

Abstract Submitted
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An Efficient Construction of a Matrix Product State for a Free Fermion Ground State¹ MATTHEW FISHMAN, Applied Physics, California Institute of Technology, Pasadena, California 91125, USA, STEVEN WHITE, Department of Physics and Astronomy, University of California, Irvine, California 92697, USA — Here we present an efficient and numerically stable procedure for creating the Matrix Product State of a pure fermionic Gaussian state, such as the ground state of a quadratic Hamiltonian. The algorithm produces a minimal number of nearest neighbor gates that, when applied to a product state, forms the many-body ground state. We will cover the procedure for both number conserving Hamiltonians as well as more general parity conserving Hamiltonians, where we will utilize the formalism of Majorana modes. Comparisons to previous methods and applications will be discussed.

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