

Abstract Submitted
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Superfluidity of fermions with repulsive on-site interaction in an anisotropic optical lattice near a Feshbach resonance¹ BIN WANG, LUMING DUAN, University of Michigan, Ann Arbor — We present numerical analysis of ground state properties of the one-dimensional general Hubbard model (GHM) with particle assisted tunnelling rates and repulsive on-site interaction (positive-U), which describes fermionic atoms in an anisotropic optical lattice near a wide Feshbach resonance. Our calculation uses the time evolving block decimation algorithm, which is an extension of the density matrix renormalization group and provides a well controlled method for one-dimensional systems. We show that the positive-U GHM, when hole doped from half-filling, shows up a phase with coexistence of quasi-long-range superfluid and charge-density-wave orders. This feature is different from the property of the conventional Hubbard model with positive-U, indicating the particle assisted tunneling in the GHM could bring in qualitatively new physics.

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