ICTS Biological Physics String Seminar

Title : Quantum chaos and the complexity of time evolution

Speaker : Vijay Balasubramanian (Department of Physics, University of Pennsylvania, USA)

Date : Friday, 03 July 2026

Time : 3:30 PM (IST)

Abstract : I will describe new ideas relating quantum chaos to the complexity of time evolution. One approach treats physical time evolution as a quantum computation, and bounds the smallest quantum circuit that can simulate this evolution. The second approach quantifies how ergodically and rapidly a quantum state explores the accessible part of the system's Hilbert space. I will illustrate how these measures separate integrable and chaotic quantum systems by considering examples including spin chains, quantum billiards, quantum many body systems, and Random Matrix Theory. I will end by describing an application of these methods to a conjecture that geometrizes complexity in quantum gravity, and will comment on the relevance of these ideas for the break down of effective field theory near spacelike singularities.

Venue : Emmy Noether Seminar Room

ZoomMeeting:https://icts-res-in.zoom.us/j/88092766911?pwd=R3ZrVk9yeW96ZmQ4ZG9KRzVhenRKZz09
Meeting ID: 880 9276 6911
Passcode: 232322