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 $m = 5619.60 \pm 0.17$ 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 $\tau = (1.470 \pm 0.010) \times 10^{-12}$ s

$c\tau = 440.7$ μm

$A_{CP}(\Lambda_b \to p\pi^-) = 0.06 \pm 0.08$

$A_{CP}(\Lambda_b \to pK^-) = -0.10 \pm 0.09$

$A_{CP}(\Lambda_b \to p\overline{K}^0\pi^-) = 0.22 \pm 0.13$

$\Delta A_{CP}(J/\psi p\pi^-/K^-) \equiv A_{CP}(J/\psi p\pi^-) - A_{CP}(J/\psi pK^-) = (5.7 \pm 2.7) \times 10^{-2}$

$A_{CP}(\Lambda_b \to \Lambda K^+\pi^-) = -0.53 \pm 0.25$

$A_{CP}(\Lambda_b \to \Lambda K^+K^-) = -0.28 \pm 0.12$

$\Delta A_{CP}(\Lambda_b^0 \to pK^-\mu^+\mu^-) \equiv A_{CP}(pK^-\mu^+\mu^-) - A_{CP}(pK^-J/\psi) = (-4 \pm 5) \times 10^{-2}$

α decay parameter for $\Lambda_b \to J/\psi\Lambda = 0.18 \pm 0.13$

$A_{FB}^{\ell}(\mu\mu)$ in $\Lambda_b \to \Lambda\mu^+\mu^- = -0.05 \pm 0.09$

$A_{FB}^{h}(p\pi)$ in $\Lambda_b \to \Lambda(p\pi)\mu^+\mu^- = -0.29 \pm 0.08$

$f_L(\mu\mu)$ longitudinal polarization fraction in $\Lambda_b \to \Lambda\mu^+\mu^- = 0.61^{+0.11}_{-0.14}$

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($b\to\ \Lambda_b^0$)		$(\ 5.8\ \pm0.8\ )\times10^{-5}$		1740
$pD^0\pi^-$		$(\ 6.3\ \pm0.7\ )\times10^{-4}$		2370
pD^0K^-		$(\ 4.6\ \pm0.8\ )\times10^{-5}$		2269
$pJ/\psi\pi^-$		$(\ 2.6\ ^{+0.5}_{-0.4}\ )\times10^{-5}$		1755
$p\pi^-J/\psi,\ J/\psi\to\ \mu^+\mu^-$		$(\ 1.6\ \pm0.8\ )\times10^{-6}$		–
$pJ/\psi K^-$		$(\ 3.2\ ^{+0.6}_{-0.5}\ )\times10^{-4}$		1589
$P_c(4380)^+K^-,\ P_c\to\ pJ/\psi$	[a]	$(\ 2.7\ \pm1.4\ )\times10^{-5}$		–
$P_c(4450)^+K^-,\ P_c\to\ pJ/\psi$	[a]	$(\ 1.3\ \pm0.4\ )\times10^{-5}$		–
$\chi_{c1}(1P)pK^-$		$(\ 7.6\ ^{+1.5}_{-1.3}\ )\times10^{-5}$		1242
$\chi_{c2}(1P)pK^-$		$(\ 7.9\ ^{+1.6}_{-1.4}\ )\times10^{-5}$		1198
$pJ/\psi(1S)\pi^+\pi^-K^-$		$(\ 6.6\ ^{+1.3}_{-1.1}\ )\times10^{-5}$		1410
$p\psi(2S)K^-$		$(\ 6.6\ ^{+1.2}_{-1.0}\ )\times10^{-5}$		1063
$p\overline{K}^0\pi^-$		$(\ 1.3\ \pm0.4\ )\times10^{-5}$		2693
pK^0K^-		$<\ 3.5\ \times10^{-6}$	CL=90%	2639
$\Lambda_c^+\pi^-$		$(\ 4.9\ \pm0.4\ )\times10^{-3}$	S=1.2	2342
$\Lambda_c^+K^-$		$(\ 3.59\pm0.30)\times10^{-4}$	S=1.2	2314
$\Lambda_c^+a_1(1260)^-$		seen		2153
$\Lambda_c^+D^-$		$(\ 4.6\ \pm0.6\ )\times10^{-4}$		1886
$\Lambda_c^+D_s^-$		$(\ 1.10\pm0.10)$ %		1833
$\Lambda_c^+\pi^+\pi^-\pi^-$		$(\ 7.7\ \pm1.1\ )\times10^{-3}$	S=1.1	2323
$\Lambda_c(2595)^+\pi^-,\ \Lambda_c(2595)^+\to\ \Lambda_c^+\pi^+\pi^-$		$(\ 3.4\ \pm1.5\ )\times10^{-4}$		2210
$\Lambda_c(2625)^+\pi^-,\ \Lambda_c(2625)^+\to\ \Lambda_c^+\pi^+\pi^-$		$(\ 3.3\ \pm1.3\ )\times10^{-4}$		2193
$\Sigma_c(2455)^0\pi^+\pi^-,\ \Sigma_c^0\to\ \Lambda_c^+\pi^-$		$(\ 5.7\ \pm2.2\ )\times10^{-4}$		2265
$\Sigma_c(2455)^{++}\pi^-\pi^-,\ \Sigma_c^{++}\to\ \Lambda_c^+\pi^+$		$(\ 3.2\ \pm1.6\ )\times10^{-4}$		2265
$\Lambda_c^+\ell^-\overline{\nu}_\ell$anything	[b]	(10.3 ±2.1) %		–
$\Lambda_c^+\ell^-\overline{\nu}_\ell$		$(\ 6.2\ ^{+1.4}_{-1.3}\ )$ %		2345
$\Lambda_c^+\pi^+\pi^-\ell^-\overline{\nu}_\ell$		$(\ 5.6\ \pm3.1\ )$ %		2335
$\Lambda_c(2595)^+\ell^-\overline{\nu}_\ell$		$(\ 7.9\ ^{+4.0}_{-3.5}\ )\times10^{-3}$		2212

