

Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

"High T_c superconductivity and non-Fermi liquid behavior near a nematic quantum critical point: a Monte Carlo study"

Samuel Lederer – Massachusetts Institute of Technology

Abstract: The Ising nematic quantum critical point (QCP) associated with the breaking of fourfold rotational symmetry in a zero temperature metal is an exemplar of metallic quantum criticality. We have carried out a minus sign-free quantum Monte Carlo study of this QCP for a two dimensional lattice model with sizes up to 24×24 sites. For sufficiently strong coupling between the fermions and the nematic bosons, high temperature superconductivity emerges near the QCP. This superconductivity condenses out of a metallic normal state with a large, temperature independent single-fermion scattering rate, and with transport properties inconsistent with Fermi liquid theory. Time permitting, I will discuss implications of these results for cuprate strange metal phenomenology, and for the field theory of quantum critical metals.

12:00pm
Tuesday, April 19, 2016
Duboc Room (4-331)

Host: Michael Pretko