Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Individual domain wall manipulation in a local oersted circular field[1] XIAOLIN HU, Mount Holyoke College, HUAJIE KE, NIHAR PRADHAN, University of Massachusetts, YINENG SUN, Mount Holyoke College, MARK TUOMINEN, University of Massachusetts, KATHERINE AIDALA, Mount Holyoke College — Understanding domain wall (DW) motion in nanoscale ferromagnetic structures reveals intriguing physics, with potential applications in nanoscale devices and DW data storage. One challenge is to create and move individual DWs in arbitrary locations. We developed a technique to generate localized circular magnetic field by applying a current through the tip of the atomic force microscope (AFM) and thereby manipulating the state of ferromagnetic rings [1]. Now we extend our ability to control domain walls in various structures, such as straight wires with notches and zigzag wires. By placing the tip near a 180 DW in a vertex of a zigzag wire, we can move the 180 DW along the wire and form a stable 360 DW in nearby vertex. We can also move 360 DWs with the local magnetic field around the AFM tip. We will discuss simulations and experimental implementations.

[1] T. Yang, N. R Pradhan, A Goldman, A. Licht, Y. Li, M T. Tuominen and K. E. Aidala, Applied Physics Letter, http://apl.aip.org/resource/1/applab/v98/i24/p242505_s1 98, 242505, (2011)

[1]NSF grant No. DMR-0906832, DMR-097201DMR-097201, NSF Center for Hierarchical Manufacturing (CMMI- 0531171). Simulations were performed with the facilities at the Center for Nanoscale Systems (CNS) (NSF award ECS-0335765).

Xiaolin Hu
Physics Department, Mount Holyoke College

Date submitted: 18 Nov 2011 Electronic form version 1.4