

ICTS Seminar (ONLINE)

Title : Tensor network methods for lattice gauge theories: From the lack-of-thermalization to critical phenomena

Speaker : Titas Chanda (Indian Institute of Technology Indore)

Date : Tuesday, 12th December 2023

Time : 03:00 PM (IST)

Abstract : Lattice gauge theories, originally developed to study non-perturbative limits in high-energy physics, have recently garnered renewed attention from the quantum many-body physics community. This heightened interest is due to the groundbreaking advancements in experimental quantum simulations and computational tensor network techniques, which have made it possible to simulate lattice gauge theories without any sign problem either on tabletop experiments or by using classical computers. In this seminar, after a brief overview of quantum simulations and tensor network techniques, I will present our recent works on lattice gauge theories in 1+1D with bosonic matter using tensor network tools. Specifically, I will discuss the out-of-equilibrium dynamics of the bosonic version of the Schwinger model, where confinement among the bosons hinders thermalization in the system, resulting in exotic asymptotic states. I will then continue with the 1+1D Abelian-Higgs model discretized on a 1D spatial lattice. In contrast to its continuum counterpart, the lattice description unveils a rich phase diagram consisting of both the confined and the Higgs phases. Importantly, I will discuss an unusual quantum critical point having a central charge of $c=3/2$ found in the discretized Abelian-Higgs model, whose origin can be explained by the Higgs mechanism.

Refs.: Phys. Rev. Lett. 124, 180602 (2020), Phys. Rev. Lett. 128, 090601 (2022), arXiv:2304.01030.

Venue : Online: Please click on the below link to join the seminar

<https://zoom.us/j/99951162780?pwd=MXhHUHdFcEp2N2dhTFRLNXF0N0tzQT09>

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