

Abstract Submitted
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Matrix product state simulations on a quantum computer

MICHAEL FOSS-FEIG, Honeywell Quantum Solutions, ANDREW POTTER, University of Texas, Austin, DAVID HAYES, Honeywell Quantum Solutions — Matrix product states (MPS) afford a compressed representation of many states that are relevant to physical systems. While classical algorithms have been developed to compute the properties of physical systems using MPS as an ansatz, in many cases of practical interest these algorithms still require exponential resources (for example in the size of the system for 2D or 3D systems, or in the evolution time when out of equilibrium). We discuss near-term prospects for using small and non-error-corrected quantum computers to aid in MPS simulations, and show examples of MPS based quantum algorithms run on a trapped-ion quantum computer.

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