



$I(J^P) = 0(\frac{1}{2}^+)$ Status: ***
 I, J, P need confirmation.

In the quark model Ω_b^- is *ssb* ground state. None of its quantum numbers has been measured.

Ω_b^- MASS

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
6046.1 ± 1.7 OUR AVERAGE			
6045.1 ± 3.2 ± 0.8	¹ AAIJ	160 LHCB	$p\bar{p}$ at 7, 8 TeV
6047.5 ± 3.8 ± 0.6	² AALTONEN	14B CDF	$p\bar{p}$ at 1.96 TeV
6046.0 ± 2.2 ± 0.5	³ AAIJ	13AV LHCB	$p\bar{p}$ at 7 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
6054.4 ± 6.8 ± 0.9	⁴ AALTONEN	09AP CDF	Repl. by AALTONEN 14B
6165 ± 10 ± 13	⁵ ABAZOV	08AL D0	$p\bar{p}$ at 1.96 TeV

¹ Reconstructed in $\Omega_b^- \rightarrow \Omega_c^0 \pi^-$, $\Omega_c^0 \rightarrow pK^- K^- \pi^+$ decays. Reference Ξ_b^- mass 5797.72 ± 0.6 MeV from AAIJ 14B.

² Uses $\Omega_b^- \rightarrow J/\psi \Omega^-$ and $\Omega_c^0 \pi^-$ decays, with the first evidence for $\Omega_b^- \rightarrow \Omega_c^0 \pi^-$ at 3.3σ significance.

³ Measured in $\Omega_b^- \rightarrow J/\psi \Omega^-$ with 19 ± 5 events.

⁴ Observed in $\Omega_b^- \rightarrow J/\psi \Omega^-$ decays with 16_{-4}^{+6} candidates, a significance of 5.5 sigma from a combined mass-lifetime fit.

⁵ Observed in $\Omega_b^- \rightarrow J/\psi \Omega^-$ decays with $17.8 \pm 4.9 \pm 0.8$ candidates, a significance of 5.4 sigma.

$m_{\Omega_b^-} - m_{\Lambda_b^0}$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
426.4 ± 2.2 ± 0.4	AAIJ	13AV LHCB	$p\bar{p}$ at 7 TeV

$m_{\Omega_b^-} - m_{\Xi_b^-}$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
247.3 ± 3.2 ± 0.5	¹ AAIJ	160 LHCB	$p\bar{p}$ at 7, 8 TeV

¹ Uses $\Omega_b^- \rightarrow \Omega_c^0 \pi^-$, $\Omega_c^0 \rightarrow pK^- K^- \pi^+$ and $\Xi_b^- \rightarrow \Xi_c^0 \pi^-$, $\Xi_c^0 \rightarrow pK^- K^- \pi^+$ decays.

Ω_b^- MEAN LIFE

"OUR EVALUATION" has been provided by the Heavy Flavor Averaging Group (HFLAV, <https://hflav.web.cern.ch/>).

VALUE (10^{-12} s)	DOCUMENT ID	TECN	COMMENT
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$1.64^{+0.18}_{-0.17}$ OUR EVALUATION

$1.65^{+0.18}_{-0.16}$ OUR AVERAGE

$1.78 \pm 0.26 \pm 0.05 \pm 0.06$ ¹ AAIJ 16O LHCB pp at 7, 8 TeV

$1.54^{+0.26}_{-0.21} \pm 0.05$ ² AAIJ 14T LHCB pp at 7, 8 TeV

$1.66^{+0.53}_{-0.40} \pm 0.02$ ² AALTONEN 14B CDF $p\bar{p}$ at 1.96 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.13^{+0.53}_{-0.40} \pm 0.02$ ³ AALTONEN 09AP CDF Repl. by AALTONEN 14B

¹ Measured in $\Omega_b^- \rightarrow \Omega_c^0 \pi^-$, $\Omega_c^0 \rightarrow pK^- K^- \pi^+$ decays relative to $\Xi_b^- \rightarrow \Xi_c^0 \pi^-$, $\Xi_c^0 \rightarrow pK^- K^- \pi^+$ decays with reference Ξ_b^- mean life 1.599 ± 0.06 ps from AAIJ 14B.

² Measured in $\Omega_b^- \rightarrow J/\psi \Omega^-$ decays.

³ Observed in $\Omega_b^- \rightarrow J/\psi \Omega^-$ decays with 16^{+6}_{-4} candidates, a significance of 5.5 sigma from a combined mass-lifetime fit.

 $\tau(\Omega_b^-)/\tau(\Xi_b^-)$ mean life ratio

VALUE	DOCUMENT ID	TECN	COMMENT
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$1.11 \pm 0.16 \pm 0.03$ ¹ AAIJ 16O LHCB pp at 7, 8 TeV

¹ Uses $\Omega_b^- \rightarrow \Omega_c^0 \pi^-$, $\Omega_c^0 \rightarrow pK^- K^- \pi^+$ and $\Xi_b^- \rightarrow \Xi_c^0 \pi^-$, $\Xi_c^0 \rightarrow pK^- K^- \pi^+$ decays.

