BOTTOM BARYONS ($B = -1$)

$\Lambda_b^0 = udb$, $\Xi_b^0 = usb$, $\Xi_b^- = dsb$

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 $m = 5620.2 \pm 1.6$ MeV

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

Mean life $\tau = (1.383^{+0.049}_{-0.048}) \times 10^{-12}$ s

$c\tau = 415$ μm

These branching fractions are actually an average over weakly decaying b-baryons weighted by their production rates in Z decay (or high-energy $p\overline{p}$), branching ratios, and detection efficiencies. They scale with the LEP b-baryon production fraction B($b \to$ b-baryon) and are evaluated for our value B($b \to$ b-baryon) = (9.2 ± 1.8)%.

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

Λ_b^0 DECAY MODES		Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$J/\psi(1S)\Lambda$		$(4.7\pm2.8) \times 10^{-4}$		1741
$\Lambda_c^+ \pi^-$		$(8.8\pm3.2) \times 10^{-3}$		2343
$\Lambda_c^+ a_1(1260)^-$		seen		2153
$\Lambda_c^+ \ell^- \overline{\nu}_\ell$ anything	[a]	(9.9 ± 2.6) %		–
$\Lambda_c^+ \ell^- \overline{\nu}_\ell$		$(5.0^{+1.9}_{-1.4})$ %		2345
$\Lambda_c^+ \pi^+ \pi^- \ell^- \overline{\nu}_\ell$		(5.6 ± 3.1) %		2335
$p h^-$	[b]	$< 2.3 \times 10^{-5}$	90%	2730
$p\pi^-$		$< 5.0 \times 10^{-5}$	90%	2730
pK^-		$< 5.0 \times 10^{-5}$	90%	2709
$\Lambda\gamma$		$< 1.3 \times 10^{-3}$	90%	2699

Σ_b

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

Mass $m(\Sigma_b^+) = 5807.8 \pm 2.7$ MeV
Mass $m(\Sigma_b^-) = 5815.2 \pm 2.0$ MeV

Σ_b DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Lambda_b^0 \pi$	dominant	128

Σ_b^*

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

Mass $m(\Sigma_b^{*+}) = 5829.0 \pm 3.4$ MeV
Mass $m(\Sigma_b^{*-}) = 5836.4 \pm 2.8$ 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	156

Ξ_b^0, Ξ_b^-

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

Mass $m = 5792.4 \pm 3.0$ MeV
Mean life $\tau = (1.42^{+0.28}_{-0.24}) \times 10^{-12}$ s

Ξ_b DECAY MODES	Fraction (Γ_i/Γ)	Scale factor	p (MeV/c)
$\Xi_b \to \Xi^- \ell^- \overline{\nu}_\ell X \times \text{B}(\overline{b} \to \Xi_b)$	$(3.9 \pm 1.2) \times 10^{-4}$	1.4	–
$\Xi_b^- \to J/\psi \Xi^- \times \text{B}(\overline{b} \to \Xi_b^-)/\text{B}(\overline{b} \to \Lambda_b)$	$(1.3 \pm 1.0) \times 10^{-4}$		–

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

Mean life $\tau = (1.319^{+0.039}_{-0.038}) \times 10^{-12}$ s

These branching fractions are actually an average over weakly decaying b-baryons weighted by their production rates in Z decay (or high-energy $p\overline{p}$), branching ratios, and detection efficiencies. They scale with the LEP b-baryon production fraction B($b \to$ b-baryon) and are evaluated for our value B($b \to$ b-baryon) = (9.2 ± 1.8)%.

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.*, $B \to$ $D^\pm$ 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	$(5.3^{+2.3}_{-2.0})$ %	–
$p \ell \overline{\nu}_\ell$ anything	(5.1± 1.4) %	–
p anything	(64 ±23) %	–
$\Lambda \ell^- \overline{\nu}_\ell$ anything	(3.5± 0.8) %	–
$\Lambda/\overline{\Lambda}$ anything	(36 ± 9) %	–
$\Xi^- \ell^- \overline{\nu}_\ell$ anything	$(6.0 \pm 1.8) \times 10^{-3}$	–

NOTES

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

[*b*] Here h^- means π^- or K^-.