(2k_F, 2k_F) density-wave orders of interacting p-orbital fermions in square optical lattice¹ ZIXU ZHANG, University of Pittsburgh, W. VINCENT LIU, University of Pittsburgh and Kavli Institute for Theoretical Physics, University of California, Santa Barbara — We study instabilities of spinless fermionic atoms in the p- orbital bands in two dimensional optical lattices at non- integer filling against interactions. Stripe charge-density- wave or orbital-density-wave orders are found for attractive and repulsive interactions, respectively. A surprising result is that the superfluid phase, usually expected of attractively interacting fermions, is less energetically favored. Nesting quasi-one-dimensional Fermi surfaces in such systems are independent of filling, which ensures that the stripe density- wave orders occur in a large parameter regime.

¹This work is supported by ARO (W911NF-07-1-0293) and ARO-DARPA-OLE (W911NF-07-1-0464). We also thank the KITP at UCSB for its hospitality where this research is supported in part by NSF Grant No. PHY05-51164.