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Intermittency Analysis of Toy Monte Carlo events

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To learn about the mechanism of particle production and phase changes from quarks to hadrons, fluctuations of observables from experiments are studied. Scaling of the observables from these experiments can reveal the properties of the system created, as it expands from quark-gluon plasma phase to hadronic phase. One of such techniques is to study the scaling behaviour of the normalized factorial moments (F_q) of multiplicity fluctuations with the bin size resolution or the number of bins (M). A power-law behaviour of F_q as function of number of bins (M), known as intermittency, is a signature of fluctuations of self-similar nature. The normalized factorial moments (NFM) of order q are observed to scale with second-order NFM with scaling exponent $\nu \approx 1.304$, for Ginzburg-Landau theory when studied for formalism with second-order phase transition. Intermittency analysis of low energy data has been studied extensively as it promises to identify the quark-hadron phase transition and associated critical point. Event-by-event intermittency analysis of toy Monte Carlo events is carried in the scenario of high multiplicity events, where the charged particle bin multiplicity is large. Dependence of NFM on the detector efficiencies and on the presence of fluctuations have been studied. NFMs are observed to be sensitive to any fluctuations of dynamical nature which appear as large local multiplicity fluctuations. With no physics in the toy Monte Carlo events the results presented here provide a baseline to the experimental results and clarity on application of detector efficiency corrections to the experimental data for analysis.

Preferred track

Collectivity & Multiple Scattering

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