ICTS Condensed Matter Seminar

Title : Absence of Normal Transport in an Interacting Disordered Spin Chain

Speaker : Francois Huveneers (King's College London, United Kingdom)

Date : Friday, 21 February 2025

Time : 3:00 PM (IST)

Abstract : Many-body localization (MBL) is an out-of-equilibrium phase of matter featuring emergent integrability: There exists a complete set of local integrals of motion. As a result, an MBL system remembers its initial state for arbitrarily long times if the system is thermally isolated. This implies, in particular, a total absence of transport. Demonstrating this with mathematical rigor proves highly challenging. In this talk, I will present a theorem stating that the diffusion constant of such systems vanishes, indicating that transport is at most sub-diffusive. An interesting aspect of the proof is that it relies on establishing MBL in some portions of the chains that are immune from resonances. Additionally, it rules out some numerical results that suggested MBL would not exist at all. Our work thus represents a step forward in rigorously establishing the existence of the MBL phase in one-dimensional systems.
From a work with W. De Roeck, L. Giacomin and O. Prosniak.

Venue : Online
Zoom Link: https://icts-res-in.zoom.us/j/94322534286?pwd=pdLFaUBcGvMRabbcGuo73IrIB5LEJt.1
Meeting ID: 943 2253 4286
Passcode: 212122