

The poor people's Quantum gravity: hydrodynamics with fluctuations

Friday, January 24, 2025 5:10 PM (40 minutes)

Ideal hydrodynamics, as a generally covariant theory, can be considered as a simplified version of general relativity. We will show that this general covariance is intimately related to statistical mechanics underlying local thermalization. We will then describe the problem of including statistical fluctuations in relativistic non-ideal hydrodynamics, a still open issue connected to the still mysterious onset of thermalization in small systems. We will show that most approaches to this so far break general covariance, and outline a way to resolve this issue, based on expanding in statistical cumulants rather than gradients, imposing fluctuation-dissipation relations and including general covariance at the outset.

We close by discussing the analogies of this problem with the one of quantization of gravity.

Based on 2307.07021 , 2109.06389 and ongoing work

Primary author: TORRIERI, Giorgio (University of Campinas)

Presenter: TORRIERI, Giorgio (University of Campinas)