Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Transition Layers in Co Films on Cu with Oxygen as Interface Surfactant Probed by Soft-X-Ray Resonant Magnetic Scattering (SXRMS) ZHIWEI LI, ERIC WIEDEMANN, DON SAVAGE, MAX LAGALLY, Mat. Sci. Program, Univ. of Wisconsin-Madison — Understanding the effect of surfactants on the magnetic properties of thin films is critical to understanding such diverse phenomena as spin-dependent transport (e.g., giant magnetoresistance [GMR]) and coupling between magnetic films. Interfacial morphology in ferromagnetic [FM] materials may be characterized as a combination of chemical and magnetic boundaries. Previous work by Kelly [1] and Barnes [2], used the diffusely scattered component of SXRMS to compare the magnetic and chemical roughness of the upper interface of 70 A Co films that were either bare or Fe-capped. The chemical and magnetic upper boundaries within the Co differed in the absence of an adjoining Fe layer, due to a transition layer of spins that do not follow applied magnetic fields. Although the bottom interface contributed very little to the resultant scattering, its relative contribution could not be resolved. By performing specular SXRMS over a wide range of incident angles, we are able to determine a depth profile of the magnetization in 30A thick Co films. The 30 A Co was sputter deposited on a 100ÅCu/Si substrate. The Cu is partly deposited using oxygen as surfactant. We find a difference in the thickness of the magnetic transition layer in films grown with and without oxygen. [1] J.J. Kelly IV, et al. J. Appl. Phys. v.91 pp.9978-9986 (2002). [2] B.M. Barnes, Z. Li et. al J. Appl. Phys. **95**, 6654 (2004) Funding provided by ONR. Funding for the Synchrotron Radiation Center provided by NSF under Award No. DMR-0084402

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Date submitted: 22 Mar 2013 Electronic form version 1.4