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Properties of easy-plane/ perpendicular magnetic anisotropy bilayers with varied interlayer exchange coupling[1] LORENZO FALLARINO[2], VOLKER SLUKA, Department of Physics, New York University, New York, NY 10003, USA., BARTEK KARDASZ, MUSTAFA PINARBASI, Spin-Transfer Technologies Inc., Freemont, CA 94538, USA., ANDREW D. KENT, Department of Physics, New York University, New York, NY 10003, USA. — We explore the possibility of an easy-cone ground state in coupled easy plane/easy axis magnetic bilayers. The samples consist of a Co/Ni multilayer with perpendicular magnetic anisotropy and a CoFe layer with easy-plane anisotropy separated by a variable thickness Ru layer. Using ferromagnetic resonance spectroscopy, we characterize the magnetic behavior of the coupled thin films for different Ru thicknesses by determining the resonance fields for both the acoustic and optical FMR modes. In particular, we observe a gap in the resonance field opening up between the two modes in angular-dependent FMR, which is direct evidence for the presence of interlayer coupling. Quantitative comparisons with a theoretical model indicate that by varying the Ru thickness the coupling strength can be tuned continuously from ferromagnetic to the anti-ferromagnetic. These results are consistent with a canted magnetic ground state in zero field, a state of interest for applications in spin-torque devices, such as current tunable spin-torque oscillators.

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