Abstract Submitted
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Matrix Product State Open Source Code for Entangled Quantum Systems[1] WEI HAN, Colorado School of Mines, Golden, CO 80401 USA, MICHAEL L. WALL, JILA, NIST and University of Colorado, Boulder, CO 80309 USA, DANIEL JASCHKE, Colorado School of Mines, Golden, CO 80401 USA, LINCOLN D. CARR, Colorado School of Mines, Golden, CO 80401 USA — Variational algorithms based on Matrix Product States (MPSs) are a common numerical approach for simulating the statics and dynamics of one dimensional quantum many body lattice systems. Our group has developed an open source MPS package named OpenMPS. The package includes algorithms for simulating both finite and infinite lattice models with general degrees of freedom, i.e. bosons, fermions, or spins. OpenMPS treats not only short-range interacting systems but also long-range interacting systems, including out-of-equilibrium dynamics. Simulation of dynamics with long-range interactions is pertinent for many AMO systems, including ultracold polar molecules in optical lattices, Rydberg atoms, and trapped ions.

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