Contribution ID: **49** Type: **Seminar**

Phillip Cussen Burke - Temperature in finite isolated quantum systems

Wednesday 6 September 2023 12:00 (40 minutes)

The concept of connecting quantum mechanical systems to statistical mechanics often arises in the study of "thermalization" in isolated many-body systems. One fundamental challenge in establishing this connection is the definition of temperature. In this talk, we explore two approaches to defining temperature in such systems.

First, we will introduce a definition of temperature inspired by the eigenstate thermalization hypothesis, which posits that the eigenstates of a thermalizing system contain information about the thermalization process. We will consider temperatures derived from the structure of eigenstate density matrices as a means to extract this information.

Following this, we consider the standard temperature-entropy relation from statistical mechanics. This relation establishes a connection between temperature and microcanonical entropy. We will investigate various methods for defining the microcanonical entropy in finite isolated quantum systems and numerically compute the corresponding temperature.