universitätbonn

Universität zu Köln

Bonn-Cologne Graduate School of Physics and Astronomy

Intensive Week Course

The flow of entropy in solids

September 6-12, 2019, 9-16 h

Seminar room - II. Phys. Institute, University of Cologne

bcgs

Main Lecturer:

Prof. Kamran Behnia (Ecole Supérieure de Physique et de Chimie Industrielles Paris, FRANCE)

Abstract:

Heat propagates in a solid thanks to phonons, superposition of atomic vibrations, which can carry entropy over a distance before being scattered by other phonons or crystal defects. In metallic solids, the presence of mobile electrons complicates the picture in several directions. Electrons can carry entropy as well and can scatter other heat carriers including phonons. Moreover, the heat flow entangles with charge flow, leading to thermoelectric phenomena, which follows the rules set by irreversible thermodynamics as demonstrated by Onsager in early 20th century.

The lectures, conceived for graduate students of condensed-matter physics, will consist of five parts:

1) Thermoelectricity: A measure of entropy per charge carrier
2) Transport coefficients: equivalency of Landauer and and Boltzmann formalisms
3) Nernst effect in metals and superconductors
4) Berry curvature and off-diagonal entropy flow
5) Thermal transport and quasi-particle hydrodynamics

The morning lectures will be accompanied by exercises in the afternoon.
Course will take place Fri, Mon, Tue, Wed & Thu.

The number of attendants will be limited to about 15. Due to organizational reasons, we require you to register. Please indicate that you need the credit points upon registration.

Please, send your informal registration requests until 16.08.2019 to hemberger@ph2.uni-koeln.de.