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Tensor Networks: entanglement and the simulation of quantum many-body problems

Wednesday, 1 June 2022 14:00 (1 hour)

Theory Colloquium
The term Tensor Network States (TNS) designates a number of ansatzes that can efficiently represent certain states of quantum many-body systems. In particular, ground states and thermal equilibrium of local Hamiltonians, and, to some extent, real time evolution can be numerically studied with TNS methods. Quantum information theory provides tools to understand why they are good ansatzes for physically relevant states, and some of the limitations connected to the simulation algorithms.

Originally introduced in the context of condensed matter physics, these methods have become a state-of-the-art technique for strongly correlated one-dimensional systems. Their applicability extends nevertheless to other fields. As an example, in the last few years it has been shown that TNS are also suitable to study lattice gauge theories and other quantum field problems. This talk gives an overview of the possibilities and limitations of these methods, and some of their recent applications to this kind of problems.

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