Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

**Metastable Dynamics of Topological Superfluids** MOON JIP PARK, MATTHEW GILBERT, Univ of Illinois - Urbana — Superfluid states resulting from the condensation of indirectly bound excitons arising from the attractive Coulomb coupling of electrons in one layer and holes in another spatially segregated layer have attracted a great deal of interest from both a fundamental and applied perspective due to their remarkable interlayer transport properties. Within these systems, one of the most important quantities is the critical current, the maximum interlayer current that can flow before coherence is lost. While a great deal is known about the superfluid state prior to reaching critical current, very little is known about the fate of the system after critical current. In this talk, we study non-equilibrium response of a dipolar intersurface superfluid in a 3D time-reversal invariant topological insulator using a fully time-dependent formulation of the Kadanoff-Baym equations. We find that past critical current there exist different metastable regions of intersurface voltage characterized by distinct time-dependent responses. While we will discuss the resultant physics of the metastable states present beyond the critical current within topological insulators, the physics is broadly applicable to both graphene and quantum Hall systems.

Moon Jip Park
Univ of Illinois - Urbana

Date submitted: 15 Nov 2013 Electronic form version 1.4