Contribution ID: **673** Type: **Oral Presentation**

Towards a reliable lower limit on the location of the critical endpoint

Wednesday, 6 November 2019 12:20 (20 minutes)

There have been various attempts to give lower limits on the location of the QCD critical endpoint via lattice simulations. These mostly rely on expanding the pressure in a Taylor series near zero chemical potential, and use estimators for the radius of convergence, mostly the ratio estimator. If the radius of convergence can be found, it gives a lower limit on the location of a true phase transition. I will give an analytic argument that shows that the ratio estimator will not converge in the generic case and explain how to obtain improved estimators with guaranteed and faster convergence, as was described in Phys. Rev. D 99, 114510.
As a next step in this research program, we calculate these estimators for the case of Nf=2+1 flavour QCD with physical quark masses, using a stout improved staggered action, two different lattice spacings, and several volumes. On the roughest lattice spacing, we perform a full finite volume scaling study of the radius of convergence of the Taylor series. We also compare with results using an alternative algorithm that directly looks for the closest singularity of the free energy in the complex chemical potential plane, without relying on Taylor expansion coefficients.

Primary authors: PASZTOR, Attila (Eotvos University); BORSANYI, Szabolcs (University of Wuppertal); FODOR, Zoltan (University of Wuppertal); GIORDANO, Matteo (Eotvos University); KAPAS, Kornel (Eotvos University); KATZ, Sandor (Eotvos University); NOGRADI, Daniel (Eotvos University)

Presenter: PASZTOR, Attila (Eotvos University)

Session Classification: Parallel Session - QCD at finite temperature II

Track Classification: QCD at finite temperature and baryon density