

**Subject:** MSD Colloquium, August 24, 11am, 200 AUDITORIUM  
**From:** Janice Coble <coble@msd.anl.gov>  
**Date:** Mon, 14 Aug 2006 15:19:20 -0500  
**To:** msd@anl.gov

**SPEAKER:** DR. ANDREAS MENZEL  
BESSY  
BERLIN, GERMANY

**TITLE:** Imaging of Magnetic Nanostructures by Resonant Soft X-Ray Holography

**DATE:** Thursday, August 24, 2006

**TIME:** 11:00 a.m.

**PLACE:** Building 200, AUDITORIUM

**HOST:** Hoydoo You

Refreshments will be served at 10:45 a.m.

**Abstract:** X-rays allow to probe electronic, chemical, and magnetic characteristics of matter. Unfortunately, x-ray imaging capabilities are still rather limited. While scattering experiments are relatively easy to realize, in general they do not allow the extraction of an image. Holography is a remedy, which allows easy image reconstruction by recording not only the intensity but also the phase of the scattered wave. Images can be produced from small-angle x-ray scattering (SAXS) patterns by simple Fourier transforms without the need of further numerical phase retrieval algorithms.

We study magnetic nanostructures with soft x-ray holography, using x-ray magnetic circular dichroism (XMCD) as contrast mechanism. We will review this imaging technique, which currently achieves a spatial resolution of ~50 nm, and present images of magnetic domain patterns in thin multilayer systems with perpendicular anisotropy. The switching behavior of patterned magnetic media, such as multilayer films deposited on polystyrene spheres of 110 nm or 58 nm diameter, has been studied by holographically measuring the magnetic state of each nanosphere. We will discuss the results of these studies as well as plans to further develop the technique.