

Quark Matter 2019 - the XXVIIIth International Conference on Ultra-relativistic Nucleus-Nucleus Collisions



Contribution ID: 2

Type: **Poster Presentation**

Dissipation and causality in fluids with polarization

Monday 4 November 2019 17:40 (20 minutes)

We examine the relativistic perfect fluid limit, defined as the fastest possible local equilibration, in a medium with polarizability, defined as a non-zero local equilibrium partition of angular momentum into spin and vorticity.

We show that the Lagrangian approach is best suited to analyzing this situation, as it can be used to efficiently avoid issues such as the breakdown of isotropy, the ambiguity of the energy-momentum tensor definition and the lack of closure of conservation equations.

We obtain the Lagrangian and the equations of motion of an ideal relativistic fluid with polarization, linearize them, and show that to restore

causality a relaxation term linking vorticity and polarization, analogous to the Israel-Stewart term linking viscous forces and gradients, is required.

We close with an discussion of the phenomenological applicability of the hydrodynamics with polarization developed here, focusing on the recent finding of Lambda polarization and resonance spin alignment, and discussing weather observables sensitive to early-time polarization exist.

Based on <https://arxiv.org/abs/1807.02796>
and previous work by the same authors

Authors: TORRIERI, Giorgio (IFGW, Unicamp); Mr MONTENEGRO, David (IFT, Unesp, Sao Paulo)

Presenter: Mr MONTENEGRO, David (IFT, Unesp, Sao Paulo)

Session Classification: Poster Session

Track Classification: New theoretical developments