

Abstract Submitted
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The Phases of an Interacting Spin-1/2 Fermi Gas as seen from a New Variational Ansatz¹ SANGWOO CHUNG, University of Cincinnati, KUEI SUN, The University of Texas at Dallas, CARLOS BOLECH, University of Cincinnati — Since its introduction, the continuous matrix product states (cMPS) have demonstrated success in predicting low energy properties of repulsive one-dimensional (1D) Bose gas systems. We have extended those efforts to nonrelativistic fermions and shown that the cMPS, moreover, is able to correctly describe the ground-state superfluid and magnetic properties of interacting Fermi gases in 1D. This includes the signatures of a partially polarized superfluid regime, in agreement with the large amount of theoretical and experimental work from recent years by the cold-atoms community. The new type of ansatz promises to be ideally posed to be able to describe atomic gases in optical lattices economically but without making a lattice-model (tight-binding) approximation.

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