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Correlations and collective flow in pp and p+Pb collisions at the LHC energies

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Flow measurements in p+Pb collisions at $\sqrt{s_{\rm NN}}$=5.02 TeV have indicated the development of collective flow in the small systems
created at the LHC. Using the ultrarelativistic quantum molecular dynamics (UrQMD) model, we investigate the azimuthal correlations
in p+Pb collisions at $\sqrt{s_{\rm NN}}$=5.02 TeV with two- and four-particle cumulants. Our calculations indicate that pure hadronic interactions
can not generate the collective flow as measured in experiments, additional effects from initial state and/or from the QGP are needed to
reproduce the flow data[1]. Using the same flow analysis method, we explore the collective flow in pp collisions at $\sqrt{s}$=13 TeV
with two different baseline calculations[2], including: 1. VISHNU hybrid model simulations that connect viscous hydrodynamics for the QGP
expansion and UrQMD for the hadron resonance gas evolution, using smooth initial conditions,
2. VISHNU simulations with fluctuating initial conditions. Our calculations of multiplicity dependent elliptic flow
are comparable with the recent measurements from ATLAS. We find that triangular flow (if observed) is one of the unique observable directly
associated with the domain structures in the created small pp systems.

References:

[1] Y. Zhou, X. Zhu, P. Li and H. Song,
"Investigation of possible hadronic flow in $\sqrt{s_{\rm NN}}$=5.02TeV p+Pb collisions," Phys. Rev. C 91, no. 6, 064908 (2015).

[2] X. Zhu, H. j. Xu, Y. Zhou, W. T. Deng and H. Song, in preparation.

Collaboration

Other

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