Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Micromagnetic Modes in Magnetoelectric Thin Films[1] RALPH SKOMSKI, PRIYANKA MANCHANDA, Department of Physics and Astronomy & NCMN, University of Nebraska, PANKAJ KUMAR, School of Basic Sciences, IIT Mandi, Himachal Pradesh, India, H. FANGOHR, School of Engineering Sciences, University of Southampton, UK, D.J. SELLMYER, Department of Physics and Astronomy & NCMN, University of Nebraska, ARTI KASHYAP, School of Basic Sciences, IIT Mandi, Himachal Pradesh, India — The effect of an electric field on the anisotropy and coercivity of magnetic thin films investigated theoretically. We use numerical methods, including VASP and micromagnetic simulations, and model calculations to determine both intrinsic and extrinsic properties of metallic thin films. Emphasis is on homogeneneous thin fms and inversion-symmetric trilayers consisting of fcc Co, Pd, and Pt. The electric field redistributes electron states near the Fermi level, which has a fairly strong effect on the surface anisotropy. However, due to the inversion symmetry, the lowest-order net anisotropy of the films remains unchanged. By contrast, the electric field causes the micromagnetic nucleation mode to become spacially asymmetric, which leads to a reduction of the the nucleation field (coercivity) and — for suitably chosen nanostructures — to drastic changes in the hysteretic behavior. This nontrivial feature can potentially be exploited in magnetoelectric swuitching devices.

[1]This research is supported by DOE (BES).

Ralph Skomski
Department of Physics and Astronomy & NCMN, University of Nebraska

Date submitted: 15 Nov 2013 Electronic form version 1.4