Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

Adiabatic ground state preparation in an expanding lattice SNIR GAZIT, CHRIS OLUND, NORMAN YAO, University of California - Berkeley —
We numerically investigate the newly proposed s-source framework for constructing ground state wave functions of gapped Hamiltonians. The key idea is to utilize the adiabatic principle to build a tensor network representation that smoothly interpolates between the ground state of system sizes L and 2L via an interleaved set of ancillary degrees of freedom. Repeatedly applying this procedure reproduces the thermodynamic limit. The scheme should be contrasted with conventional tensor network methods that rely on the variational principle to target the ground state by iteratively improving a variational energy. We introduce a simple yet flexible tensor network structure and an optimization protocol borrowing techniques from quantum control theory. We anticipate that this approach can, in principle, allow access to problems beyond current tensor network technology and even serve as an experimental scheme for ground state preparation in quantum engineered systems.

Snir Gazit
Univ of California - Berkeley

Date submitted: 27 Jan 2017 Electronic form version 1.4