

Notre Dame **Science**
Department of Physics

**STABILITY IN A TURBULENT
(FERMI) SEA:
THE EVER MORE REMARKABLE
HIGH TEMPERATURE
SUPERCONDUCTORS**

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Wednesday, February 9, 2011

4:00 p.m. NSH 118

(Refreshments at 3:30 p.m. NSH 202)

For over two decades high temperature superconductivity has captured the attention of scientists the world round. However, rather than finding a simple explanation for the properties of these materials, as was done for their low temperature cousins half a century ago, intensive research has instead led to an increasingly complex picture of materials characterized by an intricate phase diagram, full of competing or coexisting states, yet still dominated by a superconducting state which persists, at least in some materials, almost half way to room temperature.

In this talk I will describe nanoscale investigations of the electronic structure of high temperature superconductors using scanning tunneling microscopy (STM). We have recently found that a still not understood high temperature phase in these materials, the pseudogap, is characterized by strong charge inhomogeneity. Surprisingly, although this disorder persists into the superconducting state, it does not seem to perturb coexisting homogeneous superconductivity. The resolution of this apparent contradiction gives new insight into the onset of superconductivity and its relationship with the pseudogap phase.

Host: Prof. Boldizar Janko

Colloquium

All interested
persons are
cordially
invited to
attend.