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Baseline for the energy dependence of higher moments of net-proton multiplicity distributions

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Experimental confirmation of the QCD critical point is an excellent test of QCD theory in the non-perturbative region and a milestone of exploring the QCD phase diagram. It is one of the main goals of the RHIC Beam Energy Scan (BES) program. Due to the high sensitivity to the correlation length [1] of the dynamical system and directly connected to the susceptibilities in theoretical calculations, for example, the Lattice Gauge Theory (LGT) calculations [2], higher moments of multiplicity distributions have been applied to search for the QCD critical point in the heavy-ion collision experiment.

To extract the CP signal in heavy-ion collisions, it is crucial to understand the non-CP effects, such as the effects of conservations for charges (electric, baryon number and strangeness number) and resonance decays, on the experimental observable. In this talk, we will present the comparison between baseline/model with recently published experimental results [3]. We will discuss the deviations of the data from Poisson, binomial baselines as well as the implications. In addition, the results from HRG, AMPT and UrQMD model will be compared with the experimental results.

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[3] STAR Collaboration, Phys. Rev. Lett. 112, 032302 (2014).

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