Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Spin-torque ferromagnetic resonance (ST-FMR) spectroscopy of localized spin wave modes engineered by applied dipole-field localization CHI ZHANG, YONG PU, SERGEI A. MANUILOV, DENIS V. PELEKHOV, P. CHRIS HAMMEL, The Ohio State University — Maintaining efficient spin-Hall anti-damping torque in micron-scale devices is challenging near the critical current for auto-oscillation, likely due to spin wave mode degeneracies and nonlinear magnon scattering between them [1]. Localized spin wave modes confined by the strongly inhomogeneous dipole magnetic field of a nearby micro-spherical magnet [2] provides a potentially powerful tool to study these multi-mode interactions by allowing systematic tunability while avoiding potential spurious effects arising from imperfections in fabricating microscopic structures. We demonstrate electrical ST-FMR detection of well-resolved localized modes in a Py/Pt stripe. We find that magnon spectral engineering by means of a micromagnetic particle enables clear observation of damping control and significant reduction of linewidth by means of the anti-damping torque arising from an imposed DC current. The observed linewidth variation suggests that localized modes can be controlled as effectively as the uniform mode. References: [1] V. E. Demidov et al, Phys. Rev. Lett. 107, 107204 (2011) Z. Duan et al, Nat. Commun. 5, 5616 (2014) [2] I. Lee et al., Nature 466, 845 (2010) H.-J. Chia et al., Phys. Rev. Lett. 108, 087206 (2012)

Chi Zhang
The Ohio State University

Date submitted: 06 Nov 2015 Electronic form version 1.4