

# **THE UNIVERSITY OF DENVER**

## **Department of Physics & Astronomy**

Presents

### **Dynamics in Patterned Magnetic Thin Films**

**Wednesday, January 25, 2012**

**4:00 PM**

**F.W. Olin Hall Room 105**

**2190 E. Iliff Avenue**

*Presented by*

**Dr. Kristen Buchanan**

*Department of Physics, Colorado State University*

Nanomagnets have great potential for enhancing existing technologies such as magnetic storage media and magnetic sensors and they may also find new applications in biomedicine and spintronics, devices that exploit not only the charge of the electron but also its spin. In general, the magnetic properties of ferromagnets can be understood in terms of competition among the magneto-crystalline, exchange, and magnetostatic energies due to long range dipole-dipole interactions. Confinement in nanomagnets alters their energetics, and consequently the dynamic properties of the system. Furthermore, at low magnetic fields it leads to new magnetic states, for example, magnetic vortices, which have interesting properties and provide a convenient model system for studying fundamental dynamical phenomena. We have used a combination of time- and frequency domain experimental techniques, as well as, micromagnetic calculations to explore and understand the magnetization dynamics in patterned nanomaterials. In this talk, I will discuss the dynamic properties of magnetic vortices that are often found in the ground state of magnetically soft patterned structures, including how their dynamics can be tuned through choice of geometry and static magnetic field, and the effects of increasing the amplitude of the driving magnetic field that leads to instability of the vortex core. I will also show how our new Brillouin light scattering microscope can be used to study spin wave propagation in magnetic nanowires.

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Kristen Buchanan is an Assistant Professor in the Department of Physics at Colorado State University. Previously she worked at Argonne National Laboratory, first as a postdoctoral fellow with the Materials Science Division and then as one of the first scientific staff members of the new Center for Nanoscale Materials. She earned a PhD in Physics at the University of Alberta.

**HOST: Dr. Barry Zink, (303) 871-3025, [Barry.Zink@du.edu](mailto:Barry.Zink@du.edu)**

**Join us for refreshments & follow-up discussions in Physics Building Room 116, 5:00-6:00 PM**