BOTTOM BARYONS $(B = -1)$

$\Lambda_b^0 = u\,d\,b$, $\Xi_b^0 = u\,s\,b$, $\Xi_b^- = d\,s\,b$, $\Omega_b^- = s\,s\,b$

Λ_b^0

$I(J^P) = 0(\frac{1}{2}^+)$

$I(J^P)$ not yet measured; $0(\frac{1}{2}^+)$ is the quark model prediction.

Mass $m = 5619.5 \pm 0.4$ MeV

$m_{\Lambda_b^0} - m_{B^0} = 339.2 \pm 1.4$ MeV

$m_{\Lambda_b^0} - m_{B^+} = 339.7 \pm 0.7$ MeV

Mean life $\tau = (1.451 \pm 0.013) \times 10^{-12}$ s

$c\tau = 435\ \mu$m

$A_{CP}(\Lambda_b \to p\pi^-) = 0.03 \pm 0.18$

$A_{CP}(\Lambda_b \to pK^-) = 0.37 \pm 0.17$

α decay parameter for $\Lambda_b \to J/\psi\Lambda = 0.05 \pm 0.18$

The branching fractions B(b-baryon $\to \Lambda\ell^-\overline{\nu}_\ell$anything) and B($\Lambda_b^0 \to \Lambda_c^+\ell^-\overline{\nu}_\ell$anything) are not pure measurements because the underlying measured products of these with B($b \to b$-baryon) were used to determine B($b \to b$-baryon), as described in the note "Production and Decay of b-Flavored Hadrons."

For inclusive branching fractions, *e.g.*, $\Lambda_b \to \overline{\Lambda}_c$anything, the values usually are multiplicities, not branching fractions. They can be greater than one.

Λ_b^0 DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
$J/\psi(1S)\Lambda \times$ B($b \to \Lambda_b^0$)	$(5.8 \pm 0.8) \times 10^{-5}$		1740
$p D^0 \pi^-$	$(5.9 ^{+4.0}_{-3.2}) \times 10^{-4}$		2370
$p D^0 K^-$	$(4.3 ^{+3.0}_{-2.4}) \times 10^{-5}$		2269
$\Lambda_c^+ \pi^-$	$(5.7 ^{+4.0}_{-2.6}) \times 10^{-3}$	S=1.6	2342
$\Lambda_c^+ K^-$	$(4.2 ^{+2.6}_{-1.9}) \times 10^{-4}$		2314
$\Lambda_c^+ a_1(1260)^-$	seen		2153
$\Lambda_c^+ \pi^+\pi^-\pi^-$	$(8 ^{+5}_{-4}) \times 10^{-3}$	S=1.6	2323
$\Lambda_c(2595)^+\pi^-$, $\Lambda_c(2595)^+ \to \Lambda_c^+\pi^+\pi^-$	$(3.7 ^{+2.8}_{-2.3}) \times 10^{-4}$		2210

$\Lambda_c(2625)^+\pi^-$, $\Lambda_c(2625)^+ \to \Lambda_c^+\pi^+\pi^-$		$(3.6\ ^{+2.7}_{-2.1}) \times 10^{-4}$		2193
$\Sigma_c(2455)^0\pi^+\pi^-$, $\Sigma_c^0 \to \Lambda_c^+\pi^-$		$(6\ ^{+5}_{-4}) \times 10^{-4}$		2265
$\Sigma_c(2455)^{++}\pi^-\pi^-$, $\Sigma_c^{++} \to \Lambda_c^+\pi^+$		$(3.5\ ^{+2.8}_{-2.3}) \times 10^{-4}$		2265
$\Lambda_c^+\ell^-\overline{\nu}_\ell$ anything	[a]	(9.9 ± 2.2) %		–
$\Lambda_c^+\ell^-\overline{\nu}_\ell$		$(6.5\ ^{+3.2}_{-2.5})$ %	S=1.8	2345
$\Lambda_c^+\pi^+\pi^-\ell^-\overline{\nu}_\ell$		(5.6 ± 3.1) %		2335
$\Lambda_c(2595)^+\ell^-\overline{\nu}_\ell$		$(8 \pm 5) \times 10^{-3}$		2212
$\Lambda_c(2625)^+\ell^-\overline{\nu}_\ell$		$(1.4\ ^{+0.9}_{-0.7})$ %		2195
$p h^-$	[b]	$< 2.3 \times 10^{-5}$	CL=90%	2730
$p\pi^-$		$(4.1 \pm 0.8) \times 10^{-6}$		2730
pK^-		$(4.9 \pm 0.9) \times 10^{-6}$		2708
$\Lambda\mu^+\mu^-$		$(1.08 \pm 0.28) \times 10^{-6}$		2695
$\Lambda\gamma$		$< 1.3 \times 10^{-3}$	CL=90%	2699

$\Lambda_b(5912)^0$

$J^P = \frac{1}{2}^-$

Mass $m = 5912.1 \pm 0.4$ MeV
Full width $\Gamma < 0.66$ MeV, CL = 90%

$\Lambda_b(5912)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda_b^0\pi^+\pi^-$	seen	86

$\Lambda_b(5920)^0$

$J^P = \frac{3}{2}^-$

Mass $m = 5919.73 \pm 0.32$ MeV
Full width $\Gamma < 0.63$ MeV, CL = 90%

$\Lambda_b(5920)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda_b^0\pi^+\pi^-$	seen	108

Σ_b

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

Mass $m(\Sigma_b^+) = 5811.3 \pm 1.9$ MeV
Mass $m(\Sigma_b^-) = 5815.5 \pm 1.8$ MeV
$m_{\Sigma_b^+} - m_{\Sigma_b^-} = -4.2 \pm 1.1$ MeV
$\Gamma(\Sigma_b^+) = 9.7^{+4.0}_{-3.0}$ MeV
$\Gamma(\Sigma_b^-) = 4.9^{+3.3}_{-2.4}$ MeV

Σ_b DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda_b^0 \pi$	dominant	134

Σ_b^*

$I(J^P) = 1(\frac{3}{2}^+)$
I, J, P need confirmation.

