



**S N BOSE NATIONAL CENTRE
FOR BASIC SCIENCES**

Block JD, Sector III, Salt Lake, Kolkata 700 106

DEPARTMENTAL SEMINAR

Condensed Matter and Materials Physics

10th October, 2022

4.00 PM

ONLINE/ FERMION

SPEAKER

Dr. ANIKET PATRA,
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Aarhus University
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TITLE OF THE TALK

**SINGLE-SHOT DETERMINATION OF QUANTUM PHASES VIA CONTINUOUS
MEASUREMENTS**

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).

HOST FACULTY

Dr. Manoranjan Kumar

Associate Professor : CONDENSED MATTER AND MATERIALS PHYSICS
