



ICTS Statistical Physics & Condensed Matter Seminar (HYBRID)

Title : Unconventional Symmetries in Quantum Many-Body Physics

Speaker : Sanjay Moudgalya (Caltech)

Date : Tuesday, 01st August, 2023

Time : 03:00 PM (IST)

Abstract : The study of symmetry lies at the heart of various parts of physics. In equilibrium physics, symmetries are useful in classifying phases of matter and in non-equilibrium physics, they are necessary to understand the phenomenon of thermalization. Most symmetries studied in the literature have nice group structures, and they are sufficient to explain most conventional physical phenomena. However, recent discoveries of dynamical phenomena collectively known as weak ergodicity breaking have called for a generalization of the definition of symmetry. In this talk, I will discuss the physics of weak ergodicity breaking, particularly phenomena known as quantum many-body scars and Hilbert space fragmentation, and how it motivates a general mathematical framework to define symmetries in quantum many-body systems based on so-called commutant algebras. This framework leads to a generalization of the conventional notion of symmetry, provides precise explanation of weak ergodicity breaking in terms of unconventional symmetries, provides a novel interpretation of symmetry operators as ground states of local superoperators, leading to several insights on symmetries in systems with locality.

Venue : **Offline:** Emmy Noether Seminar Room (ICTS)

Online: Please click the below link to join the seminar.

<https://icts-res-in.zoom.us/j/86377387680?pwd=TU5ndHc1S09KQVAXWTJNelIxa1p6dz09>

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