GOETHE UNIVERSITÄT
FRANKFURT AM MAIN

Fachbereich Physik
Institut für Theoretische Physik

CONDENSED MATTER THEORY SEMINAR

Subject: **Kitaev model in a magnetic field: Classical spin-liquids, topological magnons and semi-classical ground-state selection**

Speaker: **Dr. Jeffrey G. Rau, MPI-PKS, Dresden**

Date & time: **Friday, December 7th, 2018 at 3.15 p.m.**

Venue: **Seminar room 1.114**

Kitaev materials have attracted attention as candidates to realize the long sought quantum spin-liquid phase. Recent efforts have considered the effects of magnetic fields that destroy any ordering, and potentially reveal a quantum spin liquid state. In this talk I will consider the physics of the Kitaev model in a magnetic field from a classical and semi-classical perspective. In the classical (anti-ferromagnetic) Kitaev model, we find that a classical spin liquid phase persists over a large window of field strength, independent of field direction. We characterize this phase using analytic arguments, a coarse-grained theory and via Monte Carlo simulations, finding the Coulomb correlations present at zero-field are immediately destroyed when the field is applied. At large fields a polarized phase appears. While the ground state is topologically trivial, we show the magnon excitations are not, with their topology having implications for thermal transport. Finally, I will discuss some preliminary results for the quantum model in the semi-classical limit, via an approach from the polarized phase and from the effects of order-by-quantum-disorder.