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Generating Damon-Eshbach Spin Waves in Py using a Conducting Diffraction Grating J. SKLENAR, Northwestern University, V.S. BHAT, L. DELONG, University of Kentucky, Lexington, J.B. KETTERSON, Northwestern University — We have patterned silver hole arrays directly on top of uniform permalloy (Py) films. Typical Py and Ag film thicknesses are 25nm and 40 nm respectively; the holes in the Ag have a 500nm diameter and are patterned on a 1 micron lattice constant. We have measured resonant modes arising from a quasi-uniform microwave excitation field, applied in the plane of the sample, as a function of the in-plane external field and the in-plane field orientation relative to the principal axes of the array. Measurements were done using our broadband meanderline-based ferromagnetic resonance (FMR) spectrometer.[1] In addition to a uniform FMR mode we observe satellite modes that correspond to the Damon-Eshbach spin waves[2] with wave vectors having Fourier components of the reciprocal lattice of the silver array. Hence, in an otherwise uniform magnetic film the silver array acts as a *diffraction grating* which excites spin waves with $k \neq 0$ from the dynamic $k \approx 0$ microwave magnetic field. The observed spin wave angular dispersion is in excellent agreement with a magnon dispersion relation for spin waves in a uniform film given by Kriesel et al.[3]

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