# BOTTOM BARYONS ($B = -1$)

$\Lambda_b^0 = udb$, $\Sigma_b^0 = udb$, $\Sigma_b^+ = uub$, $\Sigma_b^- = ddb$
$\Xi_b^0 = usb$, $\Xi_b^- = dsb$, $\Omega_b^- = ssb$

## $\Lambda_b^0$

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

$I(J^P)$ 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 $\tau = (1.471 \pm 0.009) \times 10^{-12}$ s
$c\tau = 441.0$ $\mu$m
$A_{CP}(\Lambda_b \to\ p\pi^-) = -0.025 \pm 0.029$ (S = 1.2)
$A_{CP}(\Lambda_b \to\ pK^-) = -0.025 \pm 0.022$
$A_{CP}(\Lambda_b \to\ Dp K^-) = 0.12 \pm 0.09$
$\Delta A_{CP}(pK^-/\pi^-) = 0.014 \pm 0.024$
$A_{CP}(\Lambda_b \to\ p\overline{K}^0\pi^-) = 0.22 \pm 0.13$
$\Delta A_{CP}(J/\psi p\pi^-/K^-) = (5.7 \pm 2.7) \times 10^{-2}$
$A_{CP}(\Lambda_b \to\ \Lambda K^+\pi^-) = -0.53 \pm 0.25$
$A_{CP}(\Lambda_b \to\ \Lambda K^+K^-) = -0.28 \pm 0.12$
$\Delta A_{CP}(\Lambda_b^0 \to\ pK^-\mu^+\mu^-) = (-4 \pm 5) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to\ p\pi^-\pi^+\pi^-) = (1.1 \pm 2.6) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to (p\pi^-\pi^+\pi^-)_{LBM}) = (4 \pm 4) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to\ pa_1(1260)^-) = (-1 \pm 4) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to\ N(1520)^0\rho(770)^0) = (2 \pm 5) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to\ \Delta(1232)^{++}\pi^-\pi^-) = (0.1 \pm 3.3) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to\ pK^-\pi^+\pi^-) = (3.2 \pm 1.3) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to (pK^-\pi^+\pi^-)_{LBM}) = (3.5 \pm 1.6) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to\ N(1520)^0K^*(892)^0) = (5.5 \pm 2.5) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to\ \Lambda(1520)\rho(770)^0) = (1 \pm 6) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to\ \Delta(1232)^{++}K^-\pi^-) = (4.4 \pm 2.7) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to\ pK_1(1410)^-) = (5 \pm 4) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to\ pK^-K^+\pi^-) = (-7 \pm 5) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to\ pK^-K^+K^-) = (0.2 \pm 1.9) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to\ \Lambda(1520)\phi(1020)) = (4 \pm 6) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to\ (pK^-)_{highmass}\ \phi(1020)) = (-0.7 \pm 3.4) \times 10^{-2}$
$\Delta A_{CP}(\Lambda_b^0 \to (pK^-K^+K^-)_{LBM}) = (2.7 \pm 2.4) \times 10^{-2}$

$A_{FB}^{\ell}(\mu\mu)$ in $\Lambda_b \to \Lambda\mu^+\mu^- = -0.39 \pm 0.04$
$\Delta(A_{FB}^{\ell}(\mu\mu))$ in $\Lambda_b \to \Lambda\mu^+\mu^- = -0.05 \pm 0.09$
$A_{FB}^{h}(p\pi)$ in $\Lambda_b \to \Lambda(p\pi)\mu^+\mu^- = -0.30 \pm 0.05$
$A_{FB}^{\ell h}$ in $\Lambda_b \to \Lambda\mu^+\mu^- = 0.25 \pm 0.04$

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.

