Ω_b^-

$I(J^P) = 0(\frac{1}{2}^+)$ 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*
6045.2 ± 1.2 OUR AVERAGE				
6044.30 ± 1.20 ± 1.12	[1] AAIJ	21AC	LHCB	pp at 7, 8, 13 TeV
6045.1 ± 3.2 ± 0.8	[2] AAIJ	16O	LHCB	pp at 7, 8 TeV
6047.5 ± 3.8 ± 0.6	[3] AALTONEN	14B	CDF	$p\overline{p}$ at 1.96 TeV
6046.0 ± 2.2 ± 0.5	[4] AAIJ	13AV	LHCB	pp at 7 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
6054.4 ± 6.8 ± 0.9	[5] AALTONEN	09AP	CDF	Repl. by AALTONEN 14B
6165 ±10 ±13	[6] ABAZOV	08AL	D0	$p\overline{p}$ at 1.96 TeV

[1] Uses $\Omega_b^- \to \Xi_c^+ K^- \pi^-$ and $\Xi_c^+ \to p K^- \pi^+$ 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.

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

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

[4] Measured in $\Omega_b^- \to J/\psi \Omega^-$ with 19 ± 5 events.

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

[6] Observed in $\Omega_b^- \to J/\psi \Omega^-$ decays with 17.8 ± 4.9 ± 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*
247.3±3.2±0.5	[1] AAIJ	16O	LHCB	pp at 7, 8 TeV

[1] Uses $\Omega_b^- \to \Omega_c^0 \pi^-$, $\Omega_c^0 \to p K^- K^- \pi^+$ and $\Xi_b^- \to \Xi_c^0 \pi^-$, $\Xi_c^0 \to p K^- K^- \pi^+$ 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*
$1.64^{+0.18}_{-0.17}$ 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	$p\overline{p}$ 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 $\Omega_b^- \to \Omega_c^0 \pi^-$, $\Omega_c^0 \to p K^- K^- \pi^+$ decays relative to $\Xi_b^- \to \Xi_c^0 \pi^-$, $\Xi_c^0 \to p K^- K^- \pi^+$ decays with reference Ξ_b^- mean life 1.599 ± 0.06 ps from AAIJ 14B.

[2] Measured in $\Omega_b^- \to J/\psi \Omega^-$ decays.

[3] Observed in $\Omega_b^- \to J/\psi \Omega^-$ 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*
$1.11 \pm 0.16 \pm 0.03$	[1] AAIJ	16O	LHCB	pp at 7, 8 TeV

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

Ω_b^- DECAY MODES

	Mode	Fraction (Γ_i/Γ)		Confidence level
Γ_1	$J/\psi \Omega^- \times$B($b \to \Omega_b$)	$(2.9^{+1.1}_{-0.8}) \times 10^{-6}$		
Γ_2	$p K^- K^- \times$B($\overline{b} \to \Omega_b$)	< 2.3	$\times 10^{-9}$	90%
Γ_3	$p \pi^- \pi^- \times$B($\overline{b} \to \Omega_b$)	< 1.5	$\times 10^{-8}$	90%
Γ_4	$p K^- \pi^- \times$B($\overline{b} \to \Omega_b$)	< 7	$\times 10^{-9}$	90%
Γ_5	$\Omega_c^0 \pi^-$	seen		
Γ_6	$\Omega_c^0 \pi^-$, $\Omega_c^0 \to p K^- K^- \pi^+$	seen		
Γ_7	$\Xi_c^+ K^- \pi^-$	seen		

Ω_b^- BRANCHING RATIOS

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

VALUE (units 10^{-4})	*DOCUMENT ID*		*TECN*	*COMMENT*
$0.029^{+0.011}_{-0.008}$ OUR AVERAGE				
$0.026^{+0.010}_{-0.007} \pm 0.004$	[1] AALTONEN	09AP	CDF	$p\overline{p}$ at 1.96 TeV
$0.08 \pm 0.04 \pm 0.02$	[2] ABAZOV	08AL	D0	$p\overline{p}$ at 1.96 TeV

