Contribution ID: **935**   Type: **Oral**

Search for the critical endpoint in high-statistics lattice QCD simulations

One method to estimate the position of the critical endpoint of QCD is to model the free energy as a rational function of the baryon chemical potential μ_B and determine the Lee-Yang edge singularities. Using high-statistics simulations on 4HEX improved staggered $16^3 \times 8$ lattices by the Wuppertal-Budapest Collaboration we estimate the location of the closest singularity in the QCD phase diagram. Using this lattice setup we are able to reach an unprecedentedly low temperature of $T = 100$MeV in our simulation dataset. To understand the true predictive power of such an approach we analyze the systematic uncertainties of such an approach in detail. We compare various ansätze, including formulations that preserve baryon charge quantization by forcing the appropriate periodicity in the imaginary chemical potential. The parameters can be constrained by the cumulants of the net baryon density calculated with lattice simulations at $\mu_B^2 \leq 0$. Thus, we also compare single point and multipoint Padé approximations.

Category

Theory

Collaboration (if applicable)

Primary authors: ADAM, Alexander (Bergische Universität Wuppertal); PASZTOR, Attila (Eötvös University); Dr WONG, Chik Him; GUENTHER, Jana N. (University of Wuppertal); PIRELLI, Ludovica (Bergische Universität Wuppertal); PAROTTO, Paolo; BORSANYI, Szabolcs Istvan; FODOR, Zoltan

Presenter: PASZTOR, Attila (Eötvös University)

Track Classification: QCD phase diagram & critical point