 Ω_b^- DECAY MODES

Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1 $J/\psi \Omega^- \times B(b \rightarrow \Omega_b)$	$(2.9^{+1.1}_{-0.8}) \times 10^{-6}$	
Γ_2 $pK^- K^- \times B(\bar{b} \rightarrow \Omega_b)$	$< 2.5 \times 10^{-9}$	90%
Γ_3 $p\pi^- \pi^- \times B(\bar{b} \rightarrow \Omega_b)$	$< 1.5 \times 10^{-8}$	90%
Γ_4 $pK^- \pi^- \times B(\bar{b} \rightarrow \Omega_b)$	$< 7 \times 10^{-9}$	90%

 Ω_b^- BRANCHING RATIOS

$\Gamma(J/\psi \Omega^- \times B(b \rightarrow \Omega_b))/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
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$0.029^{+0.011}_{-0.008}$ OUR AVERAGE

$0.026^{+0.010}_{-0.007} \pm 0.004$ ¹ AALTONEN 09AP CDF $p\bar{p}$ at 1.96 TeV

0.08 ± 0.04 ± 0.02 ² ABAZOV 08AL D0 $p\bar{p}$ at 1.96 TeV

¹ AALTONEN 09AP reports $[\Gamma(\Omega_b^- \rightarrow J/\psi \Omega^- \times B(b \rightarrow \Omega_b)) / \Gamma_{\text{total}}] / [B(\Lambda_b^0 \rightarrow J/\psi(1S) \Lambda \times B(b \rightarrow \Lambda_b^0))] = 0.045_{-0.012}^{+0.017} \pm 0.004$ which we multiply by our best value $B(\Lambda_b^0 \rightarrow J/\psi(1S) \Lambda \times B(b \rightarrow \Lambda_b^0)) = (5.8 \pm 0.8) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ABAZOV 08AL reports $[\Gamma(\Omega_b^- \rightarrow J/\psi \Omega^- \times B(b \rightarrow \Omega_b)) / \Gamma_{\text{total}}] / [B(\Xi_b^- \rightarrow J/\psi \Xi^- \times B(b \rightarrow \Xi_b^-))] = 0.80 \pm 0.32_{-0.22}^{+0.14}$ which we multiply by our best value $B(\Xi_b^- \rightarrow J/\psi \Xi^- \times B(b \rightarrow \Xi_b^-)) = (1.02_{-0.21}^{+0.26}) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(pK^- K^- \times B(\bar{b} \rightarrow \Omega_b)) / \Gamma_{\text{total}}$ Γ_2 / Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
<2.5 × 10⁻⁴	90	¹ AAIJ	17F LHCb	pp at 7, 8 TeV

¹ AAIJ 17F reports $[\Gamma(\Omega_b^- \rightarrow pK^- K^- \times B(\bar{b} \rightarrow \Omega_b)) / \Gamma_{\text{total}}] / [B(B^+ \rightarrow K^+ K^- K^+) / [B(\bar{b} \rightarrow B^+)]] < 18 \times 10^{-5}$ which we multiply by our best values $B(B^+ \rightarrow K^+ K^- K^+) = 3.40 \times 10^{-5}$, $B(\bar{b} \rightarrow B^+) = 40.8 \times 10^{-2}$.

$\Gamma(p\pi^- \pi^- \times B(\bar{b} \rightarrow \Omega_b)) / \Gamma_{\text{total}}$ Γ_3 / Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
<1.5 × 10⁻³	90	¹ AAIJ	17F LHCb	pp at 7, 8 TeV

¹ AAIJ 17F reports $[\Gamma(\Omega_b^- \rightarrow p\pi^- \pi^- \times B(\bar{b} \rightarrow \Omega_b)) / \Gamma_{\text{total}}] / [B(B^+ \rightarrow K^+ K^- K^+) / [B(\bar{b} \rightarrow B^+)]] < 109 \times 10^{-5}$ which we multiply by our best values $B(B^+ \rightarrow K^+ K^- K^+) = 3.40 \times 10^{-5}$, $B(\bar{b} \rightarrow B^+) = 40.8 \times 10^{-2}$.

$\Gamma(pK^- \pi^- \times B(\bar{b} \rightarrow \Omega_b)) / \Gamma_{\text{total}}$ Γ_4 / Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
<7 × 10⁻⁴	90	¹ AAIJ	17F LHCb	pp at 7, 8 TeV

¹ AAIJ 17F reports $[\Gamma(\Omega_b^- \rightarrow pK^- \pi^- \times B(\bar{b} \rightarrow \Omega_b)) / \Gamma_{\text{total}}] / [B(B^+ \rightarrow K^+ K^- K^+) / [B(\bar{b} \rightarrow B^+)]] < 51 \times 10^{-5}$ which we multiply by our best values $B(B^+ \rightarrow K^+ K^- K^+) = 3.40 \times 10^{-5}$, $B(\bar{b} \rightarrow B^+) = 40.8 \times 10^{-2}$.

Ω_b^- REFERENCES

AAIJ	17F	PRL 118 071801	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	16O	PR D93 092007	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14B	PL B728 234	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	14T	PL B736 154	R. Aaij <i>et al.</i>	(LHCb Collab.)
AALTONEN	14B	PR D89 072014	T. Aaltonen <i>et al.</i>	(CDF Collab.)
AAIJ	13AV	PRL 110 182001	R. Aaij <i>et al.</i>	(LHCb Collab.)
AALTONEN	09AP	PR D80 072003	T. Aaltonen <i>et al.</i>	(CDF Collab.)
ABAZOV	08AL	PRL 101 232002	V.M. Abazov <i>et al.</i>	(D0 Collab.)