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Measurement of Azimuthal Anisotropy of High Transverse Momentum Charged Particles in Pb+Pb Collisions using Multi-particle Cumulants with the ATLAS Detector

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Heavy-ion collisions produce a hot, dense medium, and high-momentum par- tons from the collision traverse this medium while losing energy in it. Because of the initial geometry of the QGP, partons produced at different angles, with respect to the impact parameter, traverse different path lengths in the medium leading to azimuthal-angle dependence of the yields of high transverse momen- tum (pT) final-state particles. The magnitude of angular modulation is quanti- fied by the parameter vn with respect to the nth-order event plane. This talk presents new measurements of vn and its fluctuations as a function of pT and centrality using high-pT charged hadrons in data collected by ATLAS detector at √sNN = 5.02 TeV. The measurements cover a broad track pT range from 1 to 400 GeV over collision centrality 0–60% for vn where n = 2, 3, 4 using scalar product method. The v2 and v3 coefficients are also measured with the multi-particle cumulant methods to probe fluctuations in the vn distribution. A non-zero v2 is observed through all centrality bins at pT greater than 60 GeV. For the scalar-product method, both v3 and v4 are consistent with zero in a high-pT region. The v2 and v3 showed different behaviors toward the high-pT region when studied with different methods. Comparison between the methods with improved statistics will explore a higher pT range than current measurements and provide insights for the initial-state fluctuations and non-flow contributions.

Category

Experiment

Collaboration

ATLAS

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