



Physics Colloquium

Friday, 15 January 2010, 4:00pm, PSC 3046

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Nucleation in a Magnetic Phase Transition

Nucleation is the microscopic process by which many first order phase transitions take place. Nucleation phenomena occur all around us every day, yet our understanding of nucleation remains imperfect. We use Monte Carlo computer simulations to study the nucleation process associated with the first-order phase transition of the 2D and 3D Ising model. We will apply two distinct methods of analysis to the nucleation process and test how well each performs in the case of the low nucleation barriers found on approach to the boundary of the metastable region.

Ben Jantzen

Magnetostriction in Fe-Ga Alloys: Comparing Manufacturing 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. 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. The texture of the Fe-Ga samples will be investigated through X-ray diffraction to assess the effectiveness of the manufacturing methods in aligning crystallites.