

Abstract Submitted
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Oscillatory Exchange Bias in Fe/Cr Bilayers J.S. PARKER, L. WANG, P.A. CROWELL, C. LEIGHTON, University of Minnesota — We have measured the magnetization of Fe(001),50 Å/Cr(001), t_{Cr} (Å) bilayers grown on MgO(001) using the magneto-optical Kerr effect (MOKE). Samples were grown by UHV dc magnetron sputtering at 400 C with a wedge of Cr ($t_{Cr} = 0-1000$ Å) on top of a 50 ÅFe layer. Structural characterization of the films was performed by grazing incidence X-ray diffraction (GIXRD), wide angle XRD, and atomic force microscopy (AFM). We observe small (~ 1 Oe) periodic oscillations (~ 70 K period) in the exchange bias field (H_E) as a function of temperature below the blocking temperature ($T_B \sim 300$ K), which is attributed to variations in the wavelength, Λ , of the incommensurate spin density wave (SDW) spin structure in the antiferromagnetic Cr layer. Using scanning MOKE we have measured and compared the change in oscillation period for different t_{Cr} in a single bilayer. We observe a peak in the coercive field as a function of temperature for thicker Cr layers. This effect may be related to the spin-flip transition between longitudinal and transverse spin density waves in the Cr layer. *Research supported by the NSF MRSEC program under DMR-0212032.

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