Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Ferromagnetic Resonance Imaging using a submicron localized spin wave mode[1] INHEE LEE, YURI OBUKHOV, GANG XIANG, ADAM HAUSER, FENGYUAN YANG, PALASH BANERJEE, DENIS PELEKHOV, P. CHRIS HAMMEL, The Ohio State University — Ferromagnetic Resonance Force Microscopy (FMRFM) is a highly sensitive spectroscopic tool for the study of nanoscale ferromagnets. Nanoscale imaging of buried or multi-component ferromagnetic systems requires a mechanism for defining the localized volume under study. Recently, we have discovered a new approach that employs the strong, nonuniform magnetic field of the micromagnetic probe tip aligned anti-parallel to magnetization in sample to localize FMR modes. The highest resolution obtained in our experiment is 200 nm with relatively large probe ($\sim$ 1.2 x 1.2 x 1.5 μm^3) and probe-sample separation ($\sim$ 1.3 μm), showing sub-surface scanning capability. We have imaged the non-uniform demagnetizing field of an individual 5 μm Permalloy disk and the variation of the internal magnetic field in the Permalloy film with high sensitivity ($\sim$ 1 Gauss/Hz$^{1/2}$) in the small volume $\sim$ 200 x 200 x 40 nm^3. Our method presents a technique for exploring nanoscale magnetism and spin dynamics in inhomogeneous magnetic fields.

[1]This work was supported by the U.S. Department of Energy through Grant No. DE-FG02-03ER46054.

Inhee Lee
The Ohio State University

Date submitted: 19 Nov 2009 Electronic form version 1.4