Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

360 ° domain wall formation in ferromagnetic nanorings in an applied azimuthal field ABBY GOLDMAN, Mount Holyoke College, TIANYU YANG, MARK TUOMINEN, University of Massachusetts, Amherst, KATHY AIDALA, Mount Holyoke College — Ferromagnetic nanorings form unique magnetic states that hold tremendous promise for maximizing storage densities. One such state is the vortex state, in which the magnetic field is completely enclosed within the ring, though it is challenging to control the chirality. We study a straightforward method to control the clockwise or counterclockwise chirality using an azimuthal field, as if from a current carrying wire passing through the center of the ring. Our simulations predict the formation of 360 ° domain walls during switching of 5 nm thick rings in a variety of geometries. The number and location of the domain walls depends on the ring geometry. We explore the reason 360 ° domain walls form for different widths, asymmetries, and sizes. Experimental implementation is underway to confirm computational predictions. The micromagnetic simulations are performed using OOMMF, Object Oriented Micro Magnetic Framework, a public domain program distributed by NIST to study the evolution of magnetic states with the application of a circular magnetic field.

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Date submitted: 07 Dec 2009 Electronic form version 1.4