

Abstract Submitted
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Ferromagnetic Resonance in CoFeB Ultrathin Films with Perpendicular Anisotropy¹ DAVID ELLSWORTH, LEI LU, MINGZHONG WU, Colorado State Univ, DING-SHUO WANG, CHIH-HUANG LAI, National Tsing Hua University, Hsinchu, Taiwan — Magnetic ultrathin films with perpendicular anisotropy have potential applications in high-density, fast-switching magnetic memories. This presentation reports on ferromagnetic resonance (FMR) in CoFeB films which are only 1 nm thick and have strong perpendicular magneto-crystalline anisotropy. The samples were a multi-layered structure of Si/SiO₂/Pd(3nm)/CoFeB(1nm)/MgO(1.6nm)/Pd(3nm). The FMR measurements were carried out by placing the film sample on a co-planar waveguide (CPW), magnetizing the film with an out-of-plane magnetic field, and measuring the transmission coefficients of the film/CPW structure with a vector network analyzer. The measurements were conducted over a frequency range of 10-33 GHz. The fitting of the measured FMR field vs. frequency responses with the Kittel equation yielded effective anisotropy fields that were close to the values obtained from the hysteresis loop measurements of the films. The linear fitting of the FMR linewidth vs. frequency responses gave rise to an effective Gilbert damping constant range of 0.01-0.02. The fitting also indicated a strong contribution (200-500 Oe) to the FMR linewidth from long-range film inhomogeneity.

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