| $\Lambda_b^0$ DECAY MODES | | Fraction ($\Gamma_i/\Gamma$) | 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 |
| $pD^0\pi^-$ | | $( 6.2 \pm 0.6 ) \times 10^{-4}$ | | 2370 |
| $pD^+\pi^-\pi^-$ | | $( 2.7 \pm 0.4 ) \times 10^{-4}$ | | 2332 |
| $pD^*(2010)^+\pi^-\pi^-$ | | $( 5.2 \pm 1.0 ) \times 10^{-4}$ | | 2277 |
| $pD^0K^-$ | | $( 4.5 \pm 0.8 ) \times 10^{-5}$ | | 2269 |
| $pJ/\psi\pi^-$ | | $( 2.6 \, ^{+0.5}_{-0.4} ) \times 10^{-5}$ | | 1755 |
| $p\pi^- J/\psi$, $J/\psi \to \mu^+\mu^-$ | | $( 1.6 \pm 0.8 ) \times 10^{-6}$ | | – |
| $pJ/\psi K^-$ | | $( 3.2 \, ^{+0.6}_{-0.5} ) \times 10^{-4}$ | | 1589 |
| $p\eta_c(1S)K^-$ | | $( 1.06 \pm 0.26) \times 10^{-4}$ | | 1670 |
| $P_{c\overline{c}}(4312)^+K^-$, $P_{c\overline{c}}^+ \to p\eta_c(1S)$ | | $< 2.5 \times 10^{-5}$ | CL=95% | – |
| $P_{c\overline{c}}(4380)^+K^-$, $P_{c\overline{c}}^+ \to pJ/\psi$ | [a] | $( 2.7 \pm 1.4 ) \times 10^{-5}$ | | – |
| $P_c(4450)^+K^-$, $P_c \to pJ/\psi$ | [a] | $( 1.3 \pm 0.4 ) \times 10^{-5}$ | | – |
| $\chi_{c1}(1P)pK^-$ | | $( 7.6 \, ^{+1.5}_{-1.3} ) \times 10^{-5}$ | | 1242 |
| $\chi_{c1}(1P)p\pi^-$ | | $( 5.0 \, ^{+1.3}_{-1.1} ) \times 10^{-6}$ | | 1462 |
| $\chi_{c2}(1P)pK^-$ | | $( 7.7 \, ^{+1.6}_{-1.4} ) \times 10^{-5}$ | | 1198 |
| $\chi_{c2}(1P)p\pi^-$ | | $( 4.8 \pm 1.9 ) \times 10^{-6}$ | | 1427 |
| $pJ/\psi(1S)\pi^+\pi^-K^-$ | | $( 6.6 \, ^{+1.3}_{-1.1} ) \times 10^{-5}$ | | 1410 |
| $p\psi(2S)K^-$ | | $( 6.6 \, ^{+1.2}_{-1.0} ) \times 10^{-5}$ | | 1063 |
| $\chi_{c1}(3872)pK^-$ | | $( 3.5 \pm 1.3 ) \times 10^{-5}$ | | 837 |
| $\chi_{c1}(3872)\Lambda(1520)$ | | $( 2.0 \pm 0.9 ) \times 10^{-5}$ | | 721 |
| $\psi(2S)p\pi^-$ | | $( 7.5 \, ^{+1.6}_{-1.4} ) \times 10^{-6}$ | | 1320 |

