$\eta_b(2S)$

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

OMITTED FROM SUMMARY TABLE

Quantum numbers shown are quark-model predictions.

$\eta_b(2S)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
$9999.0\pm3.5^{+2.8}_{-1.9}$	26k	[1] MIZUK	12	BELL	$e^+e^- \to \gamma\pi^+\pi^- +$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$9974.6\pm2.3\pm2.1$	11 ± 4	[2,3,4] DOBBS	12		$\Upsilon(2S) \to \gamma$ hadrons

[1] Assuming $\Gamma_{\eta_b(2S)} = 4.9$ MeV. Not independent of the corresponding mass difference measurement.

[2] SANDILYA 13 (Belle Collab.) search for such a state reconstructed in the same 26 exclusive hadronic final states as DOBBS 12 using a sample of $(157.8\pm3.6)\times10^6$ $\Upsilon(2S)$ decays or about 17 times larger and find no evidence for a signal. Their 90% C.L. upper limit on the branching fraction $B(\Upsilon(2S) \to \eta_b(2S)\gamma) \times \sum_i B(\eta_b(2S) \to X_i) < 4.9\times10^{-6}$, summed over the exclusive hadronic final states X_i, is an order of magnitude smaller than that reported by DOBBS 12.

[3] Obtained by analyzing CLEO III data but not authored by the CLEO Collaboration.

[4] Assuming $\Gamma_{\eta_b(2S)} = 5$ MeV. Not independent of the corresponding mass difference measurement.

$m_{\Upsilon(2S)} - m_{\eta_b(2S)}$

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
$24.3\pm3.5^{+2.8}_{-1.9}$	26k	[5] MIZUK	12	BELL	$e^+e^- \to \gamma\pi^+\pi^- +$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$48.7\pm2.3\pm2.1$	11 ± 4	[6,7,8] DOBBS	12		$\Upsilon(2S) \to \gamma$ hadrons

[5] Assuming $\Gamma_{\eta_b(2S)} = 4.9$ MeV. Not independent of the corresponding mass measurement.

[6] SANDILYA 13 (Belle Collab.) search for such a state reconstructed in the same 26 exclusive hadronic final states as DOBBS 12 using a sample of $(157.8\pm3.6)\times10^6$ $\Upsilon(2S)$ decays or about 17 times larger and find no evidence for a signal. Their 90% C.L. upper limit on the branching fraction $B(\Upsilon(2S) \to \eta_b(2S)\gamma) \times \sum_i B(\eta_b(2S) \to X_i) < 4.9\times10^{-6}$, summed over the exclusive hadronic final states X_i, is an order of magnitude smaller than that reported by DOBBS 12.

[7] Obtained by analyzing CLEO III data but not authored by the CLEO Collaboration.

[8] Assuming $\Gamma_{\eta_b(2S)} = 5$ MeV. Not independent of the corresponding mass measurement.

$\eta_b(2S)$ WIDTH

VALUE (MeV)	CL%	DOCUMENT ID		TECN	COMMENT
<24	90	MIZUK	12	BELL	$e^+e^- \to \gamma\pi^+\pi^-$ hadrons

$\eta_b(2S)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	hadrons	seen

$\eta_b(2S)$ BRANCHING RATIOS

$\Gamma(\text{hadrons})/\Gamma_{\text{total}}$ **Γ_1/Γ**

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
seen	26k	MIZUK	12	BELL	$e^+e^- \to \gamma\pi^+\pi^-$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen		[9,10] DOBBS	12		$\Upsilon(2S) \to \gamma$ hadrons

[9] SANDILYA 13 (Belle Collab.) search for such a state reconstructed in the same 26 exclusive hadronic final states as DOBBS 12 using a sample of $(157.8 \pm 3.6) \times 10^6$ $\Upsilon(2S)$ decays or about 17 times larger and find no evidence for a signal. Their 90% C.L. upper limit on the branching fraction $B(\Upsilon(2S) \to \eta_b(2S)\gamma) \times \sum_i B(\eta_b(2S) \to X_i) < 4.9 \times 10^{-6}$, summed over the exclusive hadronic final states X_i, is an order of magnitude smaller than that reported by DOBBS 12.

[10] Obtained by analyzing CLEO III data but not authored by the CLEO Collaboration.

$\eta_b(2S)$ REFERENCES

SANDILYA	13	PRL 111 112001	S. Sandilya *et al.*	(BELLE Collab.)
DOBBS	12	PRL 109 082001	S. Dobbs *et al.*	
MIZUK	12	PRL 109 232002	R. Mizuk *et al.*	(BELLE Collab.)