



Contribution ID: 80

Type: Oral

Hydrodynamics far-from-equilibrium: a concrete example in kinetic theory

Tuesday, June 25, 2019 5:00 PM (20 minutes)

The applicability of hydrodynamical models in the extreme conditions produced in heavy ion collisions has not yet been properly understood theoretically. This happens mostly because the derivation of hydrodynamics from microscopic theory often relies on the assumption that the system is sufficiently close to equilibrium – something difficult to justify in the rapidly expanding systems created in heavy ion collisions. In this talk we propose a more general derivation of relativistic hydrodynamics from kinetic theory, in which the fluid is assumed to be close to an *isotropic nonequilibrium* state instead of an equilibrium one. We demonstrate that, for a wide variety of nonequilibrium states, a hydrodynamic theory that is identical to the traditional hydrodynamic equations applied to heavy ion collisions is obtained. The only difference appears in the form of the transport coefficients that enter the equations of motion. Simulations of the Boltzmann equation equation in 0+1D Bjorken flow in the ultrarelativistic limit are performed to demonstrate this effect, showing that the same evolution for the energy-momentum tensor is obtained even when the momentum distribution function of partons is very different from an equilibrium one.

Primary authors: SILVEIRA DENICOL, Gabriel (Universidade Federal Fluminense); Dr NORONHA, Jorge (Universidade de Sao Paulo)

Presenter: SILVEIRA DENICOL, Gabriel (Universidade Federal Fluminense)

Session Classification: Parallel: Initial conditions for hydrodynamics & transport coefficients

Track Classification: Initial conditions for hydrodynamics & transport coefficients