$\Lambda_c(2625)^+ \ell^- \overline{\nu}_\ell$	(1.3 $^{+0.6}_{-0.5}$) %		2195
$p h^-$	[c] < 2.3 $\times 10^{-5}$	CL=90%	2730
$p \pi^-$	(4.2 ±0.8) $\times 10^{-6}$		2730
$p K^-$	(5.1 ±0.9) $\times 10^{-6}$		2709
$p D_s^-$	< 4.8 $\times 10^{-4}$	CL=90%	2364
$p \mu^- \overline{\nu}_\mu$	(4.1 ±1.0) $\times 10^{-4}$		2730
$\Lambda \mu^+ \mu^-$	(1.08±0.28) $\times 10^{-6}$		2695
$p \pi^- \mu^+ \mu^-$	(6.9 ±2.5) $\times 10^{-8}$		2720
$\Lambda \gamma$	< 1.3 $\times 10^{-3}$	CL=90%	2699
$\Lambda^0 \eta$	(9 $^{+7}_{-5}$) $\times 10^{-6}$		–
$\Lambda^0 \eta'(958)$	< 3.1 $\times 10^{-6}$	CL=90%	–
$\Lambda \pi^+ \pi^-$	(4.6 ±1.9) $\times 10^{-6}$		2692
$\Lambda K^+ \pi^-$	(5.7 ±1.2) $\times 10^{-6}$		2660
$\Lambda K^+ K^-$	(1.61±0.23) $\times 10^{-5}$		2605
$\Lambda^0 \phi$	(9.2 ±2.5) $\times 10^{-6}$		–

$\Lambda_b(5912)^0$

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

Mass $m = 5912.20 \pm 0.21$ 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 $m = 5919.92 \pm 0.19$ MeV (S = 1.1)
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.

$m(\Xi_b^-) = 5794.5 \pm 1.4$ MeV (S = 4.0)
$m(\Xi_b^0) = 5791.9 \pm 0.5$ MeV
$m_{\Xi_b^-} - m_{\Lambda_b^0} = 177.5 \pm 0.5$ MeV (S = 1.6)
$m_{\Xi_b^0} - m_{\Lambda_b^0} = 172.5 \pm 0.4$ MeV
$m_{\Xi_b^-} - m_{\Xi_b^0} = 5.9 \pm 0.6$ MeV
Mean life $\tau_{\Xi_b^-} = (1.571 \pm 0.040) \times 10^{-12}$ s
Mean life $\tau_{\Xi_b^0} = (1.479 \pm 0.031) \times 10^{-12}$ s

