Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Elastically driven ferromagnetic resonance in nickel thin films M. WEILER, C. HEEG, H. HUEBL, R. GROSS, S.T.B. GOENNENWEIN, Walther-Meißner-Institut, Bayerische Akademie der Wissenschaften, 85748 Garching, Germany, L. DREHER, M.S. BRANDT, Walter Schottky Institut, TU München, 85748 Garching, Germany — Due to magneto-elastic coupling, magnetic degrees of freedom are influenced by elastic deformation. We here demonstrate that the magneto-elastic interaction of a radio frequency (RF) surface acoustic wave (SAW) with a ferromagnetic thin film enables an all-elastic excitation and detection of ferromagnetic resonance (FMR). We have measured the SAW magneto-transmission at room temperature in Ni/$LiNbO_3$ hybrid devices as a function of SAW frequency, external magnetic field magnitude and orientation. Our data are consistently described by a modified Landau-Lifshitz-Gilbert approach [1], in which the magnetization precession is not driven by a conventional, external RF magnetic field, but rather by a purely virtual, internal tickle field stemming from RF magneto-elastic interactions. This causes a distinct magnetic field orientation dependence of elastically driven FMR, which we observe in both simulations and experiment.
This work is financially supported by the Deutsche Forschungsgemeinschaft via project GO 944/3-1, SFB 631, and the excellence cluster Nanosystems Initiative Munich (NIM).
[1] M. Weiler *et al.* arXiv:1009.5798

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Date submitted: 22 Nov 2010 Electronic form version 1.4