

Abstract Submitted  
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**Tunable Phases of Fermionic Cold Atoms Systems in Mixed Dimensions** KYLE IRWIN, SHAN-WEN TSAI, University of California, Riverside — We investigate a system with two species of fermions. One species, f-fermions, moves on a two-dimensional square lattice. Another species, c-fermions, is constrained to move on a one-dimensional lattice embedded in the square lattice of f-fermions. The phases of the effective one-dimensional system whose interactions are mediated by the two-dimensional system can be tuned by manipulating the two-dimensional density. We explore effective theories, quantum phases, correlations, and relevant energy scales for various fillings of the mixed dimensional system using a functional renormalization group approach.

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