Contribution ID: **199** Type: **Contributed talk**

Critical dynamics of net-baryon density fluctuations

Thursday 13 June 2019 14:00 (20 minutes)

The search for the QCD critical point is one of the major goals in current and future heavy-ion collision experiments. The matter created in such collisions is spatially finite, evolves highly dynamically, and near the critical point homogeneous temperature distributions may be expected at most in regions of a couple of fm. Moreover, to observe fluctuations for a globally conserved order parameter such as the net-baryon density the volume of observation must be small compared to the size of the full system. Therefore, deviations from our analytic, thermodynamic predictions for an infinite and long-lived system must be expected. In this talk, we study the diffusive dynamics of the net-baryon density near the QCD critical point for a finite size and dynamically evolving medium. Numerical simulations indicate that the Gaussian and non-Gaussian fluctuations, which evolve as fluid dynamical response to intrinsic white noise fluctuations due to non-linear couplings, show a different scaling behavior with the correlation length than is expected in a static and infinite medium. We argue that this observation may be understood as finite size corrections in the ratio of correlation length over typical observation length scale. Interesting structures and even sign changes around the critical point compared to leading-order expectations are possible in both skewness and kurtosis, as is qualitatively confirmed in the numerics. This highlights that finite size and dynamical effects are essential ingredients for our interpretation of experimental data from CERN-SPS and the beam energy scan at RHIC.

Collaboration name

Track

QCD phase diagram and critical point

Primary authors: NAHRGANG, Marlene (Subatech); BLUHM, Marcus (Subatech, Nantes)

Presenter: BLUHM, Marcus (Subatech, Nantes)

Session Classification: QCD Phase Diagram and Critical Point