Contribution ID: **190**

Type: **Poster**

Higher-order event-by-event mean-p_T fluctuations in pp and A–A collisions with ALICE

Wednesday 6 April 2022 18:02 (4 minutes)

The study of correlation and fluctuation of event-by-event mean transverse momentum (p_T) is a useful tool to understand the dynamics of the system produced in ultrarelativistic heavy-ion collisions. The measurement of higher-order fluctuations of mean-p_T can help in probing the hydrodynamic behavior of the system and is considered to be a direct way of observing initial-state fluctuations. It can also be sensitive to the early-time evolution of the produced quark-gluon plasma.

We present the first measurement of three- and four-particle p_T correlators and their intensive ratios, related to the skewness and kurtosis of event-by-event mean-p_T distribution, as a function of average charged-particle density in Pb–Pb collisions at $\sqrt{s_\mathrm{NN}}$ = 5.02 TeV and Xe–Xe collisions at $\sqrt{s_\mathrm{NN}}$ = 5.44 TeV using the data recorded by the ALICE detector. For the baseline study, the analysis is performed also in pp collisions at $\sqrt{s}$ = 5.02 TeV. The measurements are compared to corresponding results from the STAR experiment at lower collision energies and to different theoretical model predictions.

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Session Classification: Poster Session 1 T07_1

Track Classification: Correlations and fluctuations