2021 Departmental Poster Competition

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Hydrodynamic Description of Transport Properties in Quantum Wires

Content :

Recently, there has been intense interest in the application of hydrodynamics to quantum gases and liquids. In this talk, I will describe current theoretical work using hydrodynamics to describe the electrons in one-dimensional quantum wires. Often, in these systems, the electron liquid fails to fully equilibrate. In this regime, the system can be described by two-fluid hydrodynamics, the same theory used to characterize superfluid He-4. Our theoretical efforts are focused on connecting transport phenomena to this hydrodynamic description. Specifically, I will present the results of a preliminary calculation of the Peltier coefficient and the resistance in terms of the bulk viscosities of the electron liquid.

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