



$I(J^P) = 0(\frac{1}{2}^+)$ 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
6045.8 ± 0.8 OUR AVERAGE			
6045.7 ± 0.5 ± 0.6	¹ AAIJ	23BD LHCB	pp at 7, 8, 13 TeV
6047.5 ± 3.8 ± 0.6	² AALTONEN	14B CDF	$p\bar{p}$ at 1.96 TeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
6045.9 ± 0.5 ± 0.6	³ AAIJ	23BD LHCB	pp at 7, 8, 13 TeV
6044.30 ± 1.20 ± 1.12	⁴ AAIJ	21AC LHCB	Repl. by AAIJ 23BD
6045.1 ± 3.2 ± 0.8	⁵ AAIJ	16O LHCB	Repl. by AAIJ 23BD
6046.0 ± 2.2 ± 0.5	⁶ AAIJ	13AV LHCB	Repl. by AAIJ 23BD
6054.4 ± 6.8 ± 0.9	⁷ AALTONEN	09AP CDF	Repl. by AALTONEN 14B
6165 ± 10 ± 13	⁸ ABAZOV	08AL D0	$p\bar{p}$ at 1.96 TeV

¹ Combines measurement using $\Omega_b^- \rightarrow J/\psi \Omega^-$ decays with results from AAIJ 160 and AAIJ 21AC taking into account correlations amongst systematic uncertainties. Uses Ξ_b^- mass $5797.33 \pm 0.24 \pm 0.29$ MeV from AAIJ 21.

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 Uses $\Omega_b^- \rightarrow J/\psi \Omega^-$ decays.

⁴ Uses $\Omega_b^- \rightarrow \Xi_c^+ K^- \pi^-$ and $\Xi_c^+ \rightarrow p K^- \pi^+$ decays. Reports the value of $6044.3 \pm 1.2 \pm 1.1^{+0.19}_{-0.22}$ MeV where the last uncertainty is due to the mass of Ξ_c^+ . We have combined the two systematic uncertainties in quadrature.

⁵ Reconstructed in $\Omega_b^- \rightarrow \Omega_c^0 \pi^-$, $\Omega_c^0 \rightarrow p K^- K^- \pi^+$ decays. Reference Ξ_b^- mass 5797.72 ± 0.6 MeV from AAIJ 14B.

⁶ Measured in $\Omega_b^- \rightarrow J/\psi \Omega^-$ with 19 ± 5 events.

⁷ 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.

⁸ 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	pp at 7 TeV

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

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
248.50 ± 0.51 ± 0.37	¹ AAIJ	23BD LHCB	pp at 7, 8, 13 TeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
248.54 ± 0.51 ± 0.38	² AAIJ	23BD LHCB	pp at 7, 8, 13 TeV
247.3 ± 3.2 ± 0.5	³ AAIJ	16O LHCB	Repl. by AAIJ 23BD

- ¹ Uses $\Omega_b^- \rightarrow J/\psi \Omega$ decays combined with the result from AAIJ 160 obtained using $\Omega_b^- \rightarrow \Omega_c^0 \pi^-$, $\Omega_c^0 \rightarrow p K^- K^- \pi^+$ and $\Xi_b^- \rightarrow \Xi_c^0 \pi^-$, $\Xi_c^0 \rightarrow p K^- K^- \pi^+$ decays taking into account correlation of systematic uncertainties.
- ² Uses $\Omega_b^- \rightarrow J/\psi \Omega$ decays.
- ³ Uses $\Omega_b^- \rightarrow \Omega_c^0 \pi^-$, $\Omega_c^0 \rightarrow p K^- K^- \pi^+$ and $\Xi_b^- \rightarrow \Xi_c^0 \pi^-$, $\Xi_c^0 \rightarrow p K^- K^- \pi^+$ decays.

Ω_b^- MEAN LIFE

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

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

1.78 ± 0.26 ± 0.05 ± 0.06	¹ AAIJ	160	LHCB	pp at 7, 8 TeV
1.54 ^{+0.26} _{-0.21} ± 0.05	² AAIJ	14T	LHCB	pp at 7, 8 TeV
1.66 ^{+0.53} _{-0.40} ± 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} ± 0.02	³ AALTONEN	09AP	CDF	Repl. by AALTONEN 14B
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¹ Measured in $\Omega_b^- \rightarrow \Omega_c^0 \pi^-$, $\Omega_c^0 \rightarrow p K^- K^- \pi^+$ decays relative to $\Xi_b^- \rightarrow \Xi_c^0 \pi^-$, $\Xi_c^0 \rightarrow p K^- K^- \pi^+$ 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_{-4}^{+6} 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 ± 0.16 ± 0.03 ¹ AAIJ 160 LHCB pp at 7, 8 TeV

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

Ω_b^- DECAY MODES

Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1 $J/\psi \Omega^- \times B(b \rightarrow \Omega_b)$	$(1.4_{-0.4}^{+0.5}) \times 10^{-6}$	S=1.6
Γ_2 $p K^- K^- \times B(\bar{b} \rightarrow \Omega_b)$	$< 2.3 \times 10^{-9}$	CL=90%
Γ_3 $p \pi^- \pi^- \times B(\bar{b} \rightarrow \Omega_b)$	$< 1.5 \times 10^{-8}$	CL=90%
Γ_4 $p K^- \pi^- \times B(\bar{b} \rightarrow \Omega_b)$	$< 7 \times 10^{-9}$	CL=90%
Γ_5 $\Omega_c^0 \pi^-$	seen	
Γ_6 $\Omega_c^0 \pi^-$, $\Omega_c^0 \rightarrow p K^- K^- \pi^+$	seen	
Γ_7 $\Xi_c^+ K^- \pi^-$	seen	

Ω_b^- BRANCHING RATIOS

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

VALUE (units 10^{-6})	DOCUMENT ID	TECN	COMMENT
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1.4 $^{+0.5}_{-0.4}$ OUR AVERAGE Error includes scale factor of 1.6.

