

Measurement of the azimuthal anisotropy of charged particles in 5.02 TeV Pb+Pb and 5.44 TeV Xe+Xe collisions with ATLAS

Data collected by the ATLAS experiment during the 2015 Pb+Pb and 2017 Xe+Xe LHC runs offer new opportunities to study charged particle azimuthal anisotropies in heavy ion collisions. This should improve the understanding of initial conditions of nuclear collisions, hydrodynamical behavior of quark-gluon plasma and parton energy loss. ATLAS measurements of differential and inclusive Fourier harmonics of charged particles (v_n) in 5.02 TeV Pb+Pb and 5.44 TeV Xe+Xe collisions over a wide range of transverse momenta, pseudorapidity ($|\eta| < 2.5$) and collision centrality are presented. The higher order harmonics, sensitive to fluctuations in the initial state, are measured up to $n = 7$ using the two-particle correlation, cumulant and scalar product methods. The dynamical properties of the QGP are studied using a modified Pearson's correlation coefficient, ρ , between the event-wise mean transverse momentum and the square of the flow harmonic magnitude in 5.02 TeV Pb+Pb collisions. Several important observations are made. The elliptic and triangular flow harmonics show an interesting universal mean- p_T scaling. A linear correlation between the v_2 and v_3 coefficients at low and high p_T ranges is observed and quantified. The ρ coefficient is found to be negative in peripheral and positive in central Pb+Pb collisions.

Summary

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