

Condensed Matter Theory Center Seminar



Tuesday, April 21
11:00 am – 12:00 pm
2205 Toll Physics Building

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“Phases and dynamics of correlated systems: Charge order in the cuprate superconductors and dynamic phase transitions”

The first part of the talk addresses the physics of the cuprate superconductors. I will review some recent experimental evidence for incommensurate charge order in the pseudogap phase of various compounds. Motivated by these observations, we performed a number of complementary computations to analyze charge-neutral, spin-singlet ordering in metals on the square lattice taking into account correlation effects. We examined ordering with and without time-reversal symmetry, with arbitrary wave-vector and tunable form factor. Depending on the model parameters, we find a variety of different charge ordering possibilities including ones with wave-vectors parallel to the lattice generators and a d-wave form factor. The relation of these findings to the experiments is discussed. The second part of the talk deals with the non-equilibrium dynamics of spontaneous symmetry breaking for interacting fermions motivated by experiments with ultracold atoms. Within a Keldysh perturbation theory we compute single and two-particle dynamics of fermions on a lattice after a fast interaction ramp close to a magnetic instability. This allows us to analyze the interplay of thermalization processes with the growth of unstable magnetic modes and to establish a dynamic phase diagram.

Host: Philip Brydon

Web: <http://www.physics.umd.edu/cmte/seminars.html>

