Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

In Situ TEM Observation of Current-Induced Domain Wall Motion in Patterned Permalloy Wires[1] TODD BRINTLINGER[2], JOHN CUMINGS[3], University of Maryland — Using a transmission electron microscope (TEM) operating in Lorentz mode, we observe the movement of a domain-wall due to the flow of current in a permalloy wire. The wire is formed on electron-transparent silicon nitride membranes using standard electron beam lithography and thermal vacuum deposition. The resulting wire geometry is 30 nm thick, ∼100nm wide, and microns long. A custom-built electrical measurement stage and palladium leads deposited on top of the permalloy wires allow in situ measurements on the wire in the TEM. Lorentz mode imaging (Fresnel contrast) allows the determination of the domain wall location. We observe the domain wall to move in the direction of electron flow, with a current density of around 1 x 10^{11} A/m^2 being required to move the wall. We will present the nanofabrication process, results, and interpretation of these experiments.

[1]This work was supported by NSF MRSEC DMR 0520471 and conducted at the Maryland Nanocenter. We acknowledge the use of the NISP laboratory, a MRSEC shared equipment facility.
[2]Dept. of Materials Science and Eng.
[3]Dept. of Materials Science and Eng.

Todd Brintlinger
University of Maryland

Date submitted: 02 Jan 2008 Electronic form version 1.4