

Fluid dynamical fluctuations of net-baryon number near the QCD critical point

Wednesday 8 February 2017 15:40 (20 minutes)

The search for the critical point of QCD is one of the main goals of the beam energy scan at RHIC and the CERN-SPS. In equilibrium, correlations diverge at the critical point leading to large event-by-event fluctuations in conserved quantities. For expanding systems like in heavy-ion collisions it is important to study the dynamical formation of long-range correlations in the critical region. The critical mode is the diffusive baryon current and can be described fluid dynamically. We include the propagation of fluctuations in the fluid dynamical equations. Using an equation of state with a critical point we study the evolution of critical fluctuations, Gaussian and non-Gaussian, in static systems to compare to known analytical results. The requirements for the emergence of non-Gaussian correlations from underlying white noise will be explored. We investigate both relativistic and nonrelativistic fluid dynamics. Finally, moving toward more realistic scenarios of heavy-ion collisions, we discuss the development of critical fluctuations in expanding systems.

Preferred Track

Correlations and Fluctuations

Collaboration

Not applicable

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Session Classification: Parallel Session 7.1: Baryon-Rich QCD Matter and Astrophysics (II)

Track Classification: Correlations and Fluctuations