Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Domain pinning and disorder in Fe/Gd magnetic multilayers. JYOTI MOHANTY, ASHISH TRIPATHI, ERIK SHIPTON, KEITH CHAN, UC San Diego, SANGSOO KIM, IAN MCNULTY, Argonne National Laboratory, ERIC FULLERTON, OLEG SHPYRKO, UC San Diego — We study the evolution of magnetic domains and effect of pinning centers in thin film magnetic systems as a function of magnetic field, temperature, and dopants to identify the role the disorder in formation and stability of the domains in these systems. We have studied Fe/Gd multilayer exhibiting ordered stripes due to perpendicular magnetic anisotropy (PMA). Samples are well characterized using Polar Kerr effect and Vibrating sample magnetometry. Magnetic Force Microscopy (MFM) measurements show out-of-plane magnetized stripe domains. We study the effects of field pinning of the local magnetic structure of these systems through their magnetization hysteresis loops and their temperature driven dynamics. Using element sensitivity and depth resolution of resonant magnetic x-ray coherent scattering technique we investigate the magnetic domain structure and intermittent switching dynamics. Comparison of the magnetic speckles (in momentum space) provides information on correlation between the magnetic structures (in real space). We will present the X-ray Coherent Speckle Metrology approach to study of Barkhausen noise spectrum as a function of the applied magnetic field, and will discuss extension of this study to Tb-doped Fe/Gd magnetic films, which would induce strong PMA.

Jyoti Mohanty
UC San Diego

Date submitted: 21 Nov 2008 Electronic form version 1.4