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Graded Magnetic Anisotropy in Co/Pd Multilayers B. J. KIRBY, J. E. DAVIES, National Institute of Standards and Technology, S. M. WATSON, R. D. SHULL, J. A. BORCHERS, National Institute of Standards and Technology, G. T. ZIMANYI, KAI LIU, University of California - Davis — As the magnetic recording industry looks beyond perpendicular recording, multilayered exchange coupled media have demonstrated potential for increased storage density. Recent work has shown further enhancements when the anisotropy is gradually increased from a soft top to a hard bottom region.[1] However, creating graded anisotropy structures is difficult, and convincingly demonstrating such a gradient is also challenging. Since the coercivity of Co decreases with increasing thickness, we attempted to create graded anisotropy structures by sputtering [Co/Pd] superlattices with progressively varying Co layer thicknesses. We probed the depth dependent anisotropy of the samples using polarized neutron reflectometry (PNR), a technique sensitive to the depth-dependent magnetic composition of thin films. The sample magnetization vector M was bent away from the out-of-plane easy axis direction by an applied magnetic field H, and the depth profile of the in-plane component of M(H) was measured. Our results clearly demonstrate that samples with graded Co thickness also exhibit graded anisotropy. Further, comparisons of samples with different levels of gradient discretization shed light on the nature of the interlayer exchange coupling in a graded anisotropy system. [1] D. Suess, Appl. Phys. Lett. 89, 189901 (2006).

B. J. Kirby
National Institute of Standards and Technology

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