



## ICTS Ph.D. Thesis Defense Seminar

**Title** : Nonequilibrium Green's function formalism for topological materials and some applications

**Speaker** : Junaid Majeed Bhat, (ICTS-TIFR, Bengaluru)

**Date** : Tuesday, 22<sup>nd</sup> August 2023

**Time** : 10:00 AM (IST)

**Abstract** : Topological phases of matter are exotic states that support dissipationless currents due to the presence of special modes localized at the edges of the sample. We look at the transport characteristics of models hosting such phases in open system geometries using the quantum Langevin and non-equilibrium Green's function formalism. Using this formalism, we first obtain exact steady-state properties such as particle and heat currents of a general model of superconducting wires in contact with thermal reservoirs. As applications of this formalism, we explore the transport properties of two particular models: the 1D Kitaev chain and the 2D spinless-Bernevig-Hughes-Zhang (SBHZ) model. These are some of the simplest examples of 1D topological superconductors and 2D topological insulators, respectively. We also consider the application of our formalism to the study of energy transport in a classical system, namely a harmonic chain of charged particles in the presence of a spatially homogeneous or random magnetic field.

**Venue** : Chern Lecture Hall & Online

Zoom link: <https://icts-res-in.zoom.us/j/82877865542?pwd=ckp6VzZyYktKQUlnN2YrSUFwK1V4QT09>

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