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Competing phases in the single-band Hubbard model on the 1/5-depleted square lattice MICHAEL MULANIX, EHSAN KHATAMI, San Jose State University — Using exact diagonalization of small clusters, we study the Hubbard model on the 1/5-depleted square lattice. This geometry, which arises in ordered-vacancy iron selenide superconductors, consists of 2 by 2 plaquettes connected through inter-plaquette bonds. Previous determinantal quantum Monte Carlo simulations have shown that the model at half filling displays multiple quantum phase transitions by tuning the ratio of hoppings for the two types of bonds, or by varying the interaction strength. We extend those results to the region away from half filling and study the magnetic, charge and pairing correlation functions for a wide range of interaction strengths and the hopping ratios. We find an interesting variation of the magnetic ordering wavevector as the density changes, particularly if the hopping ratio is tuned in favor of the intra-plaquatte bond. We also find that, for small interaction strengths and at low densities, unexpected charge or pair density waves dominate.

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