

Abstract Submitted
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Phase diagram of strongly attractive p-orbital fermions on optical lattices THEJA DE SILVA, Augusta University — We examine a system of doubly degenerate p-orbital polarized fermions on a two-dimensional square lattice with a strong on-site interaction. For strong attractive interactions at the half filling density limit, a four-site square plaquette interaction term is generated from the directional tunneling dependence of p-orbitals. By treating both on-site interaction and the four-site square plaquette interaction term in fourth order perturbation theory, we derive an effective Hamiltonian for the system. We then map the resulting effective particle Hamiltonian into an effective spin-Hamiltonian and study the phase diagram of the system by using a variational mean field approach and a linear spin-wave theory. Further, we discuss the experimental signatures of the resulting phases within the context of current cold-atom experimental techniques.

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