

Abstract Submitted  
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**Fermionic duality approach to strongly-interacting lattice models**<sup>1</sup> JOE MITCHELL, TIGRAN SEDRAKYAN, VICTOR GALITSKI, University of Maryland — We derive an exact Grassmann path-integral representation for strongly interacting fermion systems that is dual to the conventional Hubbard-Stratonovich approach. In contrast to the latter, we decouple the interaction Hamiltonian by introducing additional (dual) fermionic fields. This fermionic decoupling naturally forms in particle-hole channels and leads to alternative order parameters given in terms of the dual fields. The new formalism is tested by calculating the partition function in a simple solvable model with four-fermion interaction and is argued to be very effective for strong or repulsive interactions.

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