

## ICTS Seminar

**Title** : Quantum Pseudoentanglement

**Speaker** : Soumik Ghosh (University of Chicago)

**Date** : Thursday, 05<sup>th</sup> October 2023

**Time** : 11:30 AM (IST)

**Abstract** : Entanglement is a quantum resource, in some ways analogous to randomness in classical computation. Inspired by recent work of Gheorghiu and Hoban, we define the notion of "pseudoentanglement", a property exhibited by ensembles of efficiently constructible quantum states which are indistinguishable from quantum states with maximal entanglement. Our construction relies on the notion of quantum pseudorandom states -- first defined by Ji, Liu and Song -- which are efficiently constructible states indistinguishable from (maximally entangled) Haar-random states. Specifically, we give a construction of pseudoentangled states with entanglement entropy arbitrarily close to  $\log n$  across every cut, a tight bound providing an exponential separation between computational vs information theoretic quantum pseudorandomness. We discuss applications of this result to Matrix Product State testing, entanglement distillation, and the complexity of the AdS/CFT correspondence.

**Venue** : Offline: Obaid Siddiqi Meeting Room

Online: Please click on the below link to join the meeting

<https://icts-res-in.zoom.us/j/81978430574?pwd=PjrNknhw0PShHXqygF3cVNq3JhBixb.1>