| | | | | |
|---|---|---|---|---|
| $p\overline{K}^0\pi^-$ | | $(\ 1.3\ \pm0.4\ )\times10^{-5}$ | | 2693 |
| $pK^0K^-$ | | $<\ 3.5\ \times10^{-6}$ | CL=90% | 2639 |
| $\Lambda_c^+\pi^-$ | | $(\ 4.9\ \pm0.4\ )\times10^{-3}$ | S=1.2 | 2342 |
| $\Lambda_c^+K^-$ | | $(\ 3.56\pm0.28)\times10^{-4}$ | 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 |
| $\Lambda_c^+\pi^+\pi^-\pi^-$ | | $(\ 7.6\ \pm1.1\ )\times10^{-3}$ | S=1.1 | 2323 |
| $\Lambda_c(2595)^+\pi^-$, $\Lambda_c(2595)^+\to\ \Lambda_c^+\pi^+\pi^-$ | | $(\ 3.4\ \pm1.4\ )\times10^{-4}$ | | 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 |
| $\Sigma_c(2455)^{++}\pi^-\pi^-$, $\Sigma_c^{++}\to\ \Lambda_c^+\pi^+$ | | $(\ 3.2\ \pm1.5\ )\times10^{-4}$ | | 2265 |
| $\Lambda_c^+K^+K^-\pi^-$ | | $(\ 1.02\pm0.11)\times10^{-3}$ | | 2184 |
| $\Lambda_c^+p\overline{p}\pi^-$ | | $(\ 2.63\pm0.27)\times10^{-4}$ | | 1805 |
| $\Sigma_c(2455)^0p\overline{p}$, $\Sigma_c^0\to\ \Lambda_c^+\pi^-$ | | $(\ 2.3\ \pm0.5\ )\times10^{-5}$ | | – |
| $\Sigma_c(2520)^0p\overline{p}$, $\Sigma_c(2520)^0\to\ \Lambda_c^+\pi^-$ | | $(\ 3.1\ \pm0.7\ )\times10^{-5}$ | | – |
| $\Lambda_c^+\ell^-\overline{\nu}_\ell$anything | [b] | $(10.9\ \pm2.2\ )$ % | | – |
| $\Lambda_c^+\ell^-\overline{\nu}_\ell$ | | $(\ 6.2\ ^{+1.4}_{-1.3}\ )$ % | | 2345 |
| $\Lambda_c^+\tau^-\overline{\nu}_\tau$ | | $(\ 1.9\ \pm0.5\ )$ % | | 1933 |
| $\Lambda_c^+\pi^+\pi^-\ell^-\overline{\nu}_\ell$ | | $(\ 5.6\ \pm3.1\ )$ % | | 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 |
| $ph^-$ | [c] | $<\ 2.3\ \times10^{-5}$ | CL=90% | 2730 |
| $p\pi^-$ | | $(\ 4.6\ \pm0.8\ )\times10^{-6}$ | | 2730 |
| $pK^-$ | | $(\ 5.5\ \pm1.0\ )\times10^{-6}$ | | 2709 |
| $pD_s^-$ | | $(\ 1.25\pm0.13)\times10^{-5}$ | | 2364 |
| $p\mu^-\overline{\nu}_\mu$ | | $(\ 4.1\ \pm1.0\ )\times10^{-4}$ | | 2730 |
| $\Lambda\mu^+\mu^-$ | | $(\ 1.08\pm0.28)\times10^{-6}$ | | 2695 |
| $p\pi^-\mu^+\mu^-$ | | $(\ 6.9\ \pm2.5\ )\times10^{-8}$ | | 2720 |
| $pK^-e^+e^-$ | | $(\ 3.1\ \pm0.6\ )\times10^{-7}$ | | 2708 |
| $pK^-\mu^+\mu^-$ | | $(\ 2.6\ ^{+0.5}_{-0.4}\ )\times10^{-7}$ | | 2685 |
| $\Lambda\gamma$ | | $(\ 7.1\ \pm1.7\ )\times10^{-6}$ | | 2699 |

| | | | |
|---|---|---|---|
| $\Lambda\eta$ | $( 9 \ {}^{+7}_{-5} ) \times 10^{-6}$ | | 2670 |
| $\Lambda\eta'(958)$ | $< 3.1 \times 10^{-6}$ | CL=90% | 2611 |
| $\Lambda\pi^+\pi^-$ | $( 4.6 \pm 1.9 ) \times 10^{-6}$ | | 2692 |
| $\Lambda K^+\pi^-$ | $( 5.6 \pm 1.2 ) \times 10^{-6}$ | | 2660 |
| $\Lambda K^+K^-$ | $( 1.60 \pm 0.21 ) \times 10^{-5}$ | | 2605 |
| $\Lambda\phi$ | $( 9.8 \pm 2.6 ) \times 10^{-6}$ | | 2599 |
| $p\pi^-\pi^+\pi^-$ | $( 2.08 \pm 0.21 ) \times 10^{-5}$ | | 2715 |
| $pK^-K^+\pi^-$ | $( 4.0 \pm 0.6 ) \times 10^{-6}$ | | 2612 |
| $pK^-\pi^+\pi^-$ | $( 5.0 \pm 0.5 ) \times 10^{-5}$ | | 2675 |
| $pK^-K^+K^-$ | $( 1.25 \pm 0.13 ) \times 10^{-5}$ | | 2524 |

## $\Lambda_b(5912)^0$

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

Mass $m = 5912.19 \pm 0.17$ MeV
Full width $\Gamma < 0.25$ MeV, CL = 90%

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

## $\Lambda_b(5920)^0$

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

Mass $m = 5920.09 \pm 0.17$ MeV
Full width $\Gamma < 0.19$ MeV, CL = 90%

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

## $\Lambda_b(6070)^0$

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

Quantum numbers based on quark model expectations.

