ICTS | INTERNATIONAL CENTRE for THEORETICAL SCIENCES

TATA INSTITUTE OF FUNDAMENTAL RESEARCH

ICTS Thesis Defense Seminar

Title : Signatures of chaos and integrability in isolated and open quantum many-body systems, and controlling chaos in the Kicked Top model

Speaker : Mahaveer Prasad (ICTS-TIFR, Bengaluru)

Date : Thursday, 23 January 2025

Time : 2:00 PM (IST)

Abstract : The study of chaos and integrability in isolated and open quantum many-body systems is an active area of research related to in and out-of-equilibrium physics such as thermalization and many-body localization (MBL). We consider the dissipative Dicke model, an archetype of symmetry-breaking quantum phase transitions, and demonstrate that the Liouvillian, which describes the quantum dynamics, exhibits distinct spectral features indicative of integrable and chaotic behavior across the critical point. We study its connections to non-Hermitian random matrices. We also discuss the integrability and chaotic features in the extended version of the Tavis–Cummings model on a finite chain. Furthermore, we identify a single-site impurity model that successfully captures the spectral properties of the lattice model. We also present some analytical and numerical results on long range spectral correlations and their utility in characterizing and distinguishing different phases. Finally, we discuss stochastic control of chaos in the Kicked Top model. We show that above a critical value of control probability, the dynamics freezes to an unstable fixed point.

Venue : Madhava Lecture Hall
Zoom Link: https://icts-res-in.zoom.us/j/99278975139?pwd=gPFJebo8scF2wx2gVbMLcCr50RLCOn.1
Meeting ID: 992 7897 5139
Passcode: 232324