# OPEN TALK

**Thursday, 14 August 2014** **4:00 pm** **Fermion**

Speaker

**Prof. Syed R. Hassan**

Affiliation

**Institute of Mathematical Sciences, Chennai**

Title:

**Topological phases of the Kitaev-Hubbard model at half filling**

Abstract:

The Kitaev-Hubbard model of interacting fermions is defined on the honeycomb lattice and, at strong coupling, interpolates between the Heisenberg model and the Kitaev model. It is basically a Hubbard model with ordinary hopping t and spin-dependent hopping t′. We study this model in the weak to intermediate coupling regime, at half filling, using the cellular dynamical impurity approximation (CDIA), an approach related to dynamical mean field theory but based on Potthoff's variational principle. We identify four phases in the (U,t′) plane: two semimetallic phases with different numbers of Dirac points, an antiferromagnetic insulator, and an algebraic spin liquid. The last two are separated by a first-order transition. These four phases all meet at a single point and could be realized in cold atom systems.

---