Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

**Strain-induced magnetic domain re-configuration in magnetostrictive $Fe_{70}Ga_{30}$ thin films**[1] PARIS ALEXANDER, STEPHEN DAUNHEIMER, LOURDES SALAMANCA-RIBA, ICHIRO TAKEUCHI, JOHN CUMINGS, Department of Materials Science & Engineering, University of Maryland-College Park — It has been long understood that the magnetic order parameter in many metals carries with it a symmetry-breaking distortion of the lattice that manifests as a macroscopic strain. In the inverse effect, a strain can give a magnetic anisotropy, restructuring the magnetic domains of a ferromagnet under applied force. We use Lorentz–force transmission electron microscopy to observe magnetic domain structure dynamics induced via direct application of strain on magnetostrictive iron gallium ($Fe_{70}Ga_{30}$) thin films. Iron-gallium films are deposited on flexible free-standing membranes, and using a mechanically manipulated tip, a strain is applied to the sample. The varied hysteretic behaviors under applied magnetic and strain fields have been modeled and will be presented. Strain-mediated magnetic domain switching has previously been investigated with multiferroic devices, where the applied strain is induced from an underlying piezoelectric film introducing clamping effects, and we will extend our observations to this technologically-relevant multiferroic system.

[1]This work was supported by the NSF-MRSEC at the University of Maryland, DMR 0520471.

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Date submitted: 28 Nov 2009 Electronic form version 1.4