INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

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Speaker: Professor Heiko Rieger, Saarland University, Germany

Ref: http://www.uni-saarland.de/fak7/rieger/

Date & time: 27-11-2019, 11:30 am

Venue: Room No. C-406, Physics Seminar Room, Centenary Building

Title: Quantum relaxation, metastability and thermalization of lattice bosons with cavity-induced long-range interactions

Abstract: The coupling of cold atoms to the radiation field within a high-finesse optical resonator, an optical cavity, induces long-range interactions which can compete with an underlying optical lattice. The interplay between short- and long-range interactions gives rise to new phases of matter including supersolidity (SS) and density waves (DW), and interesting quantum dynamics. Here it is shown that for hard-core bosons in one dimension the ground state phase diagram and the quantum relaxation after sudden quenches can be calculated exactly in the thermodynamic limit. Remanent DW order is observed for quenches from a DW ground state into the superfluid (SF) phase below a dynamical transition line. After sufficiently strong SF to DW quenches beyond a static metastability line DW order emerges on top of remanent SF order, giving rise to a dynamically generated SS state. Our method to handle infinite- and short-range interactions in the infinite system size limit opens a way to solve exactly other Hamiltonians with infinite- and short-range interactions as well.

All are cordially invited to attend the seminar