

Subject: MS Colloquium, Liu, Thurs, 5/17, 11am, 212, A-157
From: Suzanne Kokosz <kokosz@anl.gov>
Date: Thu, 05 Apr 2007 15:35:26 -0500
To: Materials Science Division <msd@anl.gov>

SPEAKER: PROF. KAI LIU
University of California, Davis

TITLE: ³Fingerprinting Magnetic Nanostructures²

DATE: Thursday, May 17, 2007

TIME: 11:00 a.m.

PLACE: Building 212, Room A-157

HOST: Axel Hoffmann

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

Abstract:

Realistic assemblies of magnetic nanostructures inevitably have inhomogeneities, which are manifested in distributions of magnetic properties, mixed magnetic phases, different magnetization reversal mechanisms, etc. The first order reversal curve (FORC) method [1-7] is ideally suited for ³fingerprinting² such systems, both qualitatively and quantitatively. In this colloquium I will first cover the basics of the technique, and then illustrate some of its rather unique capabilities using our recent studies on a few technologically important systems, including: i). Vortex state to single-domain transition in arrays of sub-100nm Fe nanodots [7,8]; ii). Effect of hard layer crystallinity and partial demagnetization on the reversal processes of exchange spring magnets [4]; iii). Exotic magnetization reversal in Co/Pt and (Co/Pt)/Ru films with perpendicular anisotropy [3]; iv). Reversal asymmetry in exchange biased thin films [6]; and v). Nanoscale magnetic phase separation in LaSrCoO [5]. These results demonstrate that FORC is a powerful method for magnetization reversal studies, due to its capability of capturing magnetic inhomogeneities, sensitivity to irreversible switching, and the qualitative and quantitative phase information it can extract.

1. C. R. Pike, et al, JAP 85, 6660 (1999).
2. H. G. Katzgraber, et al, PRL 89, 257202 (2002).
3. J. E. Davies, et al, PRB 70, 224434 (2004).
4. J. E. Davies, et al, APL 86, 262503 (2005).
5. J. E. Davies, et al, PRB 72, 134419 (2005).
6. J. Olamit et al, APL 90, 032510 (2007).
7. R. K. Dumas et al, PRB 75, 134405 (2007).
8. K. Liu, et al. inhomogeneities, APL 81, 4434 (2002).