

Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Superfluid - Mott transition in the presence of artificial gauge fields IVANA VASIC, ITP, Goethe University, Frankfurt am Main, ALEX PETRESCU, Department of Physics, Yale University, New Haven, USA, KARYN LEHUR, Centre de Physique Theorique, Ecole Polytechnique, CNRS, Palaiseau Cedex, France, WALTER HOFSTETTER, ITP, Goethe University, Frankfurt am Main — Several recent cold atom experiments reported implementation of artificial gauge fields in optical lattice systems, paving the way toward observation of new phases of matter. Here we study the tight-binding model on the honeycomb lattice introduced by Haldane, for lattice bosons. We analyze the ground state topology and quasiparticle properties in the Mott phase by applying bosonic dynamical mean field theory, strong-coupling perturbation theory and exact diagonalization. The phase diagram also contains two different superfluid phases. The quasiparticle dynamics, number fluctuations, and local currents are measurable in cold atom experiments.

Ivana Vasic
ITP, Goethe University, Frankfurt am Main

Date submitted: 19 Feb 2014

Electronic form version 1.4