Mass $m = 6072.3 \pm 2.9$ MeV
Full width $\Gamma = 72 \pm 11$ MeV

| $\Lambda_b(6070)^0$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Lambda_b^0\pi^+\pi^-$ | seen | 343 |

## $\Lambda_b(6146)^0$

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

Mass $m = 6146.2 \pm 0.4$ MeV
$m_{\Lambda_b(6146)^0} - m_{\Lambda_b^0} = 526.55 \pm 0.34$ MeV
Full width $\Gamma = 2.9 \pm 1.3$ MeV

| $\Lambda_b(6146)^0$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Lambda_b^0 \pi^+ \pi^-$ | seen | 427 |

## $\Lambda_b(6152)^0$

$J^P = \frac{5}{2}^+$

Mass $m = 6152.5 \pm 0.4$ MeV
$m_{\Lambda_b(6152)^0} - m_{\Lambda_b^0} = 532.89 \pm 0.28$ MeV
$m_{\Lambda_b(6152)^0} - m_{\Lambda_b(6146)^0} = 6.34 \pm 0.32$ MeV
Full width $\Gamma = 2.1 \pm 0.9$ MeV

| $\Lambda_b(6152)^0$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Lambda_b^0 \pi^+ \pi^-$ | seen | 434 |

## $\Sigma_b$

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

Mass $m(\Sigma_b^+) = 5810.56 \pm 0.25$ MeV
Mass $m(\Sigma_b^-) = 5815.64 \pm 0.27$ MeV
$m_{\Sigma_b^+} - m_{\Sigma_b^-} = -5.06 \pm 0.18$ MeV
$\Gamma(\Sigma_b^+) = 5.0 \pm 0.5$ MeV
$\Gamma(\Sigma_b^-) = 5.3 \pm 0.5$ MeV

| $\Sigma_b$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Lambda_b^0 \pi$ | dominant | 133 |

## $\Sigma_b^*$

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

Mass $m(\Sigma_b^{*+}) = 5830.32 \pm 0.27$ MeV
Mass $m(\Sigma_b^{*-}) = 5834.74 \pm 0.30$ MeV
$m_{\Sigma_b^{*+}} - m_{\Sigma_b^{*-}} = -4.37 \pm 0.33$ MeV (S = 1.6)

$m_{\Sigma_b^{*+}} - m_{\Sigma_b^+} = 19.73 \pm 0.18$
$m_{\Sigma_b^{*-}} - m_{\Sigma_b^-} = 19.09 \pm 0.22$
$\Gamma(\Sigma_b^{*+}) = 9.4 \pm 0.5$ MeV
$\Gamma(\Sigma_b^{*-}) = 10.4 \pm 0.8$ MeV (S = 1.3)
$m_{\Sigma_b^*} - m_{\Sigma_b} = 21.2 \pm 2.0$ MeV

| $\Sigma_b^*$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Lambda_b^0\pi$ | dominant | 159 |

## $\Sigma_b(6097)^+$

$J^P = ?^?$

Mass $m = 6095.8 \pm 1.7$ MeV
Full width $\Gamma = 31 \pm 6$ MeV

| $\Sigma_b(6097)^+$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Lambda_b\pi^+ \times$ B($b \to \ \Sigma_b(6097)^+$) | seen | – |

## $\Sigma_b(6097)^-$

$J^P = ?^?$

Mass $m = 6098.0 \pm 1.8$ MeV
Full width $\Gamma = 29 \pm 4$ MeV

| $\Sigma_b(6097)^-$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Lambda_b\pi^- \times$ B($b \to \ \Sigma_b(6097)^-$) | seen | – |

