Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

**Effective field theories for topological insulators by functional bosonization** PAK ON CHAN, TAYLOR L. HUGHES, SHINSEI RYU, EDUARDO FRADKIN, Department of Physics, University of Illinois at Urbana-Champaign — Effective field theories that describe the dynamics of electric current for topological insulators in general dimension D = d+1 are discussed using the functional bosonization. For non-interacting topological insulators with a conserved U(1) charge and characterized by an integer topological invariant, we derive the BF-type topological field theories supplemented with the Chern-Simons (when D is odd) or the Axion term (when D is even). For topological insulators characterized by a Z2 topological invariant, their topological field theories are obtained by dimensional reduction. Building on this effective field theory description for non- interacting topological phases, we also discuss, following the spirit of the parton construction of the fractional quantum Hall effect, the putative "fractional" topological insulators and their possible effective field theories.

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Date submitted: 10 Dec 2012 Electronic form version 1.4