Elliptic and higher-order azimuthal anisotropies via multiparticle correlations in pPb and PbPb collisions with the CMS experiment

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The elliptic and higher-order azimuthal anisotropy Fourier harmonics ($v_n$) are obtained for pPb collisions at $\sqrt{s_{NN}} = 8.16$ TeV over a wide range of event multiplicities based on multiparticle correlations. The data were collected by the CMS experiment during the 2016 LHC run. A sample of peripheral PbPb collisions at $\sqrt{s_{NN}} = 5.02$ TeV covering a similar range of event multiplicities to the pPb results is also analyzed for comparison. The ratios of different harmonic moments are obtained for both $v_2$ and $v_3$ with high precision, which allows a direct comparison to theoretical predictions assuming a hydrodynamic evolution of the created medium with initial-state density fluctuations, particularly probing the non-Gaussian nature of initial-state fluctuations in small collision systems. The presented results provide crucial insights into the origin of collective long-range correlations observed in small collision systems.

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