FRONTIERS OF QUANTUM MATTER

量子物质前沿讲座

CONFERENCE HALL 104

SCIENCE BUILDING

TSINGHUA UNIVERSITY

Tensor Network Simulation of Dynamics and Finite-temperature Quantum System

Tuesday, Jan 9 & Thursday, Jan 11   3:30PM

Zhehao Dai (Berkeley)

Tensor network states are variational ansatzs of quantum many-body wavefunctions. The celebrated density matrix renormalization group (DMRG) algorithm produces virtually exact ground states of local 1D Hamiltonians in the form of tensor network states. On the other hand their potential in higher dimensions and in simulating dynamical and thermal properties are less explored. In the first lecture I will introduce recent progress in simulating 1D thermal ensembles of quantum states via time evolution and sampling (METTS). In the second lecture I will introduce a special class of tensor networks states, isometric tensor network states. This ansatz efficiently simulate real-time dynamics and thermal ensembles of 2D quantum systems.

Bio: Zhehao Dai is a postdoc at University of California, Berkeley, and an incoming assistant professor at University of Pittsburgh. He received his PhD from MIT in 2020 under Prof. Patrick Lee and BS from Tsinghua University in 2014. He is interested in strongly correlated quantum systems, such as high temperature superconductors, topological phases, and critical points. Recently, his research focuses on developing 2D tensor network simulation methods for quantum systems.