

Vortices in Superconductors – from Exotic Matter to Commercial Coated Conductors

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PRESENTATION

Condensed Matter Physics Seminar
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Speaker: Jim Thompson, UT

Title: **Vortices in Superconductors - from exotic matter to commercial coated conductors**

The phenomenon of superconductivity presently impacts on a wide range of activities from fundamental physics to advanced technology. First discovered in 1911 in elemental Hg, the more recent discovery of high temperature superconductivity in entire families of cuprate materials led to an enormous burst of activity and expectations of a rapid development of cheap machinery, transformers, power lines, etc. While these developments have proved to be much more difficult than first envisioned, the progress has been steady and perhaps accelerating.

More fundamentally, superconductors interact strongly with magnetic fields and electrical currents. The presence of a magnetic field, generated either externally or by currents flowing in the material, raises its energy. Consequently most superconductors (so-called Type II materials) permit the field to enter as discrete, quantized units of magnetic flux, i.e., as vortices. This talk will describe some basic features of vortices and vortex matter, and show that proper "doping" of the superconductor can dramatically improve its properties. Finally, I will briefly introduce some of the creative solutions being devised to fabricate superconductive wires and tapes that conduct high density currents with very low loss.

Date: Monday, March 31, 2003

Time: 12:15 pm

Location: 107 South College, UTK