Mass $m(\Sigma_b^{*+}) = 5832.1 \pm 1.9$ MeV
Mass $m(\Sigma_b^{*-}) = 5835.1 \pm 1.9$ MeV
$m_{\Sigma_b^{*+}} - m_{\Sigma_b^{*-}} = -3.0^{+1.0}_{-0.9}$ MeV
$\Gamma(\Sigma_b^{*+}) = 11.5 \pm 2.8$ MeV
$\Gamma(\Sigma_b^{*-}) = 7.5 \pm 2.3$ MeV
$m_{\Sigma_b^*} - m_{\Sigma_b} = 21.2 \pm 2.0$ MeV

Σ_b^* DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda_b^0 \pi$	dominant	161

Ξ_b^0, Ξ_b^-

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

$m(\Xi_b^-) = 5794.9 \pm 0.9$ MeV (S = 1.1)
$m(\Xi_b^0) = 5793.1 \pm 2.5$ MeV (S = 1.1)
$m_{\Xi_b^-} - m_{\Lambda_b^0} = 176.2 \pm 0.9$ MeV
$m_{\Xi_b^0} - m_{\Lambda_b^0} = 174.8 \pm 2.5$ MeV
$m_{\Xi_b^-} - m_{\Xi_b^0} = 3 \pm 6$ MeV
Mean life $\tau_{\Xi_b^-} = (1.56^{+0.27}_{-0.25}) \times 10^{-12}$ s
Mean life $\tau_{\Xi_b} = (1.49^{+0.19}_{-0.18}) \times 10^{-12}$ s

Ξ_b DECAY MODES	Fraction (Γ_i/Γ)	Scale factor	p (MeV/c)
$\Xi_b \rightarrow \Xi^- \ell^- \overline{\nu}_\ell X \times B(\overline{b} \rightarrow \Xi_b)$	$(3.9 \pm 1.2) \times 10^{-4}$	1.4	–
$\Xi_b^- \rightarrow J/\psi \Xi^- \times B(b \rightarrow \Xi_b^-)$	$(1.02^{+0.26}_{-0.21}) \times 10^{-5}$		1783
$\Xi_b^0 \rightarrow p D^0 K^- \times B(\overline{b} \rightarrow \Xi_b)$	$(1.8\ {}^{+1.3}_{-1.1}) \times 10^{-6}$		–
$\Xi_b^0 \rightarrow \Lambda_c^+ K^- \times B(\overline{b} \rightarrow \Xi_b)$	$(8 \pm 7) \times 10^{-7}$		–

$\Xi_b(5945)^0$

$J^P = \frac{3}{2}^+$

Mass $m = 5949.3 \pm 1.2$ MeV
Full width $\Gamma = 2.1 \pm 1.7$ MeV

$\Xi_b(5945)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_b^- \pi^+$	seen	69

Ω_b^-

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

Mass $m = 6048.8 \pm 3.2$ MeV (S = 1.5)
$m_{\Omega_b^-} - m_{\Lambda_b^0} = 426.4 \pm 2.2$ MeV
Mean life $\tau = (1.1^{+0.5}_{-0.4}) \times 10^{-12}$ s

Ω_b^- DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$J/\psi \Omega^- \times B(b \rightarrow \Omega_b)$	$(2.9^{+1.1}_{-0.8}) \times 10^{-6}$	1808

b-baryon ADMIXTURE (Λ_b, Ξ_b, Σ_b, Ω_b)

Mean life $\tau = (1.449 \pm 0.015) \times 10^{-12}$ s

These branching fractions are actually an average over weakly decaying *b*-baryons weighted by their production rates at the LHC, LEP, and Tevatron, branching ratios, and detection efficiencies. They scale with the *b*-baryon production fraction B($b \rightarrow$ *b*-baryon).

The branching fractions B(*b*-baryon $\rightarrow \Lambda \ell^- \overline{\nu}_\ell$ anything) and B($\Lambda_b^0 \rightarrow \Lambda_c^+ \ell^- \overline{\nu}_\ell$ anything) are not pure measurements because the underlying measured products of these with B($b \rightarrow$ *b*-baryon) were used to determine B($b \rightarrow$ *b*-baryon), as described in the note "Production and Decay of *b*-Flavored Hadrons."

For inclusive branching fractions, *e.g.*, $B \rightarrow D^\pm$ anything, the values usually are multiplicities, not branching fractions. They can be greater than one.

b-baryon ADMIXTURE DECAY MODES (Λ_b,Ξ_b,Σ_b,Ω_b)	Fraction (Γ_i/Γ)	p (MeV/c)
$p \mu^- \overline{\nu}$ anything	$(5.3^{+2.2}_{-1.9})$ %	–
$p \ell \overline{\nu}_\ell$ anything	(5.1 ± 1.2) %	–
p anything	(64 ± 21) %	–
$\Lambda \ell^- \overline{\nu}_\ell$ anything	(3.5 ± 0.6) %	–
$\Lambda / \overline{\Lambda}$ anything	(36 ± 7) %	–
$\Xi^- \ell^- \overline{\nu}_\ell$ anything	$(6.0 \pm 1.6) \times 10^{-3}$	–

NOTES

[*a*] Not a pure measurement. See note at head of Λ_b^0 Decay Modes.

[*b*] Here h^- means π^- or K^-.