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Baryon number fluctuations at large baryon chemical potentials

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Calculations of baryon number fluctuations at finite temperature and density in Ref.[1] have been extended to regime of large baryon chemical potentials with 400 MeV $\leq \mu_B \leq$ 650 MeV. A peak structure is found for the dependence of the kurtosis of baryon number distributions, i.e., $R^B_{42} = \chi^B_4/\chi^B_2$, on the collision energy in a range of 3 GeV $\leq \sqrt{s_{\rm NN}} \leq$ 7.7 GeV [2]. The computation is done within the functional renormalization group approach with a critical end point located at around $(T,\, \mu_B)_{\rm CEP} \sim (100,\, 640)$ 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. Pawlowski, 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. Pawlowski, Fabian Rennecke, Rui Wen, Shi Yin, in preparation.

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