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Quantum Simulation of Finite Temperature Schwinger Model via Quantum Imaginary Time Evolution

Thursday, 3 August 2023 14:10 (20 minutes)

We have studied the chiral and confinement-screening phase transitions in the Schwinger model at finite temperature and density using the quantum algorithm.
The theoretical exploration of the phase diagram for strongly interacting systems at finite temperature and density remains incomplete mainly due to the sign problem in the conventional Lattice Monte Carlo method. However, quantum computation offers a promising solution to circumvent the sign problem as it deals with quantum field theories in the Hamiltonian formalism.
The preparation of thermal states on quantum circuits is a non-trivial challenge.
We have successfully implemented the thermal state preparation on quantum circuits using a theoretical framework known as Thermal Pure Quantum states (TPQs) and the Quantum Imaginary Time Evolution (QITE) algorithm.
The details of the algorithm, our improvements, and the results will be presented in the talk.

Topical area

Quantum Computing and Quantum Information

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