

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Numerical study on the ionic Hubbard model in one and two dimensions** JI-WOO LEE, YONG CHUL LEE, SOO HYUN CHO, Myongji University — We investigate the quantum phase transition of an ionic Hubbard model in one and two dimensions. There are three parameters in the ionic Hubbard model, one is the hopping term  $t$ , the other is the Coulomb term  $U$  between local spin-up and spin-down electrons, and another is the band energy  $\Delta$  which corresponds to the difference in local chemical potentials of bipartite lattice. Via exact diagonalization and quantum Monte Carlo simulations, we obtained the phase boundary of Mott insulator, metal, and band insulator. We measure the ground state energy and the energy gap between the ground-state and the first excited-state energy, and also measure the order parameters such as Drude weight and double occupancy in the three phases to understand the nature of three phases.

Ji-Woo Lee  
Myongji University

Date submitted: 19 Nov 2010

Electronic form version 1.4