

ICTS Statistical Physics and Condensed Matter Seminar

Title : Spectral and eigenstate correlations in non-Hermitian systems

Speaker : Soumi Ghosh (ICTS -TIFR, Bengaluru)

Date : Tuesday, 16th May 2023

Time : 11:00 AM (IST)

Abstract : While localisation in closed quantum many-body systems has been discussed in great detail in the past few years, localisation in many-body systems described by non-Hermitian Hamiltonians has been considered very recently. Here, the non-Hermiticity arises due to effective coupling of the system with external baths. In the first part of the talk, we will discuss three such non-Hermitian models with onsite disordered potentials. Specifically, we will discuss the presence or absence of spectral correlations which indicate towards localisation transitions in these models. In the second part of the talk, we focus on eigenstate correlation which is a central ingredient in understanding the dynamics of such non-Hermitian systems. We study such correlations across the localisation transition in a prototypical model, the power-law banded random matrix ensemble. We show that eigenstate correlation behaves differently in the delocalised and localised phases. From the variation of the eigenstate correlation with energy difference one can extract an exponent which varies across the transition. We explain our results using non-Hermitian random matrices and an analytical treatment in the delocalised and localised phases respectively.

References:

1. Soumi Ghosh, Sparsh Gupta, and Manas Kulkarni, Spectral properties of disordered interacting non-Hermitian systems, Phys. Rev. B, 106, 134202 (2022).
2. Soumi Ghosh, Manas Kulkarni, and Sthitadhi Roy, Eigenvector correlations across the localisation transition in non-Hermitian power-law banded random matrices, arXiv:2304.09892.

Venue : Online & Feynman Lecture Hall (ICTS)

Zoom link: <https://icts-res-in.zoom.us/j/84552145622?pwd=dW9DSnNjSytFSUVtS1V5eFdPVlZTUT09>

Meeting ID: 845 5214 5622

Passcode: 161617



International Centre for Theoretical Sciences - TIFR
Survey No. 151, Shivakote Village, Hesaraghatta Hobli, Bengaluru (North) - 560089
Tel: +91 80 4653 6000 Fax: +91 80 4653 6002
Email: academicoffice@icts.res.in **Website:** www.icts.res.in