Inhomogeneous phases of repulsive fermions in cubic lattices JIE
XU, SIMONE CHIESA, SHIWEI ZHANG, College of William and Mary — We
present a fully self-consistent mean-field study of the inhomogeneous phases in the
three-dimensional Hubbard model as the density deviates from half-filling. As the
interaction U increases at fixed density, there is a transition from a uniform Fermi
liquid to an inhomogeneous metallic phase characterized by a spin density wave along
the [001] direction. Upon further increase of U the system undergoes a discontinuous
transition to an insulating phase with a spin density wave along the [111] direction.
We determine the evolution of the modulation wavelength of the spin density wave as
a function of U and density, and discuss signature in the momentum distribution that
are relevant to optical lattice experiments. Crossover from two- to three-dimensions
is also studied.

Simone Chiesa
College of William and Mary