

# $\Lambda_b \rightarrow \Lambda_c + \Lambda_c^- + \bar{n}$ : A first study of purely baryonic decays with a neutron

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We present an ongoing search for the decay mode  $\Lambda_b^0 \rightarrow \Lambda_c^+ \Lambda_c^- n$ , utilising pp collision data collected at a center of mass energy of  $\sqrt{s} = 13$  TeV recorded by the LHCb detector. The sample was collected in 2016-2018 during Run 2 of the Large Hadron Collider. This analysis marks the first search at the LHC featuring a final-state neutron, offering a unique probe into the dynamics of baryonic decays. The analysis employs a missing-momentum style approach to reconstruct the neutron, adapting techniques from LHCb semileptonic analyses that are characterised by an undetected neutrino. The study contributes to the emerging experimental field of purely baryonic decays, a sector with only one other experimentally observed process to date. By exploring this decay channel, we aim to provide new insights into the underlying mechanisms of weak decays involving baryons and to test the predictions of the Standard Model in this relatively unexplored regime.

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