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Ground state energy of the two-dimensional pure $\mathbb{Z}_2$ lattice gauge theory via quantum imaginary time evolution.

Friday 7 November 2025 14:30 (20 minutes)

The quantum imaginary time evolution (QITE) is a quantum algorithm that approximates imaginary-time evolution using unitary operators.
We apply the QITE to the two-dimensional pure $\mathbb{Z}_2$ lattice gauge theory to obtain the ground state energy. In addition, we estimate the algorithmic and statistical errors and computational costs via classical simulation. It was also shown in the previous work in the context of spin models that one can construct the unitary operators while preserving (global) symmetry, which reduces the gate count. We utilize the same method for the local gauge constraints (Gauss's law) and demonstrate a reduction in gate cost.

Parallel Session (for talks only)

Quantum computing and quantum information

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