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Baryon number fluctuations at high baryon density (remote)

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Calculations of baryon number fluctuations up to the sixth order at finite temperature and density in Ref.[1] have been extended to regime of high baryon chemical potentials with $400 \text{ MeV} \leq \mu_B \leq 700 \text{ MeV}$. A peak structure is found for the dependence of the kurtosis of baryon number distributions, i.e., $R_{42}^B = \chi_4^B / \chi_2^B$, on the collision energy in a range of $3 \text{ GeV} \leq \sqrt{s_{\text{NN}}} \leq 7.7 \text{ GeV}$ [2]. The computation is done within the functional renormalization group approach with a critical end point located at around $(T, \mu_B)_{\text{CEP}} \sim (100, 640) \text{ MeV}$ in the phase diagram, which is in agreement with recent estimates from first-principle QCD calculations. Errors of calculated results arising from, e.g., the chemical freeze-out curves, locations of CEP, effects of baryon number conservation at low collision energy etc., have been evaluated in detail.

Reference:

[1] Wei-jie Fu, Xiaofeng Luo, Jan M. Pawłowski, Fabian Rennecke, Rui Wen, Shi Yin, Phys. Rev. D 104, 094047, 2021, arXiv: 2101.06035 [hep-ph].

[2] Wei-jie Fu, Xiaofeng Luo, Jan M. Pawłowski, Fabian Rennecke, Shi Yin, in preparation.

Category

Theory

Collaboration (if applicable)

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Session Classification: Critical Point

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