## $\Xi_b^-$

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

$m(\Xi_b^-) = 5797.0 \pm 0.6$ MeV (S = 1.7)
$m_{\Xi_b^-} - m_{\Lambda_b^0} = 177.46 \pm 0.31$ MeV (S = 1.3)
$m_{\Xi_b^-} - m_{\Xi_b^0} = 5.9 \pm 0.6$ MeV
Mean life $\tau_{\Xi_b^-} = (1.572 \pm 0.040) \times 10^{-12}$ s

| $\Xi_b^-$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | Confidence level | $p$ (MeV/$c$) |
|---|---|---|---|
| $J/\psi\Xi^- \times$ 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 |
| $pK^-K^- \times$ B($b \to \ \Xi_b^-$) | $(3.7 \ \pm 0.8 \ ) \times 10^{-8}$ | | 2731 |

| | | | | |
|---|---|---|---|---|
| $pK^-K^-$ | seen | | | 2731 |
| $p K^- \pi^-$ | seen | | | 2783 |
| $\Lambda_b^0 \pi^- \times$ B($b \to \ \Xi_b^-$)/B($b \to \ \Lambda_b^0$) | (7.0 $\pm$0.9 ) | $\times 10^{-4}$ | | 99 |
| $\Xi_c^0 \pi^-$ | seen | | | 2367 |
| $\Sigma(1385) K^-$ | (2.6 $\pm$2.3 ) | $\times 10^{-7}$ | | 2707 |
| $\Lambda(1405) K^-$ | (1.9 $\pm$1.2 ) | $\times 10^{-7}$ | | 2702 |
| $\Lambda(1520) K^-$ | (7.6 $\pm$3.2 ) | $\times 10^{-7}$ | | 2673 |
| $\Lambda(1670) K^-$ | (4.5 $\pm$2.3 ) | $\times 10^{-7}$ | | 2629 |
| $\Sigma(1775) K^-$ | (2.2 $\pm$1.5 ) | $\times 10^{-7}$ | | 2599 |
| $\Sigma(1915) K^-$ | (2.6 $\pm$2.5 ) | $\times 10^{-7}$ | | 2553 |
| $\Xi^- \gamma$ | $< 1.3$ | $\times 10^{-4}$ | 95% | – |

## $\Xi_b^0$

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

$m(\Xi_b^0) = 5791.9 \pm 0.5$ MeV
$m_{\Xi_b^0} - m_{\Lambda_b^0} = 172.5 \pm 0.4$ MeV
Mean life $\tau_{\Xi_b^0} = (1.480 \pm 0.030) \times 10^{-12}$ s

| $\Xi_b^0$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | | Confidence level | $p$ (MeV/$c$) |
|---|---|---|---|---|
| $pD^0K^- \times$ B($b \to \ \Xi_b^0$) | (1.7 $\pm$0.5 ) | $\times 10^{-6}$ | | 2374 |
| $p\overline{K}^0 \pi^- \times$ B($b \to \ \Xi_b^0$)/B($\overline{b} \to$ $B^0$) | $< 1.6$ | $\times 10^{-6}$ | 90% | 2783 |
| $pK^0K^- \times$ B($b \to \ \Xi_b^0$)/B($\overline{b} \to$ $B^0$) | $< 1.1$ | $\times 10^{-6}$ | 90% | 2730 |
| $\Lambda\pi^+\pi^- \times$ B($b \to \ \Xi_b^0$)/B($b \to$ $\Lambda_b^0$) | $< 1.7$ | $\times 10^{-6}$ | 90% | 2781 |
| $\Lambda K^-\pi^+ \times$ B($b \to \ \Xi_b^0$)/B($b \to$ $\Lambda_b^0$) | $< 8$ | $\times 10^{-7}$ | 90% | 2751 |
| $\Lambda K^+K^- \times$ B($b \to \ \Xi_b^0$)/B($b \to$ $\Lambda_b^0$) | $< 3$ | $\times 10^{-7}$ | 90% | 2698 |
| $J/\psi\Lambda$ | seen | | | 1868 |
| $J/\psi\Xi^0$ | seen | | | 1785 |
| $\Lambda_c^+ K^- \times$ B($b \to \ \Xi_b^0$) | (6 $\pm$4 ) | $\times 10^{-7}$ | | 2416 |
| $pK^-\pi^+\pi^- \times$ B($b \to$ $\Xi_b^0$)/B($b \to \ \Lambda_b^0$) | (1.9 $\pm$0.4 ) | $\times 10^{-6}$ | | 2766 |
| $pK^-K^-\pi^+ \times$ B($b \to$ $\Xi_b^0$)/B($b \to \ \Lambda_b^0$) | (1.70$\pm$0.30) | $\times 10^{-6}$ | | 2704 |
| $pK^-K^+K^- \times$ B($b \to$ $\Xi_b^0$)/B($b \to \ \Lambda_b^0$) | (1.7 $\pm$0.9 ) | $\times 10^{-7}$ | | 2620 |

