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New measures of longitudinal decorrelation of harmonic flow

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Longitudinal harmonic flow decorrelation (the “torque” effect [1,2]) is a sensitive probe of the early dynamics of ultra-relativistic nuclear collisions. We propose new decorrelation measures of flow magnitude and event-plane angles and apply them to Pb+Pb collisions at the LHC, modeled via event-by-event hydrodynamic simulations. The basic purpose is to verify a generic feature, namely, that the events with a higher flow magnitude decorrelate significantly less in the event-plane angle, compared to the events with a lower flow magnitude. We find a hierarchy between various flow decorrelation measures and confirm specific factorization relations. The model results are in qualitative agreement with the experimental data from the ATLAS and CMS Collaborations. The proposed generalization of the flow decorrelation measures, with weights involving higher powers of the flow magnitude, can be directly tested in future experimental analyses.

[1] P. Bozek, W. Broniowski, J. Moreira, Phys.Rev. C83 (2011) 034911

[2] P. Bozek, W. Broniowski, arXiv:1711.03325 [nucl-th]

Content type

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Collaboration

Centralised submission by Collaboration

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