Title /Abstract

Title: Scattering mechanisms and electrical transport near and Ising-nematic quantum critical point

Abstract:

Electrical transport properties near an Ising-nematic quantum critical point are of both theoretical and experimental interest. The difficulty of the problem is in part due to the fact that the electronic scattering mediated by critical fluctuations are momentum-conserving. As a result, despite destroying coherent Landau quasi-particles, critical fluctuations do not naturally lead to a finite electrical resistivity. One is led to carefully address the interplay with various current relaxation mechanisms that are absent from the low-energy theory, namely impurity scattering, umklapp scattering, and so on.
In this talk, I will first derive a generalized kinetic equation valid in a broad temperature regime near the quantum critical point. Next, I discuss several current-relaxation mechanisms and how they lead to very rich features in the temperature scaling of dc electrical resistivity beyond what has been studied in the literature. Finally I will discuss Raman scattering in the B1g channel, in particular the properties of a quasi-elastic peak due to critical fluctuations.