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Measurement of the production fraction times branching fraction $f(b \rightarrow \Lambda_b) \times \mathcal{B}(\Lambda_b \rightarrow J/\psi \Lambda)$

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The $\Lambda_b(udb)$ baryon is observed in the decay $\Lambda_b \rightarrow J/\psi \Lambda$ using 6.1 fb^{-1} of $p\bar{p}$ collisions collected with the D0 detector at

$\sqrt{s} = 1.96 \text{ TeV}$. The production fraction multiplied by the branching fraction for this decay relative to that for the decay $B^0 \rightarrow J/\psi K_s^0$ is measured to be $0.345 \pm 0.034 \text{ (stat.)} \pm 0.033 \text{ (syst.)} \pm 0.003 \text{ (PDG)}$.

Using the world average value of $f(b \rightarrow B^0) \cdot \mathcal{B}(B^0 \rightarrow J/\psi K_s^0) = (1.74 \pm 0.08) \times 10^{-5}$, we obtain $f(b \rightarrow \Lambda_b) \cdot \mathcal{B}(\Lambda_b \rightarrow J/\psi \Lambda) = (6.01 \pm 0.60 \text{ (stat.)} \pm 0.58 \text{ (syst.)} \pm 0.28 \text{ (PDG)}) \times 10^{-5}$. This measurement represents an improvement in precision by about a factor of three with respect to the current world average.

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