Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Synchronous and Asynchronous Mott Transitions in Topological Insulator Ribbons[1] AMAL MEDHI, VIJAY B. SHENOY, H.R. KRISHNAMURTHY, Center for Condensed Matter Theory, Indian Institute of Science, Bangalore 560012, India — We address how the nature of linearly dispersing edge states of two dimensional (2D) topological insulators evolves with increasing electron-electron correlation engendered by a Hubbard like on-site repulsion U. We consider finite ribbons of two systems of topological band insulators with local electronic interactions incorporated. Using an inhomogeneous cluster slave rotor mean-field method developed here, we show that electronic correlations drive the topologically nontrivial phase into a Mott insulating phase via two different routes. In a synchronous transition, the entire ribbon attains a Mott insulating state at one critical U. In the second, asynchronous route, Mott localization first occurs on the edge layers at a smaller critical value of electronic interaction which then propagates into the bulk as U is futher increased until all layers of the ribbon become Mott localized.

[1]Work supported by DAE, SRC and DST, India

Amal Medhi
Center for Condensed Matter Theory,
Indian Institute of Science, Bangalore 560012, India

Date submitted: 08 Nov 2011 Electronic form version 1.4