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

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The experimental 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 anisotropy. The high-statistics Pb+Pb sample allows for a detailed study of the azimuthal anisotropy of produced particles. This should improve the understanding of initial conditions of nuclear collisions, hydrodynamical behavior of quark-gluon plasma and parton energy loss. New ATLAS measurements of differential and global Fourier harmonics of charged particles (v_n) in 5.02 TeV Pb+Pb and 5.44 TeV Xe+Xe collisions in 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 dynamic properties of QGP are studied using a recently-proposed modified Pearson's correlation coefficient, $\rho(v_n^2, p_{\mathrm{T}})$, between the eventwise mean transverse momentum and the magnitude of the flow vector in 5.02 TeV Pb+Pb and p+Pb collisions. Several important observations are made. The elliptic and triangular flow harmonics show an interesting universal 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 Pearson's correlation coefficient $\rho(v_2^2)$ is found to be negative in peripheral and positive in central Pb+Pb collisions. The value of $\rho(v_3^2)$ is found to be much smaller than $\rho(v_2^2)$ and to have similar centrality behavior as $\rho(v_2^2)$.

Content type

Experiment

Collaboration

ATLAS

Centralised submission by Collaboration

Presenter name already specified

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