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Observation of Λ hyperon local polarization in pPb collisions at $\sqrt{s_{NN}} = 8.16$ TeV

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The observation of hyperon polarization along beam direction (P_z) in nucleus-nucleus collisions has opened a new way to study the complex vortical structures of the QGP. With the high-statistics data collected by the CMS experiment, we present the first P_z results for Λ and $\bar{\Lambda}$ particles in pPb collision at $\sqrt{s_{NN}} = 8.16$ TeV over a wide transverse momentum (p_T) and charged particle multiplicity ($N_{\rm trk}^{\rm offline}$) range. The P_z values decrease as a function of $N_{\rm trk}^{\rm offline}$, but increase with p_T. A hydrodynamic model that describes the observed P_z values in nucleus-nucleus collisions by introducing vorticity effects does not reproduce either the sign or the magnitude of the pPb results. These observations pose a challenge to the current theoretical implementation of spin polarization in heavy ion collisions and offer new insights into the origin of spin polarization in hadronic collisions at LHC energies.

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