



Physics Colloquium

Friday, January 14, 2011, 3:30 pm, PS 3046
(Note the earlier time!)

Prof. Ted Monchesky

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MnSi thin films: a potential new spintronic material

Helical magnets are one class of material where the spins spiral about a particular crystallographic direction. These materials have recently attracted the interest of the spintronics community since they present novel opportunities to control electron spin. Heterostructures consisting of thin layers of helical magnets and traditional ferromagnetics would enable injection of spin-polarized currents into helical magnets. A spin-polarized current flowing in a helical magnetic system is predicted to induce a torque that would produce new kinds of magnetic excitations. This spin-transfer torque, which enables switching of traditional ferromagnetic heterostructures, has attracted considerable attention.

I will present the structural and magnetic characterization of epitaxial MnSi layers on Si(111) to determine their suitability for spintronics studies. I will show that, the 3% lattice mismatch between MnSi(111) and the Si(111) substrate produces a positive volume strain in the film, which results in a 50% increase in the Curie temperature. Polarized neutron reflectometry shows that the magnetic structure contains both left and right-handed chiralities with a reduced helical wavelength. The results from this work identify the challenges for creating spintronics devices from these materials.

Following the talk, at 4:30 pm Prof. Monchesky will host an information session for students interested in learning about graduate programs in physics, atmospheric sciences, and meteorology at Dalhousie University. Pizza and refreshments will be provided.