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Insights into the Baryon Correlation Puzzle from Multiplicity-Dependent Two-Particle Angular Correlations at LHC Energies

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One of the most effective techniques for investigating the mechanism of baryon production is the study of angular correlations between two particles. Angular correlations represent a convolution of various physical processes, such as mini-jets, Bose-Einstein quantum statistics, conservation of momentum, resonances, and other phenomena that contribute to the unique behavior observed for different particle species.
Experimental results from proton-proton collisions at 7 TeV have revealed a pronounced anticorrelation, a phenomenon that any Monte Carlo model had not replicated. This triggered a series of studies that helped create what is called the "baryon correlation puzzle".

In this work, the first ALICE measurements of the angular correlation functions for identical particles (such as $\pi^{\pm}$, $K^{\pm}$, and pp) in pp, p–Pb and Pb–Pb collisions at LHC energies in various multiplicity/centrality classes are presented.
This new puzzle piece enhances the understanding of anticorrelation and raises new questions. This will prompt theorists to implement and improve existing theoretical models for new answers.

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