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First measurements of genuine three-harmonic correlations in Pb-Pb collisions with ALICE

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Multiparticle azimuthal correlations have proved their usefulness to study and constrain the properties of the quark-gluon plasma (QGP) produced in ultrarelativistic heavy-ion collisions. Recently, the event-by-event correlated fluctuations between two different flow amplitudes have been measured using Symmetric Cumulants. These results exhibit a better sensitivity to the transport properties of the QGP and the initial state than the studies of single flow amplitudes.

The question of the existence of genuine correlations between three and more flow amplitudes naturally arose. To answer it, the generalization of the Symmetric Cumulants to more than two flow amplitudes has been recently proposed. The measurements of such correlations can provide new information on the initial state and dynamical properties of the system created in heavy-ion collisions, which is by definition inaccessible through the previous flow measurements.

In this talk, we will focus on the first results of these new higher order Symmetric Cumulants in the case of three different flow amplitudes obtained in Pb–Pb collisions collected by ALICE at $\sqrt{s_{\rm NN}} = 2.76$ TeV and 5.02 TeV. In particular, the centrality dependence and comparison with the predictions from state-of-the-art hydrodynamics models will be shown.

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