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Fidelity Study of Superconductivity in Extended Hubbard Models NACHUM PLONKA, CHUNJING JIA, Stanford University, BRIAN MORITZ, SLAC National Accelerator Laboratory, YAO WANG, Stanford University, THOMAS DEVEREAUX, Stanford University, SLAC National Accelerator Laboratory — The role of strong electronic correlations on unconventional superconductivity remains an important open question. Here, we explore the influence of long-range Coulomb interactions, present in real material systems, through nearest and next-nearest neighbor extended Hubbard interactions in addition to the usual on-site terms. Utilizing large scale, numerical exact diagonalization, we analyze the signatures of superconductivity in the ground states through the fidelity metric of quantum information theory. We find that these extended interactions enhance charge fluctuations with various wave vectors. These suppress superconductivity in general, but in certain parameter regimes superconductivity is sustained. This has implications for tuning extended interactions in real materials.

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