INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

2 A & B, Raja S. C. Mullick Road, Jadavpur, Kolkata-32

SCHOOL OF PHYSICAL SCIENCES COLLOQUIUM

Title : **"How to Store and Process Many Qubits Very Well."**

Speaker : **Prof. Vedika Khemani (Stanford University)**

Date : **November 03, 2026 (Tuesday)**

Time : **14:00 HRS (IST)**

Venue : **C.V Raman Hall, 2nd Floor, IACS Main Building**

Abstract : **Recent breakthroughs in quantum error correction have shown that it is possible to robustly store many qubits with remarkably low overhead. In this talk, I will explore the many-body physics underlying these quantum memories, as well as the challenge of computing with them. I will discuss a new phase of matter—the topological quantum spin glass—that captures the physics of this new generation of quantum codes. But robust storage is only half the challenge: our understanding of how to reliably manipulate protected quantum information remains surprisingly incomplete, even for well-studied codes such as the two-dimensional toric code. I will introduce a new framework for fault-tolerant computation that provides a systematic way to discover new operations on protected quantum information.**

All are cordially invited to attend.