Higher Moments of Proton and Net-proton Multiplicity Distributions at RHIC XIAOFENG LUO, Lawrence Berkeley National Laboratory, STAR COLLABORATION — One of the main goals of RHIC Beam Energy Scan (BES) program is to search for the QCD critical point in order to further our understanding of the phase structure of the hot and dense QCD matter created in high-energy nuclear collisions at RHIC. The STAR detector with its large, uniform acceptance is particularly suitable for fluctuation measurements, which are among the most promising for the search. Due to the higher sensitivity to the critical point compared to the variance ($\sigma2$) and direct connection to Lattice calculations [1,2], higher moments of proton and net-proton multiplicity distributions will be used [3]. In this talk, we will present measurements for higher moments (variance ($\sigma2$), skewness (S) and kurtosis (κ)) of proton and net-proton multiplicity distributions measured at RHIC. It is observed that both S and κ are positive at all collision centralities and energies. The results of the products of the moment $\kappa*\sigma2$ and S*σ, which have been related by Lattice QCD calculation and QCD-based models to the ratio of different orders of the baryon number susceptibility [1] and long range correlations [2] will also be presented. [1] M. Cheng et al., Phys. Rev. D 79, 074505(2009), R. V. Gavai and S. Gupta, arXiv:1001.3796 [2] M. A. Stephanov, Phys. Rev. Lett. 102, 032301(2009) [3] M.M. Aggarwal et al. (STAR Collaboration), arXiv:1004.4959 (http://arxiv.org/abs/1004.4959)

Xiaofeng Luo
Lawrence Berkeley National Laboratory