[1] AALTONEN 09AP reports $[\Gamma(\Omega_b^- \to J/\psi\Omega^- \times B(b \to \Omega_b))/\Gamma_{total}]$ / $[B(\Lambda_b^0 \to J/\psi(1S)\Lambda \times B(b \to \Lambda_b^0))] = 0.045^{+0.017}_{-0.012} \pm 0.004$ which we multiply by our best value $B(\Lambda_b^0 \to J/\psi(1S)\Lambda \times B(b \to \Lambda_b^0)) = (5.8 \pm 0.8) \times 10^{-5}$. 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 $[\Gamma(\Omega_b^- \to J/\psi\Omega^- \times B(b \to \Omega_b))/\Gamma_{total}]$ / $[B(\Xi_b \to J/\psi\Xi^- \times B(b \to \Xi_b^-))] = 0.80 \pm 0.32^{+0.14}_{-0.22}$ which we multiply by our best value $B(\Xi_b \to J/\psi\Xi^- \times B(b \to \Xi_b^-)) = (1.02^{+0.26}_{-0.21}) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

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

VALUE (units 10^{-5})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
$<2.3 \times 10^{-4}$	90	[1] AAIJ	21AH	LHCB	pp at 7, 8, 13 TeV

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

$<2.5 \times 10^{-4}$	90	[2] AAIJ	17F	LHCB	pp at 7, 8 TeV

[1] AAIJ 21AH reports $[\Gamma(\Omega_b^- \to pK^-K^- \times B(\overline{b} \to \Omega_b))/\Gamma_{total}]$ / $[B(\Xi_b^- \to pK^-K^- \times B(b \to \Xi_b^-))] < 62 \times 10^{-3}$ which we multiply by our best value $B(\Xi_b^- \to pK^-K^- \times B(b \to \Xi_b^-)) = 3.7 \times 10^{-8}$.

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

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

VALUE (units 10^{-5})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
$<1.5 \times 10^{-3}$	90	[1] AAIJ	17F	LHCB	pp at 7, 8 TeV

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

$\Gamma(pK^-\pi^- \times B(\overline{b} \to \Omega_b))/\Gamma_{total}$ 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

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

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

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
seen	AAIJ	16O	LHCB	pp at 7, 8 TeV

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

VALUE (units 10^2)	*DOCUMENT ID*		*TECN*	*COMMENT*
2.2±0.2±1.0	[1] AAIJ	21AC	LHCB	pp at 7, 8, 13 TeV

[1] AAIJ 21AC reports $[\Gamma(\Omega_b^- \to \Xi_c^+ K^- \pi^-)/\Gamma(\Omega_b^- \to \Omega_c^0 \pi^-,\ \Omega_c^0 \to p K^- K^- \pi^+)] \times [B(\Xi_c^+ \to p K^- \pi^+)] = 1.35 \pm 0.11 \pm 0.05$ which we divide by our best value $B(\Xi_c^+ \to p K^- \pi^+) = (6.2 \pm 3.0) \times 10^{-3}$. 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	21AC	PR D104 L091102	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	21AH	PR D104 052010	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17F	PRL 118 071801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	16O	PR D93 092007	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14B	PL B728 234	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14T	PL B736 154	R. Aaij *et al.*	(LHCb Collab.)
AALTONEN	14B	PR D89 072014	T. Aaltonen *et al.*	(CDF Collab.)
AAIJ	13AV	PRL 110 182001	R. Aaij *et al.*	(LHCb Collab.)
AALTONEN	09AP	PR D80 072003	T. Aaltonen *et al.*	(CDF Collab.)
ABAZOV	08AL	PRL 101 232002	V.M. Abazov *et al.*	(D0 Collab.)