$1.22 \pm 0.12^{+0.31}_{-0.26}$	1,2 AAIJ	23BD LHCB	$p\bar{p}$ at 13 TeV
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$2.6^{+1.0}_{-0.7} \pm 0.4$	3 AALTONEN	09AP CDF	$p\bar{p}$ at 1.96 TeV
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$8 \pm 4 \pm 2$	4 ABAZOV	08AL D0	$p\bar{p}$ at 1.96 TeV
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¹ AAIJ 23BD reports $[\Gamma(\Omega_b^- \rightarrow J/\psi \Omega_b^- \times B(b \rightarrow \Omega_b)) / \Gamma_{\text{total}}] / [B(\Xi_b^- \rightarrow J/\psi \Xi_b^- \times B(b \rightarrow \Xi_b^-))] = 0.120 \pm 0.008 \pm 0.008$ which we multiply by our best value $B(\Xi_b^- \rightarrow J/\psi \Xi_b^- \times B(b \rightarrow \Xi_b^-)) = (1.02^{+0.26}_{-0.21}) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² Reconstructing beauty baryons in the kinematic region $2 < \eta < 6$ and $p_T < 20$ GeV/c with their decays to a J/ψ meson and a hyperon.

³ AALTONEN 09AP reports $[\Gamma(\Omega_b^- \rightarrow J/\psi \Omega_b^- \times B(b \rightarrow \Omega_b)) / \Gamma_{\text{total}}] / [B(\Lambda_b^0 \rightarrow J/\psi(1S)\Lambda \times B(b \rightarrow \Lambda_b^0))] = 0.045^{+0.017}_{-0.012} \pm 0.004$ 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.

⁴ ABAZOV 08AL reports $[\Gamma(\Omega_b^- \rightarrow J/\psi \Omega_b^- \times B(b \rightarrow \Omega_b)) / \Gamma_{\text{total}}] / [B(\Xi_b \rightarrow J/\psi \Xi_b^- \times B(b \rightarrow \Xi_b^-))] = 0.80 \pm 0.32^{+0.14}_{-0.22}$ which we multiply by our best value $B(\Xi_b \rightarrow J/\psi \Xi_b^- \times B(b \rightarrow \Xi_b^-)) = (1.02^{+0.26}_{-0.21}) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
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$< 2.3 \times 10^{-4}$	90	1 AAIJ	21AH LHCB	$p\bar{p}$ at 7, 8, 13 TeV
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 2.5 \times 10^{-4}$	90	2 AAIJ	17F LHCB	$p\bar{p}$ at 7, 8 TeV
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¹ AAIJ 21AH reports $[\Gamma(\Omega_b^- \rightarrow p K^- K^- \times B(\bar{b} \rightarrow \Omega_b)) / \Gamma_{\text{total}}] / [B(\Xi_b^- \rightarrow p K^- K^- \times B(b \rightarrow \Xi_b^-))] < 62 \times 10^{-3}$ which we multiply by our best value $B(\Xi_b^- \rightarrow p K^- K^- \times B(b \rightarrow \Xi_b^-)) = 3.7 \times 10^{-8}$.

² AAIJ 17F reports $[\Gamma(\Omega_b^- \rightarrow p K^- K^- \times B(\bar{b} \rightarrow \Omega_b)) / \Gamma_{\text{total}}] / [B(B^+ \rightarrow K^+ K^- K^+) / [B(\bar{b} \rightarrow B^+)]] < 18 \times 10^{-5}$ 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
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$< 1.5 \times 10^{-3}$	90	1 AAIJ	17F LHCB	$p\bar{p}$ at 7, 8 TeV
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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
$<7 \times 10^{-4}$	90	¹ AAIJ	17F LHCb	pp at 7, 8 TeV

¹AAIJ 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 $B(B^+ \rightarrow K^+ K^- K^+) = 3.40 \times 10^{-5}$, $B(\bar{b} \rightarrow B^+) = 40.8 \times 10^{-2}$.

$\Gamma(\Omega_c^0 \pi^-)/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
seen	AAIJ	160 LHCb	pp at 7, 8 TeV

$\Gamma(\Xi_c^+ K^- \pi^-)/\Gamma(\Omega_c^0 \pi^-, \Omega_c^0 \rightarrow pK^- K^- \pi^+)$ Γ_7/Γ_6

VALUE (units 10^2)	DOCUMENT ID	TECN	COMMENT
$2.2 \pm 0.2 \pm 1.0$	¹ AAIJ	21AC LHCb	pp at 7, 8, 13 TeV

¹AAIJ 21AC reports $[\Gamma(\Omega_b^- \rightarrow \Xi_c^+ K^- \pi^-)/\Gamma(\Omega_b^- \rightarrow \Omega_c^0 \pi^-, \Omega_c^0 \rightarrow pK^- K^- \pi^+)] \times [B(\Xi_c^+ \rightarrow pK^- \pi^+)] = 1.35 \pm 0.11 \pm 0.05$ which we divide by our best value $B(\Xi_c^+ \rightarrow pK^- \pi^+) = (6.2 \pm 3.0) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

Ω_b^- REFERENCES

AAIJ	23BD PR D108 052008	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	21 PR D103 012004	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	21AC PR D104 L091102	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	21AH PR D104 052010	R. Aaij <i>et al.</i>	(LHCb Collab.)
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.)