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Local multiplicity fluctuations in Pb−Pb collisions at $\sqrt{s_{\rm NN}}$ = 2.76 TeV with ALICE at the LHC

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Local multiplicity fluctuations are a useful tool to understand the dynamics of the particle production and the phase-space changes from quarks to hadrons in ultrarelativistic heavy-ion collisions. The study of scaling behavior of multiplicity fluctuations in geometrical configurations in multiparticle production can be performed using the factorial moments and recognized in terms of a phenomenon referred to as intermittency.

In this contribution, we present the analysis of the factorial moment performed on the multiplicity distributions of charged particles produced in Pb−Pb collisions at $\sqrt{s_{\rm NN}}$ = 2.76 TeV, recorded with the ALICE detector at the LHC. The normalized factorial moments (NFM), F_q of the spatial configurations of charged particles in two-dimensional angular (η, φ) phase space are calculated. For a system with dynamic fluctuations due to the characteristic critical behaviour near the phase transition, F_q exhibits power-law growth with increasing bin number or decreasing bin size which indicates self-similar fluctuations. Relating the $q^{\rm th}$ order NFM (F_q) to the second-order NFM (F_2), the value of the scaling exponent (ν) is extracted, which indicates the order of the phase transition within the framework of Ginzburg-Landau theory. The dependence of scaling exponent on the $p_{\rm T}$ bin width and the centrality of the events will be presented. The measurements are also compared with the corresponding results from the AMPT and HIJING models.

Session

Heavy Ions and QCD

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