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s-Wave Superconductivity Phase Diagram for the Two Dimensional Inhomogeneous Attractive Hubbard Model KARAN ARYANPOUR, UC Davis-SUNY Buffalo, THEREZA C. PAIVA, Instituto de Fisica, Universidade Federal do Rio de Janeiro, Brazil, WARREN E. PICKETT, RICHARD T. SCALETTAR, UC Davis — We study s-wave superconductivity in the two-dimensional square lattice attractive Hubbard Hamiltonian for various inhomogeneous patterns of interacting sites at different concentration values f. Using the Bogoliubov-de Gennes (BdG) mean field approximation, we find the phase diagram for inhomogeneous interaction patterns in which the on-site interaction U_i takes on two values, $U_i = 0, U/(1-f)$ as a function of electron occupation per site n and study the evolution of the phase diagram as f varies. In certain regions of the phase diagram, inhomogeneity results in a larger zero temperature averaged pairing amplitude and also the superconducting phase transition temperature T_c, relative to a uniform system with $U_i = U$ on all sites. These effects are observed for stripe, checkerboard, and even random patterns of the attractive centers, suggesting that the pattern of inhomogeneity is unimportant. The phase diagrams also include regions where superconductivity is obliterated due to the formation of various charge ordered phases. We show that for certain regular inhomogeneous patterns, increasing temperature works against the formation of these charge ordered phases and as a result, can enhance superconductivity.

Karan Aryanpour
UC Davis-SUNY Buffalo

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