## $\Xi_b'(5935)^-$

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

Mass $m = 5935.1 \pm 0.5$ MeV
Full width $\Gamma = 0.03 \pm 0.032$ MeV

| $\Xi_b'(5935)^-$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (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 $m = 5952.3 \pm 0.6$ MeV
Full width $\Gamma = 0.87 \pm 0.08$ MeV

| $\Xi_b(5945)^0$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Xi_b^-\pi^+$ | seen | 78 |

## $\Xi_b(5955)^-$

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

Mass $m = 5955.7 \pm 0.5$ MeV
Full width $\Gamma = 1.43 \pm 0.11$ MeV

| $\Xi_b(5955)^-$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (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 |

## $\Xi_b(6087)^0$

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

Mass $m = 6087.2 \pm 0.5$ MeV
Full width $\Gamma = 2.4 \pm 0.5$ MeV

| $\Xi_b(6087)^0$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Xi_b^0\pi^+\pi^-$ | seen | – |

## $\Xi_b(6095)^0$

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

Mass $m = 6095.3 \pm 0.5$ MeV
Full width $\Gamma = 0.50 \pm 0.35$ MeV

| $\Xi_b(6095)^0$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Xi_b^0\pi^+\pi^-$ | seen | – |

## $\Xi_b(6100)^-$

$J^P = \frac{3}{2}^-$
$J$, $P$ need confirmation.

Mass $m = 6099.8 \pm 0.6$ MeV
Full width $\Gamma = 0.94 \pm 0.31$ MeV

| $\Xi_b(6100)^-$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Xi_b^-\pi^+\pi^-$ | seen | 128 |

## $\Xi_b(6227)^-$

$J^P = ?^?$

Mass $m = 6227.9 \pm 0.9$ MeV
Full width $\Gamma = 19.9 \pm 2.6$ MeV

| $\Xi_b(6227)^-$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | Scale factor | $p$ (MeV/$c$) |
|---|---|---|---|
| $\Lambda_b^0 K^-\times$ B($b\to$ $\Xi_b(6227)$)/B($b\to$ $\Lambda_b^0$) | $(3.20\pm0.35)\times10^{-3}$ | | 336 |
| $\Xi_b^0\pi^-\times$ B($b\to$ $\Xi_b(6227)$)/B($b\to$ $\Xi_b^0$) | (2.8 $\pm$1.1 ) % | 1.8 | 398 |

## $\Xi_b(6227)^0$

$J^P = ?^?$

Mass $m = 6226.8 \pm 1.6$ MeV
Full width $\Gamma = 19^{+5}_{-4}$ MeV

| $\Xi_b(6227)^0$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Xi_b^-\pi^+\times$ B($b\to$ $\Xi_b(6227)^0$)/B($b\to$ $\Xi_b^-$) | (4.5$\pm$0.9) % | 398 |

## $\Xi_b(6327)^0$

$J^P = ?^?$

Mass $m = 6327.28 \pm 0.35$ MeV
Full width $\Gamma < 2.56$ MeV, CL = 95%

| $\Xi_b(6327)^0$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Lambda_b^0 K^- \pi^+$ | seen | 298 |

## $\Xi_b(6333)^0$

$J^P = ?^?$

Mass $m = 6332.69 \pm 0.28$ MeV
Full width $\Gamma < 1.92$ MeV, CL = 95%

| $\Xi_b(6333)^0$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Lambda_b^0 K^- \pi^+$ | seen | 309 |

