

$$h_b(2P)$$

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

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±0.5±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±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² Superseded by MIZUK 12.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 ± 5) %	
Γ_3 $\eta_b(2S)\gamma$	(48 ±13) %	
Γ_4 $\Upsilon(1S)\eta$	(7.1 ⁺ ₋ 4.0 _{3.3}) × 10 ⁻³	
Γ_5 $\Upsilon(1S)\pi^0$	< 1.8 × 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±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±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^{±0.8}	3.8	KOVALENKO	24 BELL	$e^+e^- \rightarrow \Upsilon(5S)$

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

h_b(2P) 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.)