



## **INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE**

2A & 2B, Raja S. C. Mullick Road, Jadavpur, Kolkata-700 032

### **School of Physical Sciences**

#### **SEMINAR NOTICE**

- Title : Single-Shot Determination of Quantum Phases via Continuous Measurements**
- Speaker : Dr. Aniket Patra, Aarhus University, Denmark.**
- Date : October 14, 2022 (Friday)**
- Time : 15:00 hours (IST)**
- Venue : Physics Seminar Room (C-406), 3rd Floor, Centenary Building, IACS**

#### **Abstract:**

We demonstrate that weak continuous probing may be exploited to determine and define quantum phases of complex many body systems based on the measurement record alone [1]. After deriving a stochastic Schrödinger equation for the experimental setup under consideration, we test the resulting phase criterion in numerical simulations of measurements on the Bose-Hubbard model and the quantum Ising chain. This yields a phase transition point in reasonable agreement with the quantum phase transition in the ground state of the closed system in the thermodynamic limit, despite the system being highly excited through the measurement dynamics. At high measurement strengths, the system's response enters a Zeno regime suppressing transitions between eigenstates of the measurement operator.

References [1] Aniket Patra, Lukas F. Buchmann, Felix Motzoi, Klaus Mølmer, Jacob Sherson, and Anne E. B. Nielsen, Single-Shot Determination of Quantum Phases via Continuous Measurements, arXiv:1906.02518v3 (accepted in Phys. Rev. A).

**All are cordially invited to attend the seminar.**