Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Electrostatic Effects in Topological Insulators DIMITRIS GALANAKIS, Nanyang Technological University, Singapore, TUDOR STANESCU, West Virginia University — We study electrostatic effects in topological insulators generated by non-uniform charge distributions and by external electric fields. The system is modeled using a tight-binding model and the Coulomb interaction is included at a mean-field level within a self-consistent calculation. The self-consistent charge profiles are calculated numerically for both insulating and low density metallic systems. Using this approach, we investigate the bending of the bulk bands due to the presence of surface states and of charged surface impurities and the effect of applying gate voltages to topological insulator films of variable thickness. Our results shed new light on the potential differences between surface- and bulk-sensitive measurements of topological insulators.

Tudor Stanescu
West Virginia University

Date submitted: 19 Nov 2010 Electronic form version 1.4