

New flow results in ALICE from multiparticle azimuthal correlations

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Multiparticle azimuthal correlations are utilized in anisotropic flow studies as observables sensitive to the properties of Quark-Gluon Plasma (QGP), an extreme state of matter which can be produced in ultra-relativistic heavy-ion collisions. We will present the first results [1] for elliptic (v_2), triangular (v_3) and quadrangular flow (v_4) of charged particles in Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV recorded by ALICE during the LHC Run 2 operations. The comparison of experimental measurements to various theoretical calculations will be discussed.

In addition, results are reported for so-called symmetric cumulants. Developed by ALICE, these new multiparticle observables depend only on the correlations between event-by-event amplitude fluctuations of anisotropic flow harmonics v_n , and are therefore independent on the corresponding symmetry planes. The centrality dependence of correlation between fluctuations of the elliptic, v_2 , and quadrangular, v_4 , flow harmonics, as well as of anti-correlation between v_2 and triangular, v_3 , flow harmonics will be discussed in two different regimes for the initial stages: geometry-dominated (in mid-central heavy-ion collisions) and fluctuation-dominated (in the most central heavy-ion collisions).

The measurement of individual flow harmonics together with symmetric cumulants further constrain details of initial stages and the transport properties of the produced QGP. These results offer a unique opportunity to test the validity of the hydrodynamic picture and to discriminate between various possibilities for the temperature dependence of shear viscosity to entropy density ratio of the produced QGP.

Collaboration

ALICE

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