Contribution ID: **116** Type: **not specified**

Quantum imaginary time evolution on 1D infinite-size lattice

Thursday, 28 August 2025 16:36 (3 minutes)

This work presents an implementation of the Quantum Imaginary Time Evolution (QITE) and QLanczos algorithms on a 1D infinite-size lattice. We transform the uniform matrix product state (uMPS) into a quantum circuit and use the concept of the time-dependent variational principle (TDVP) to implement QITE. Our study includes simulation results for the transverse-field Ising model, obtained from both quantum simulators and actual IBM-Q devices. These quantum circuit simulation results will be compared with those from classical tensor network TDVP algorithms. A key aspect of our approach is that the cost function, which is obtained directly from measurements on the quantum circuits. Consequently, the results are inherently statistical distributions rather than deterministic values. We'll analyze how the measurement methods impact the accuracy and convergence of the QITE algorithm.

Primary authors: HUNG, Hao-Ti (NTU Physics); Mr TSAO, Tung (NTU Physics); KAO, Ying-Jer (NTU Physics)

Presenter: HUNG, Hao-Ti (NTU Physics)

Session Classification: Poster

Track Classification: Poster presentation