ID de Contribution: **89** Type: **Talk**

Probing the speed of sound in QGP with multi-particle $[p_{\mathrm{T}}]$ cumulants in ALICE

mardi 4 juin 2024 11:40 (20 minutes)

The speed of sound squared, c_s^2, one of the properties of the quark-gluon plasma (QGP) connected to the QCD equation of state, can be extracted from ultra-central heavy-ion collisions, where the medium mostly maintains a fixed size and fluctuations in the initial state and thermal fluctuations dominate. We present the first ALICE measurements of the event-by-event mean transverse momentum, $\langle[p_{\mathrm{T}}]\rangle$, in particular its average and higher-order fluctuations as a function of multiplicity using particle spectra and multi-particle $\langle[p_{\mathrm{T}}]\rangle$ cumulant techniques, in ultra-central Pb–Pb collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV. The pronounced rise in $\langle[p_{\mathrm{T}}]\rangle$ and the sudden transition in higher-order fluctuations at high multiplicities are used to extract the speed of sound in QGP, c_s^2, and to probe the thermalisation of the QGP, respectively. Our approach yields valuable insights into the thermalized nature of the deconfined state resulting from heavy-ion collisions, contributing to a deeper understanding of the QCD equation of state.

Auteur principal: GORM NIELSEN, Emil

Co-auteur: ALICE, Collaboration

Orateur: GORM NIELSEN, Emil

Classification de Session: Track4-Bulk&Phase

Classification de thématique: Bulk matter phenomena, QCD phase diagram and Critical point