Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Driven dynamic mode-splitting of magnetic vortices[1] KRISTEN BUCHANAN, MARCOS GRIMSDITCH, FRANK FRADIN, SAM BADER, VAL NOVOSAD, Center for Nanoscale Materials and Materials Science Division, Argonne National Laboratory — It has been established theoretically and experimentally that a magnetic vortex in restricted geometry possesses a translational excitation that corresponds to circular motion of the vortex core at a characteristic frequency. Here we explore the effect of increased driving-field amplitude on this dynamic mode using a microwave reflection technique. We find a new effect - the vortex translational eigenmode splits into two peaks. The splitting in frequency is >25% for driving magnetic fields <25 Oe for micron-sized permalloy ellipses that are 40-nm thick. Splitting effects were detected for driving fields as low as 3 Oe in circular dots. Micromagnetic modeling suggests this effect could be indicative of nonlinear fold-over but further theoretical work will be required to develop a full understanding of these observations.

[1]This work was supported by DOE contract number DE-AC02-06CH11357. We acknowledge stimulating discussions with K. Guslienko.

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Date submitted: 22 Nov 2006 Electronic form version 1.4