

Unitary circuits for strongly correlated fermions

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Reference:

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<http://link.aps.org/doi/10.1103/PhysRevA.81.050303> [2]

We introduce a scheme for efficiently describing pure states of strongly correlated fermions in higher dimensions using unitary circuits featuring a causal cone. A local way of computing local expectation values is presented. We formulate a dynamical reordering scheme, corresponding to time-adaptive Jordan-Wigner transformation, that avoids nonlocal string operators. Primitives of such a reordering scheme are highlighted. Fermionic unitary circuits can be contracted with the same complexity as in the spin case. The scheme gives rise to a variational description of fermionic models not suffering from a sign problem. We present numerical examples in a 9×9 and 6×6 fermionic lattice model to show the functioning of the approach.

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