## $\Omega_b^-$

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

Mass $m = 6045.8 \pm 0.8$ MeV
$m_{\Omega_b^-} - m_{\Lambda_b^0} = 426.4 \pm 2.2$ MeV
$m_{\Omega_b^-} - m_{\Xi_b^-} = 248.5 \pm 0.6$ MeV
Mean life $\tau = (1.64^{+0.18}_{-0.17}) \times 10^{-12}$ s
$\tau(\Omega_b^-)/\tau(\Xi_b^-)$ mean life ratio $= 1.11 \pm 0.16$

| $\Omega_b^-$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | Scale factor/ Confidence level | $p$ (MeV/$c$) |
|---|---|---|---|
| $J/\psi\,\Omega^- \times$B($b \to\ \Omega_b$) | $(1.4^{+0.5}_{-0.4}) \times 10^{-6}$ | S=1.6 | 1805 |
| $p K^- K^- \times$B($\overline{b} \to\ \Omega_b$) | $< 2.3 \times 10^{-9}$ | CL=90% | 2865 |
| $p \pi^- \pi^- \times$B($\overline{b} \to\ \Omega_b$) | $< 1.5 \times 10^{-8}$ | CL=90% | 2943 |
| $p K^- \pi^- \times$B($\overline{b} \to\ \Omega_b$) | $< 7 \times 10^{-9}$ | CL=90% | 2915 |
| $\Omega_c^0 \pi^-$ | seen | | 2420 |
| $\Omega_c^0 \pi^-,\ \Omega_c^0 \to\ p K^- K^- \pi^+$ | seen | | – |
| $\Xi_c^+ K^- \pi^-$ | seen | | 2473 |

## $\Omega_b(6316)^-$

$I(J^P) = ?(?^?)$
$I$, $J$, $P$ need confirmation.

Mass $m = 6315.6 \pm 0.6$ MeV
Full width $\Gamma < 4.2$ MeV, CL = 95%

| $\Omega_b(6316)^-$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Xi_b^0 K^-$ | seen | 168 |

## $\Omega_b(6330)^-$

$I(J^P) = ?(?^?)$
$I$, $J$, $P$ need confirmation.

Mass $m = 6330.3 \pm 0.6$ MeV
Full width $\Gamma < 4.7$ MeV, CL = 95%

| $\Omega_b(6330)^-$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Xi_b^0 K^-$ | seen | 206 |

## $\Omega_b(6340)^-$

$I(J^P) = ?(?^?)$
$I$, $J$, $P$ need confirmation.

Mass $m = 6339.7 \pm 0.6$ MeV
Full width $\Gamma < 1.8$ MeV, CL = 95%

| $\Omega_b(6340)^-$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Xi_b^0 K^-$ | seen | 227 |

## $\Omega_b(6350)^-$

$I(J^P) = ?(?^?)$
$I$, $J$, $P$ need confirmation.

Mass $m = 6349.8 \pm 0.6$ MeV
Full width $\Gamma < 3.2$ MeV, CL = 95%

| $\Omega_b(6350)^-$ DECAY MODES | Fraction ($\Gamma_i/\Gamma$) | $p$ (MeV/$c$) |
|---|---|---|
| $\Xi_b^0 K^-$ | seen | 248 |

## $b$-baryon ADMIXTURE ($\Lambda_b$, $\Xi_b$, $\Omega_b$)

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 ($\Lambda_b$,$\Xi_b$,$\Omega_b$)** | Fraction ($\Gamma_i/\Gamma$) | Scale factor | $p$ (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 | (70 ±22 ) % | | – |
| $\Lambda\ell^-\overline{\nu}_\ell$ anything | ( 3.8± 0.6) % | | – |
| $\Lambda\ell^+\nu_\ell$ anything | ( 3.2± 0.8) % | | – |
| $\Lambda$ anything | (39 ± 7 ) % | | – |
| $\Xi^-\ell^-\overline{\nu}_\ell$ anything | ( 4.6± 1.4) $\times 10^{-3}$ | 1.2 | – |

NOTES

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

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

[*c*] Here $h^-$ means $\pi^-$ or $K^-$.