Measurement of cumulants of net-charge and net-kaon distributions in Au+Au collisions at $\sqrt{s_{NN}} = 27$ GeV from the STAR experiment at RHIC

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Abstract

Higher-order cumulants of conserved charges in high-energy heavy-ion collisions are excellent probes of phase structure in the QCD phase diagram, nature of quark-hadron phase transition, and freeze-out dynamics. The cumulants and their ratios are related to the correlation length of the system and susceptibilities. The susceptibilities are calculable in various QCD-based models and lattice QCD.

We present the cumulants of net-charge and net-kaon distributions from high statistics Au+Au collisions at $\sqrt{s_{NN}} = 27$ GeV recorded by the STAR detector at RHIC in 2018. Cumulants and ratios of cumulants measured at mid-rapidity will be presented as a function of collision centrality. The results will be compared with model calculations. Finally, the status and prospects of such measurements in the ongoing phase II of the STAR beam energy scan program at RHIC will be discussed.