Ξ_b DECAY MODES	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
$\Xi^-\ell^-\overline{\nu}_\ell X \times$ B($\overline{b} \to \Xi_b$)	$(3.9 \pm 1.2) \times 10^{-4}$	S=1.4	–
$J/\psi\Xi^- \times$ B($b \to \Xi_b^-$)	$(1.02^{+0.26}_{-0.21}) \times 10^{-5}$		1782
$J/\psi\Lambda K^- \times$ B($b \to \Xi_b^-$)	$(2.5 \pm 0.4) \times 10^{-6}$		1631
$pD^0K^- \times$ B($\overline{b} \to \Xi_b$)	$(1.8 \pm 0.6) \times 10^{-6}$		2374
$p\overline{K}^0\pi^- \times$ B($\overline{b} \to \Xi_b$)/B($\overline{b} \to B^0$)	$< 1.6 \times 10^{-6}$	CL=90%	2783
$pK^0K^- \times$ B($\overline{b} \to \Xi_b$)/B($\overline{b} \to B^0$)	$< 1.1 \times 10^{-6}$	CL=90%	2730

$pK^-K^-\times$ B($\overline{b}\to\ \Xi_b$)	(3.6 ±0.8)	$\times10^{-8}$		2731
$\Lambda\pi^+\pi^-\times$ B($b\to\ \Xi_b^0$)/B($b\to$ Λ_b^0)	< 1.7	$\times10^{-6}$	CL=90%	2781
$\Lambda K^-\pi^+\times$ B($b\to\ \Xi_b^0$)/B($b\to$ Λ_b^0)	< 8	$\times10^{-7}$	CL=90%	2751
$\Lambda K^+K^-\times$ B($b\to\ \Xi_b^0$)/B($b\to$ Λ_b^0)	< 3	$\times10^{-7}$	CL=90%	2698
$\Lambda_c^+K^-\times$ B($\overline{b}\to\ \Xi_b$)	(6 ±4)	$\times10^{-7}$		2416
$\Lambda_b^0\pi^-\times$ B($b\to\ \Xi_b^-$)/B($b\to\ \Lambda_b^0$)	(5.7 ±2.0)	$\times10^{-4}$		99

$\Xi_b'(5935)^-$

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

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) %	31

$\Xi_b(5945)^0$

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

Mass $m = 5949.8 \pm 1.4$ MeV
Full width $\Gamma = 0.90 \pm 0.18$ MeV

$\Xi_b(5945)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$\Xi_b^-\pi^+$	seen	73

$\Xi_b(5955)^-$

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

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($\overline{b}\to$ $\Xi_b^*(5955)^-$)/B($\overline{b}\to\ \Xi_b^0$)	(20.7±3.5) %	84

Ω_b^-

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

Mass $m = 6046.1 \pm 1.7$ MeV
$m_{\Omega_b^-} - m_{\Lambda_b^0} = 426.4 \pm 2.2$ MeV
$m_{\Omega_b^-} - m_{\Xi_b^-} = 247.3 \pm 3.2$ MeV
Mean life $\tau = (1.64^{+0.18}_{-0.17}) \times 10^{-12}$ s
Mean life $\tau = 1.11 \pm 0.16$

Ω_b^- DECAY MODES	Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$J/\psi\,\Omega^- \times$B($b \to\ \Omega_b$)	$(2.9^{+1.1}_{-0.8}) \times 10^{-6}$		1806
$pK^-K^- \times$B($\overline{b} \to\ \Omega_b$)	$< 2.5 \times 10^{-9}$	90%	2866
$p\pi^-\pi^- \times$B($\overline{b} \to\ \Omega_b$)	$< 1.5 \times 10^{-8}$	90%	2943
$pK^-\pi^- \times$B($\overline{b} \to\ \Omega_b$)	$< 7 \times 10^{-9}$	90%	2915

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

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($b \to\ b$-baryon).

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	($5.5^{+\ 2.2}_{-\ 1.9}$) %	–
$p\ell\overline{\nu}_\ell$anything	(5.3± 1.1) %	–
$p$anything	(66 ±21) %	–
$\Lambda\ell^-\overline{\nu}_\ell$anything	(3.6± 0.6) %	–
$\Lambda\ell^+\nu_\ell$anything	(3.0± 0.8) %	–
Λanything	(37 ± 7) %	–
$\Xi^-\ell^-\overline{\nu}_\ell$anything	(6.2± 1.6) $\times 10^{-3}$	–

NOTES

[*a*] P_c^+ is a pentaquark-charmonium state.

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

[*c*] Here h^- means π^- or K^-.