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Orbital coupled dipolar fermions in an asymmetric optical ladder[1]

XIAOPENG LI, W. VINCENT LIU, University of Pittsburgh — We study a quantum ladder of dipolar atoms/molecules with coupled s and p orbitals. The interaction of such a system can be controlled with dipole moments being aligned by an external field. The two orbital components have distinct hoppings. The tunneling between them is equivalent to a partial Rashba spin-orbital coupling when the orbital space (s, p) is identified as spanned by pseudo-spin 1/2 states. A rich phase diagram is established. In particular a superconducting phase is found for repulsive fermions and a plaquette phase is found for bosons at 1/4 filling.

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