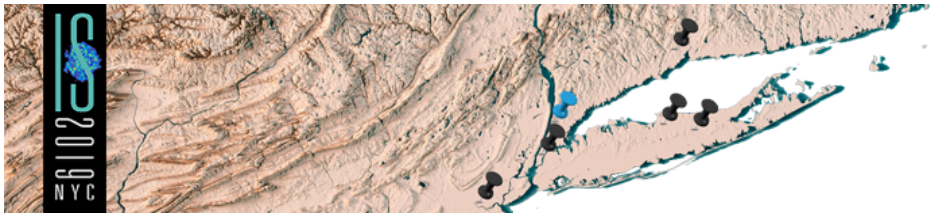

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Stochastic hydrodynamics and long time tails of a non-equilibrium fluid

Tuesday, June 25, 2019 2:20 PM (20 minutes)

We investigate the impact of hydrodynamic fluctuations on correlation functions of a relativistic fluid with a conserved U(1) charge. The kinetic equations for the two-point functions of pressure, momentum and heat energy densities are derived within the framework of stochastic hydrodynamics. The leading non-analytic contributions to the energy-momentum tensor as well as the U(1) current are determined from the solutions to these kinetic equations. In the case of a static homogeneous background we show that the long time tails obtained from hydro-kinetic equations reproduce the one-loop results derived from statistical field theory. We use these results to establish bounds on transport coefficients. We generalize the stochastic equation to a scale invariant background flow undergoing Bjorken expansion. We compute the leading fractional power $\mathcal{O}((\tau T)^{-3/2})$ correction to the U(1) current and compare with the first order gradient term. Finally, we discuss the extension of stochastic hydrodynamics to study the effects of critical behavior of the heat conductivity, shear and bulk viscosities in heavy ion collisions for a system close to the QCD critical point.

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