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Pomeranchuk cooling of $SU(N)$ ultracold fermions in optical lattice

1 Zi Cai, Hsiang-Hsuan Hung, Department of physics, UCSD, Dong Zheng, Department of physics, Tsinghua University, Congjun Wu, Department of physics, UCSD — We investigate thermodynamic properties of a half-filled $SU(2N)$ Fermi-Hubbard model in two-dimensional square lattice using the determinantal Quantum Monte Carlo simulation. We address the question how the large number of hyperfine-spin components makes thermodynamic properties of $SU(N)$ ultracold fermions different from the conventional Hubbard model with $N=2$. Various thermodynamic quantities such as entropy, charge fluctuations, and spin correlations have been calculated. We devote special attention to the interaction-induced adiabatic cooling: an analogue of the Pomeranchuk effect in Helium-3.

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