

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Sorting Category: 05.13 (C)

s-Wave Superconductivity Phase Diagram in the Inhomogeneous Two-Dimensional Attractive Hubbard Model¹

KARAN ARYANPOUR, Department of Physics, SUNY at Buffalo, THEREZA PAIVA, Universidade Federal do Rio de Janeiro, Brazil, WARREN E. PICKETT, RICHARD T. SCALETTAR, Department of Physics, University of California, Davis — We study s-wave superconductivity in the 2-D square lattice attractive Hubbard Hamiltonian for inhomogeneous patterns of interacting sites. Using the Bogoliubov-de Gennes (BdG) mean field approximation, we obtain the phase diagram for inhomogeneous patterns with on-site electron interaction U_i taking on two values, 0 and $-U/(1-f)$ (f the non-interacting sites concentration) as a function of electron density per site n as f varies. Inhomogeneity can result in a larger average pairing amplitude at $T = 0$ and also a higher superconducting T_c , relative to a uniform system. Superconductivity can also vanish due to charge ordered phase formation. T_c enhancement due to inhomogeneity is robust as long as $n < 2(1-f)$ regardless of the pattern. Also, for certain inhomogeneous patterns, when $n = 2(1-f)$, raising temperature works against the stability of existing charge ordered phases for large f and as a result, enhances T_c .

¹We acknowledge NSF Grants DMR-0421810, DMR-0426826, US ONR, CNPq-Brazil and FAPERJ-Brazil.

Prefer Oral Session
 Prefer Poster Session

Karan Aryanpour
aryanpok@buffalo.edu
Department of Physics, SUNY at Buffalo

Date submitted: 19 Dec 2007

Electronic form version 1.4