Condensed Matter Theory Center Seminar

Tuesday, November 3
11:00 am – 12:30 pm
2205 Toll Physics Building

Arun Paramekanti

University of Toronto

"Band topology meets correlations - from oxides to cold atoms"

Abstract: Band topology plays an important role in such unusual phases as topological insulators and semimetals. This talk will discuss the interplay of band topology and correlation effects in different systems. I will argue based on model Hamiltonians and ab initio calculations that double perovskites with strong spin-orbit coupling and high Tc ferromagnetism could host Chern bands and regimes of C=2 quantum anomalous Hall insulator (QAHI) phases in [111] thin film geometries. I will then consider models of phase transitions from QAHI to ordinary insulators, which involve quadratic band touching, and show that interactions drive an emergent dome of nematic order at such topological critical points. Finally, I will consider interaction effects in the Haldane model of a QAHI. We will see that the Mott insulating regime realizes a chiral spin liquid with gapped semions, and discuss the Chern-Simons-Higgs theory of transitions out of this liquid.

Host: Will Cole

Web: http://www.physics.umd.edu/cmtc/seminars.html

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University of Maryland