BOTTOM BARYONS ($B = -1$)

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

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 $m = 5619.51 \pm 0.23$ MeV
$m_{\Lambda_b^0} - m_{B^0} = 339.2 \pm 1.4$ MeV
$m_{\Lambda_b^0} - m_{B^+} = 339.72 \pm 0.28$ MeV
Mean life $\tau = (1.466 \pm 0.010) \times 10^{-12}$ s
$c\tau = 439.5$ μm
$A_{CP}(\Lambda_b \to p\pi^-) = 0.06 \pm 0.07$
$A_{CP}(\Lambda_b \to pK^-) = 0.00 \pm 0.19$ (S = 2.4)
$A_{CP}(\Lambda_b \to p\overline{K}^0\pi^-) = -0.22 \pm 0.13$
$\Delta A_{CP}(J/\psi p\pi^-/K^-) \equiv A_{CP}(J/\psi p\pi^-) - A_{CP}(J/\psi pK^-)$
$= (5.7 \pm 2.7) \times 10^{-2}$
α decay parameter for $\Lambda_b \to J/\psi\Lambda = 0.18 \pm 0.13$

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
$pD^0\pi^-$	$(6.6 \pm 0.8) \times 10^{-4}$		2370
pD^0K^-	$(4.8 \pm 0.9) \times 10^{-5}$		2269
$pJ/\psi\pi^-$	seen		1755
$pJ/\psi K^-$	seen		1589
$p\overline{K}^0\pi^-$	$(1.3 \pm 0.4) \times 10^{-5}$		2693
pK^0K^-	$< 3.5 \times 10^{-6}$	CL=90%	2639
$\Lambda_c^+\pi^-$	$(4.7 \pm 0.4) \times 10^{-3}$	S=1.4	2342
$\Lambda_c^+K^-$	$(3.42 \pm 0.33) \times 10^{-4}$	S=1.4	2314

$\Lambda_c^+ a_1(1260)^-$		seen		2153
$\Lambda_c^+ D^-$		(4.6 $\pm$0.6) $\times 10^{-4}$		1886
$\Lambda_c^+ D_s^-$		(1.10$\pm$0.10) %		1833
$\Lambda_c^+ \pi^+ \pi^- \pi^-$		(7.3 $\pm$1.1) $\times 10^{-3}$	S=1.1	2323
$\Lambda_c(2595)^+ \pi^-$, $\Lambda_c(2595)^+ \to \Lambda_c^+ \pi^+ \pi^-$		(3.2 $\pm$1.4) $\times 10^{-4}$		2210
$\Lambda_c(2625)^+ \pi^-$, $\Lambda_c(2625)^+ \to \Lambda_c^+ \pi^+ \pi^-$		(3.1 $\pm$1.2) $\times 10^{-4}$		2193
$\Sigma_c(2455)^0 \pi^+ \pi^-$, $\Sigma_c^0 \to \Lambda_c^+ \pi^-$		(5.4 $\pm$2.1) $\times 10^{-4}$		2265
$\Sigma_c(2455)^{++} \pi^- \pi^-$, $\Sigma_c^{++} \to \Lambda_c^+ \pi^+$		(3.1 $\pm$1.5) $\times 10^{-4}$		2265
$\Lambda_c^+ \ell^- \overline{\nu}_\ell$ anything	[a]	(10.7 $\pm$2.2) %		–
$\Lambda_c^+ \ell^- \overline{\nu}_\ell$		(6.2 $^{+1.4}_{-1.2}$) %		2345
$\Lambda_c^+ \pi^+ \pi^- \ell^- \overline{\nu}_\ell$		(5.6 $\pm$3.1) %		2335
$\Lambda_c(2595)^+ \ell^- \overline{\nu}_\ell$		(7.8 $^{+4.0}_{-3.5}$) $\times 10^{-3}$		2212
$\Lambda_c(2625)^+ \ell^- \overline{\nu}_\ell$		(1.3 $^{+0.6}_{-0.5}$) %		2195
$p h^-$	[b]	$<$ 2.3 $\times 10^{-5}$	CL=90%	2730
$p \pi^-$		(4.4 $\pm$0.8) $\times 10^{-6}$		2730
$p K^-$		(5.3 $\pm$1.0) $\times 10^{-6}$		2708
$p D_s^-$		$<$ 4.8 $\times 10^{-4}$	CL=90%	2364
$\Lambda \mu^+ \mu^-$		(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 $m = 5912.11 \pm 0.26$ 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 $m = 5919.81 \pm 0.23$ 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.

