$	90%

$h_b(2P)$ BRANCHING RATIOS

$\Gamma(\text{hadrons})/\Gamma_{\text{total}}$					Γ_1/Γ
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
not seen	83.9k	ADACHI	12 BELL	$10.86 e^+e^- \rightarrow \pi^+\pi^-$ MM	
$\Gamma(\eta_b(1S)\gamma)/\Gamma_{\text{total}}$					Γ_2/Γ
VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT	
$22.3 \pm 3.8^{+3.1}_{-3.3}$	10k	MIZUK	12 BELL	$e^+e^- \rightarrow (\gamma)\pi^+\pi^-$ hadrons	
$\Gamma(\eta_b(2S)\gamma)/\Gamma_{\text{total}}$					Γ_3/Γ
VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT	
$47.5 \pm 10.5^{+6.8}_{-7.7}$	26k	MIZUK	12 BELL	$e^+e^- \rightarrow (\gamma)\pi^+\pi^-$ hadrons	
$\Gamma(\Upsilon(1S)\eta)/\Gamma_{\text{total}}$					Γ_4/Γ
VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT	
$7.1^{+3.7}_{-3.2} \pm 0.8$	3.8	KOVALENKO	24 BELL	$e^+e^- \rightarrow \Upsilon(5S)$	

$\Gamma(\Upsilon(1S)\pi^0)/\Gamma_{\text{total}}$			Γ_5/Γ		
<i>VALUE</i>	<i>CL%</i>	<i>EVTS</i>	<i>DOCUMENT ID</i>	<i>TECN</i>	<i>COMMENT</i>
$<1.8 \times 10^{-3}$	90	0.1	KOVALENKO 24	BELL	$e^+e^- \rightarrow \Upsilon(5S)$

h_b(2*P*) REFERENCES

KOVALENKO	24	PRL 133 261901	E. Kovalenko <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.)