

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Magnetization reversal of surface and subsurface Co/Pt multilayers in a porous matrix** B.J. KIRBY, NIST, M.T. RAHMAN, Univ. of Minnesota, R.K. DUMAS, Univ. of Gothenberg, J.E. DAVIES, NVE Corp., KAI LIU, Univ. of California - Davis, C. LAI, Tsing Hua Univ. — Deposition of magnetic multilayers onto porous host matrices has been studied as a simple and cost-effective method for fabrication of nano-patterned magnetic arrays [1]. For such structures, the magnetic reversal properties of the surface multilayer are twofold dependent on the size and depth of the host pores. First, the pore size determines the lateral size of the surface multilayer with respect to that of a single domain. Second, the pore size determines the amount and location of magnetic material within the pore - material that can exchange couple to the surface multilayer. To study these effects, we have used polarized neutron reflectometry to measure the structural and field-dependent magnetic depth profiles of a series of Co/Pt multilayers deposited on nanoporous alumina (diameter: 13, 20, or 28 nm). Despite the film porosity, we observe robust spin-dependent reflectivities, providing strong sensitivity to interfaces throughout the structure. The determined nuclear profiles show impressive agreement with cross-sectional transmission electron microscopy, and the magnetic profiles feature clearly distinct surface and subsurface magnetizations. The surface magnetization reversal and the role of exchange coupling will be discussed. [1] M. T. Rahman, et al., APL. 94, 042507 (2009).

B. J. Kirby  
NIST

Date submitted: 30 Dec 2010

Electronic form version 1.4