

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Magneto-optical mapping of the domain wall pinning potential in ferromagnetic films¹ ROBERT BADEA, JESSE BEREZOVSKY, Case Western Reserve Univ — The propagation of domain walls in ferromagnetic films is influenced by defects which suppress and pin the motion of the domain walls. We map the nanoscale effective pinning potential in a ferromagnetic film by raster scanning a single ferromagnetic vortex domain and measuring the hysteretic displacement vs. applied magnetic field.[1] We use a differential magneto-optical microscopy technique which yields spatial sensitivity of ~ 10 nm to measure the motion of the vortex domain.[2] Using a simple algorithm, we extract the effective pinning potential from the measured vortex displacement vs. applied field. The resulting effective pinning potential maps reveal different types of nanoscale pinning features which we attribute to different structural defects of the film. By comparing the pinning map to atomic force microscopy maps, we identify correlations between pinning sites and topographic features. [1] R. Badea, and J. Berezovsky, cond-mat/1510.07059, (2015). [2] R. Badea, J. A. Frey, and J. Berezovsky, Journal of Magnetism and Magnetic Materials 381, 463 (2015).

¹This work was supported by DOE, award No. DE-SC008148

Robert Badea
Case Western Reserve Univ

Date submitted: 06 Nov 2015

Electronic form version 1.4