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## Tensor Renormalization Group Methods for Real-Time Evolution

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Ab-initio calculations of real-time evolution for lattice gauge theory have very interesting potential applications but present challenging computational aspects.

We show that tensor renormalization group methods developed in the context of Euclidean-time lattice field theory can be applied to calculation of Trotterized evolution operators at real time. We discuss the optimization of truncation procedures for various observables. We apply the numerical methods to the 1D Quantum Ising Model with an external transverse field in both the ordered and disordered phase and compare with universal quantum computing for  $N_s = 4, 8,$  and  $16$  sites.

### Topical area

Quantum Computing and Quantum Information

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