University of Crete
Department of Physics

Physics Colloquium

Localization in quasi-periodic and disordered Hamiltonians: Open and Closed Systems

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ABSTRACT

In the first part of my talk, I will start with a broad overview of quasi-periodic systems. In particular, I will discuss the Aubry-Andre-Harper (AAH) model and its various generalizations. I will then discuss our recent findings on the isolated and open quantum system extension of the AAH model [1] and its various generalizations. I will also discuss the case where there is a single-particle mobility edge [2]. I will present results on transport properties and particle density profiles in various regimes (delocalized, critical, localized) of the AAH system and its generalizations.

In the second part of my talk, I will discuss transport in a classical disordered interacting system [3] and signatures of many-body localization through a study of thermal conductivity. I will discuss a system connected to heat baths at different temperatures and the resulting non-equilibrium steady state heat current and the temperature profile. I will also present results on the spatio-temporal correlations and a classical version of the Out-of-Time-Ordered-Commutator to investigate the role of disorder.

[1] A. Purkayastha, S. Sanyal, A. Dhar, M. Kulkarni, Phys. Rev. B 97, 174206 (2018), Editors' Suggestion
[2] A. Purkayastha, A. Dhar, M. Kulkarni, Phys. Rev. B, 96, 180204, Rapid (2017).
[3] M. Kumar, A. Kundu, M. Kulkarni, D. A. Huse, A. Dhar, arXiv:1911.03753 (2019).