Department of
Theoretical Physics

The Quantum Space-Time Seminar

Solvable Models of Heat Transport in Quantum Mechanics

Prithvi Narayan (IIT Palakkad)

Date and time: 11:15 AM, 28 Nov 2025 (Fri)
Venue: AG 80

Zoom link will be sent separately.

In this talk, I will discuss solvable models of heat transport between two quantum-mechanical systems prepared at different temperatures and weakly coupled at a specified initial time. Using heat current as the primary diagnostic, we analyze both the early-time transients and the later-time approach to non-equilibrium steady states (NESS). We first study simple toy models—one inspired by Random Matrix Theory and another exhibiting conformal-like dynamics—and show that they already capture a variety of behaviours, including transient current peaks, distinct thermal-conductivity scalings, and qualitatively different approaches to NESS. We then demonstrate how these features arise in different limits of a more realistic solvable model: the double-scaled Sachdev–Ye–Kitaev (DSSYK) model.