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Evidence for the rare decay $B^+ \to \bar{\Lambda} p \mu^+ \mu^-$

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A search for the rare decay $B^+ \to \bar{\Lambda} p \mu^+ \mu^-$ is performed using proton-proton collision data recorded by the LHCb experiment at a centre-of-mass energy of $\sqrt{s} = 13$ TeV, corresponding to an integrated luminosity of 5.4 fb^{-1}. An excess of events is found with respect to the background-only expectation, with a signal significance of 3.5 standard deviations, in the threshold-mass-enhanced region of $m(\bar{\Lambda} p) < 2.8\mathrm{Gev/c^2}$. The branching fraction is measured to be $calB(B^+ \to \bar{\Lambda} p \mu^+ \mu^-)|_{m(\bar{\Lambda}p)<2.8\mathrm{Gev/c^2}} = (1.70 \pm 0.60_{\mathrm{stat}} \pm 0.19_{\mathrm{syst}} \pm 0.14_{\mathrm{ext}}) \times 10^{-8}$, where the last uncertainty is due to external inputs on $calB(B^+ \to \bar{\Lambda} p J/\psi) \times calB(J/\psi \to \mu^+ \mu^-)$. With no obvious signal observed in the high \lamp region, an upper limit is set to be $calB(B^+ \to \bar{\Lambda} p \mu^+ \mu^-)|_{m(\bar{\Lambda}p)>2.8\ \mathrm{GeV}/c^2} < 2.4 \times 10^{-9}$ at 90\% confidence level.

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