The 8th International Conference on Chirality, Vorticity and Magnetic Field in Quantum Matter

ID de Contribution: **11**

Type: **Talk**

Relaxation terms for anomalous hydrodynamic transport in Weyl semimetals

jeudi 25 juillet 2024 15:00 (30 minutes)

Weyl semimetals, a class of topological materials, exhibit a hydrodynamic regime and offer an ideal environment for investigating chiral anomalies through table-top experiments and transport measurements. In this presentation, I will consider a $(3+1)$-dimensional fluid with a $U(1)_V \times U(1)_A$ chiral anomaly as a model of Weyl semimetals. My focus will be on longitudinal thermoelectric magnetotransport, where I will search for relaxation models that meet fundamental and phenomenological constraints, including electric charge conservation, Onsager reciprocity, and finite DC conductivities. I will take into account all possible mixed energy, electric, and axial charge relaxations and show how models which respect these constraints unavoidably render the system open, thus violating the second law of thermodynamics. Furthermore, these relaxations lead to a novel prediction for the DC thermoelectric transport, opening the path to experimental verification. To conclude, I will discuss how mixed relaxations arise naturally from kinetic theory using a modified relaxation time approximation.

Auteur principal: MARTINOIA, Luca (University of Genova)

Co-auteurs: AMORETTI, Andrea (University of Genova); BRATTAN, Daniel K. (Ecole Polytechnique, CPHT); MATTHAIAKAKIS, Ioannis (University of Genova); RONGEN, Jonas (University of Genova)

Orateur: MARTINOIA, Luca (University of Genova)

Classification de Session: Hydrodynamics