

Theory Colloquium

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“Controlling the cold atomic gases via the coupling to a dissipative cavity”

Abstract

Quantum gases in optical cavities have shown many exciting phenomena as the self-organization into superradiant phases. Additionally, many complex phases have been predicted to be realizable in these systems reaching from topologically interesting phases to glass like phases. The theoretical treatment of these systems is very difficult due to the presence of the long-range coupling of the cavity to the atoms and fluctuations need to be critically taken into account. We investigate bosonic and fermionic atoms on a lattice and coupled to an optical cavity using many-body adiabatic elimination technique and exact matrix product state methods to capture the global coupling to the cavity mode and the open nature of the cavity. We investigate the system dynamics and a new type of bistabilities which are caused by the fluctuations in the system.

Wednesday | 03.06.2026 | 5:00pm

SR 1 | ICT building