Quark Matter 2018



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Correlation between higher order flow harmonics and their non-linear modes for (un)identified charged hadrons in Pb-Pb collisions measured with ALICE

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The recently proposed symmetric cumulants and non-linear flow mode coefficients provide new observational probes to study initial conditions and microscopic transport properties of the quark-qluon plasma (QGP) formed in heavy-ion collisions. Comparison of such measurements with viscous hydrodynamic calculations should, in particular, enable the study of the temperature dependence of the shear viscosity to entropy density ratio (η/s).

We present the measurements of symmetric cumulants and non-linear flow modes of charged hadrons up to the 8th harmonic in Pb-Pb collisions at $\sqrt{s_{\rm NN}}$ =5.02 TeV. The results will be compared to those at lower energies and to calculations from hydrodynamic models. Together they provide better constraints on the initial conditions, $\eta/s(T)$ and freeze-out conditions. In addition, we present the first results of $p_{\rm T}$ -differential non-linear flow modes for charged pions, kaons and (anti-)protons measured in Pb-Pb collisions at $\sqrt{s_{\rm NN}}$ =5.02 TeV. These results cover a wide centrality range from ultra-central up to very peripheral collisions. These new results allow us to identify the contribution of the linear and non-linear terms to the observed mass ordering and particle-type grouping in different flow harmonics, thus providing increased discriminatory power in the study of initial conditions as well as a new stringent constraint to hydrodynamical calculations.

Content type

Experiment

Collaboration

ALICE

Centralised submission by Collaboration

Presenter name already specified

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