$m(\Xi_b^-) = 5794.4 \pm 1.2$ MeV (S = 3.7)
$m(\Xi_b^0) = 5791.8 \pm 0.5$ MeV
$m_{\Xi_b^-} - m_{\Lambda_b^0} = 177.9 \pm 0.9$ MeV (S = 2.1)
$m_{\Xi_b^0} - m_{\Lambda_b^0} = 172.5 \pm 0.4$ MeV
$m_{\Xi_b^-} - m_{\Xi_b^0} = 5.9 \pm 0.6$ MeV
Mean life $\tau_{\Xi_b^-} = (1.560 \pm 0.040) \times 10^{-12}$ s
Mean life $\tau_{\Xi_b^0} = (1.464 \pm 0.031) \times 10^{-12}$ s

Ξ_b DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
$\Xi_b \to \Xi^- \ell^- \overline{\nu}_\ell X \times$ B($\overline{b} \to \Xi_b$)	$(3.9 \pm 1.2) \times 10^{-4}$	S=1.4	–
$\Xi_b^- \to J/\psi \Xi^- \times$ B($b \to \Xi_b^-$)	$(1.02^{+0.26}_{-0.21}) \times 10^{-5}$		1782
$\Xi_b^0 \to p D^0 K^- \times$ B($\overline{b} \to \Xi_b$)	$(1.8 \pm 0.6) \times 10^{-6}$		2374
$\Xi_b^0 \to p \overline{K}^0 \pi^- \times$ B($\overline{b} \to \Xi_b$)/B($\overline{b} \to B^0$)	$< 1.6 \times 10^{-6}$	CL=90%	2783
$\Xi_b^0 \to p K^0 K^- \times$ B($\overline{b} \to \Xi_b$)/B($\overline{b} \to B^0$)	$< 1.1 \times 10^{-6}$	CL=90%	2730
$\Xi_b^0 \to \Lambda_c^+ K^- \times$ B($\overline{b} \to \Xi_b$)	$(6 \pm 4) \times 10^{-7}$		2416

$\Xi_b'(5935)^-$

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

Mass $m = 5935.02 \pm 0.05$ MeV
$m_{\Xi_b'(5935)^-} - m_{\Xi_b^0} - m_{\pi^-} = 3.653 \pm 0.019$ MeV
Full width $\Gamma < 0.08$ MeV, CL = 95%

$\Xi_b'(5935)^-$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_b^0 \pi^- \times$ B($\overline{b} \to \Xi_b'(5935)^-$)/B($\overline{b} \to \Xi_b^0$)	(11.8±1.8) %	32

$\Xi_b(5945)^0$

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

Mass $m = 5948.9 \pm 1.5$ 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	71

$\Xi_b^*(5955)^-$

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

Mass $m = 5955.33 \pm 0.13$ MeV
$m_{\Xi_b^*(5955)^-} - m_{\Xi_b^0} - m_{\pi^-} = 23.96 \pm 0.13$ MeV
Full width $\Gamma = 1.65 \pm 0.33$ MeV

$\Xi_b^*(5955)^-$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_b^0 \pi^- \times$ B($\overline{b} \rightarrow$ $\Xi_b^*(5955)^-$)/B($\overline{b} \rightarrow$ Ξ_b^0)	(20.7±3.5) %	84

Ω_b^-

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

Mass $m = 6048.0 \pm 1.9$ MeV
$m_{\Omega_b^-} - m_{\Lambda_b^0} = 426.4 \pm 2.2$ MeV
Mean life $\tau = (1.57^{+0.23}_{-0.20}) \times 10^{-12}$ s

Ω_b^- DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$J/\psi\,\Omega^- \times$B($b \rightarrow$ Ω_b)	$(2.9^{+1.1}_{-0.8}) \times 10^{-6}$	1807

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	($5.8^{+\ 2.3}_{-\ 2.0}$) %	–
$p\ell\overline{\nu}_\ell$ anything	(5.6± 1.2) %	–
p anything	(69 ±22) %	–
$\Lambda\ell^-\overline{\nu}_\ell$ anything	(3.7± 0.6) %	–
$\Lambda\ell^+\nu_\ell$ anything	(3.1± 0.8) %	–
Λ anything	(39 ± 7) %	–
$\Xi^-\ell^-\overline{\nu}_\ell$ anything	(6.5± 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^-.