Attractive Hofstadter-Hubbard model with imbalanced chemical and vector potentials[1] MENDERES ISKIN, Koc University - Istanbul — We study the interplay between the Hofstadter butterfly, strong interactions and Zeeman field within the mean-field Bogoliubov-de Gennes theory in real space, and explore the ground states of the attractive single-band Hofstadter-Hubbard Hamiltonian on a square lattice, including the exotic possibility of imbalanced vector potentials. We find that the cooperation between the vector potential and superfluid order breaks the spatial symmetry of the system, and flourish stripe-ordered Fulde-Ferrell-Larkin-Ovchinnikov (FFLO)-like superfluid and supersolid phases that can be distinguished and characterised according to their coexisting pair-density (PDW), charge-density (CDW) and spin-density (SDW) wave orders. We also discuss confined systems and comment on the likelihood of observing such stripe-ordered phases by loading neutral atomic Fermi gases on laser-induced optical lattices under laser-generated artificial gauge fields.

Menderes Iskin
Koc University - Istanbul

Date submitted: 03 Nov 2014   Electronic form version 1.4