



center for nanophysics  
and advanced materials

# Condensed Matter Colloquium

Thursday, December 9, 2010

2 pm, Room 1201

**Ryan Gordon**

**Iowa State University,  
Ames National Laboratory**

## *London Penetration Depth Measurements in Iron-Based Superconductors*

With the recent discovery of superconductivity in different classes of iron-based materials containing elements from the pnictogen and chalcogen groups, interesting questions are posed regarding the pairing symmetry of the superconducting state, which is intimately linked to the structure of the superconducting gap. In my talk, I will present an overview of the London penetration depth measurements taken on these materials with the use of a tunnel diode resonator (TDR) circuit in order to address these questions. Emphasis will be placed on the so called “122” class of these materials of which large, high quality single crystals are available. Information about the superconducting gap structure, in particular the presence of nodes, will be inferred from the doping evolution of the experimentally determined power law form of the penetration depth, which will be compared to recent measurements of the thermal conductivity in the same series. In addition, evidence for contributions to the penetration depth data from pairbreaking scattering effects will be presented based on heavy ion irradiation studies and a comparison to the LiFeAs system, believed to be a material in the clean limit.

**Refreshments at 1:30 pm in Room 1305F**

