Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Spin dynamics in patterned nanometer-thick yttrium iron garnet films[1] MATTHIAS BENJAMIN JUNGFLEISCH, WEI ZHANG, WANJUN JIANG, STEPHEN M. WU, JOHN E. PEARSON, ANAND BHATTACHARYA, AXEL HOFFMANN, Argonne National Laboratory, JOSEPH SKLENAR, JOHN B. KETTERSON, Northwestern University, HOUCHEN CHANG, MINGZHONG WU, Colorado State University — We present experimental investigations on the propagation of spin-wave modes in micro-structured yttrium iron garnet (YIG) stripes.[1] The stripes were patterned by photo-lithography from high-quality 40-nm-thick YIG films grown by sputtering.[2] Magnetization dynamics is driven by the rf field of a shorted coplanar waveguide patterned onto the YIG stripes. The propagation of spin waves are detected by means of spatially-resolved Brillouin light scattering microscopy. The propagation distance of spin waves is determined in the linear regime, where an exponential decay of 10 μm is observed. The estimated Gilbert damping parameter extracted from the spin-wave decay length is 3 times larger than that obtained through ferromagnetic resonance measurements in unstructured films, which is possibly due to enhanced two-magnon scattering in the patterned films. Furthermore, studies on the spin dynamics driven by spin-torque ferromagnetic resonance in YIG/Pt bilayers and the corresponding spatially-resolved spin-wave distribution are presented. [1]M. B. Jungfleisch, *et al.*, J. Appl. Phys., in press. [2]H. Chang, *et al.*, IEEE Magn. Lett. **5**, 6700104 (2014).

[1]This work was supported by Department of Energy, Office of Science, Materials Science and Engineering Division, the Army Research Office, and National Science Foundation.

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Date submitted: 14 Nov 2014 Electronic form version 1.4