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Competing instabilities of cold atoms on self-assembled dipolar lattices CHUNTAI SHI, SHAN-WEN TSAI, University of California, Riverside — Cold atoms moving on a self-assembled lattice of dipolar molecules can be created with the motion of the (dressed) atoms being described by extended Hubbard models with tunable long-range interactions with repulsive and attractive components [1]. Motivated by this proposal, we investigate the phase diagram of the extended fermionic Hubbard model with an off-site interaction V between nearest-neighbor pairs in addition to the usual on-site interaction U and hopping amplitude t. We study this model close to half filling, where a rich set of phases, including (charge or spin) density waves and (s-wave, p-wave or d-wave) superconductivities, can be realized via tuning of the strength of the components of the interaction and of the chemical potential. We employ a one-loop functional renormalization-group approach which takes into account all the scattering processes around the Fermi surface systematically, and enable us to investigate the competing orders on an equal basis.

[1] G. Pupillo *et al.*, Phys. Rev. Lett. **100**, 050402 (2008)

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