

Baryon Stopping at RHIC Beam Energy Scan and its Possible Effect on net-protons higher moment analysis

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One of the main motivations of heavy ion collision is to explore the QCD phase diagram of strong interaction. In the QCD phase diagram, at large μ_B the existence of critical point (CP) is expected. It is believed that, the non-monotonic behavior of higher moments of the distribution of conserved numbers with $\sqrt{s_{NN}}$ is a probe of the QCD critical point. The net-proton $k\sigma^2$, measured by STAR experiment [1] hints for the possibility of existence of critical point around $\sqrt{s_{NN}} = 19.6$ GeV. However, the measured protons by STAR experiment contain the protons from heavy resonance decay, from baryon stopping and from production.

Since there is a significant contribution of stopped protons at RHIC lower energies it will be important to quantify the stopped protons in their acceptance. Also, these stopped protons fluctuate from event-to-event, which can contribute to the net-proton fluctuations significantly. In the present work we formulate a procedure to estimate the stopped protons in the STAR acceptance [2]. Further, we briefly discuss its implication to the net-proton fluctuation results by STAR experiment.

References:

[1] "Energy Dependence of Moments of Net-proton Multiplicity Distributions at RHIC"
L. Adamczyk et al.[STAR Collaboration], Phys. Rev.Lett.112, 032302 (2014).

[2] "Estimation of Stopped Protons at RHIC BES Energies"
arXiv:1611.05078 (Phys. Rev. C (In Press))

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Charge fluctuations, correlations and balance functions

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