



Physics Colloquium

Friday, 26 March 2010, 4:00pm, PSC 3046

Patrick Longobardi

*Measuring the Transition from the Normal
to Superconducting State in Tantalum*

The existence of superconductivity in various materials has been known now for almost a full century. Materials in their superconducting state can produce very high magnetic fields and this ability has allowed them to be used in many fields of work, such as MRIs, magnetic levitation trains, particle accelerators and even electromagnetic bombs. This paper will focus on the transition from the normal state to the superconductive state in tantalum, and the magnetic and temperature dependent conditions required to bring it back to the normal state again.

Ben Jantzen

*Magnetostriction of Fe-Ga alloys after
new processing techniques*

Magnetostrictive materials, that is, materials whose dimensions change with magnetization, have important applications in sensing and actuation. Fe-Ga alloys have attracted much attention as magnetostrictive materials because they have been shown to be mechanically robust as well achieve large magnetostrictions with low saturating fields, both desired properties for these applications. We have used high resolution capacitance dilatometry to make measurements on a set of polycrystalline Fe-Ga samples. Magnetostriction of as-cast, torch melted and automatically induction melted rods will be compared. Magnetostriction is greatest in the cubic [100] direction so we hope that these processing techniques increase the alignment of the crystallites in this direction. We have also made similar magnetostriction measurements on single crystal iron and polycrystalline copper as a basis for comparison of the physical mechanisms of magnetostriction and standardization of the dilatometer. Some texture measurements have also been made on the single crystal iron and Fe-Ga samples through X-ray diffraction.