

Inhomogeneity in the Extended $t - J$ Model: The Cases of Hole- and Electron-doped Cuprates

Ting-Kuo Lee and Chung-Pin Chou

Institute of Physics, Academia Sinica, Taipei, Taiwan

In this study we present variational Monte Carlo calculation to examine spatial inhomogeneity in hole- and electron-doped cuprates. Since Yamada plot in hole-doped cuprates has been successfully reproduced in a recently proposed $t - J$ -type model with mass renormalization from electron-phonon coupling, we reasonably presume that the same Hamiltonian could be introduced into electron-doped regime. Interestingly, we find that unlike hole-doped cuprates "in-phase" stripe domains with the period as large as lattice length can be stabilized near underdoped region in electron-doped systems. According to the finite lattice size to which we can reach, our results may imply an electronic phase separation into electron-rich and electron-poor domains can be another candidate for the ground state. In addition, we have also examined some trial states in hole-doped cases, such as diagonal stripe, randomly-oriented glass, and checkerboard-like patterns.