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Measurement of Intermittency for Charged Particles in Au + Au Collisions at $\sqrt{s_{NN}} = 7.7 - 200$ GeV from STAR

One of the main goals of RHIC beam energy scan (BES) program is to search for signatures of a critical point in the QCD phase diagram through heavy-ion collisions. It is predicted that the local density fluctuations near the critical point exhibit power-law scaling, which can be probed with an intermittency analysis of the scaled factorial moments, $F_q(M)$, for charged particles. The power-law behavior of qth order scaled factorial moments can be expressed as: $F_q(M) \sim F_2(M)^{\beta_q}$, where M is the number of equally sized cells in one dimension of momentum space, and β_q is the intermittency exponent. The scaling exponent, ν, related to the critical component can be derived from the equation: $\beta_q = (q-1)^{\nu}$. The energy dependence of ν could be used to search for the signature of the QCD critical point. Similar measurements have been carried out by NA49 and NA61 experiments in heavy-ion collisions with different system sizes.

In this talk, we will present the scaled factorial moments ($F_q(M)$, up to sixth order) of charged particles in Au + Au collisions at $\sqrt{s_{NN}}$ = 7.7 - 200 GeV measured by STAR experiment in the first phase of RHIC BES. Then, we will show the energy and centrality dependence of the extracted ν values. The physical implications of these results will be discussed.

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