Abstract Submitted
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Interfacial Structure of Fe-GaAs(001) with annealing and substrate surface morphology[1] RYAN PHILIP, JONG-WOO KIM, Ames Laboratory, PAUL MICELLI, University of Columbia-Missouri, JUSTIN SHAW, National Institute of Standards and Technology, CHARLES M. FALCO, University of Arizona — The primary obstacle confronting 'spintronics' is the inability to efficiently create spin resolved current within a semiconductor. There are two leading approaches, create a magnetic semiconductor with a Tc above room temperature, as yet elusive and the ability to inject a spin current from a transition metal film into a semiconductor. The issue at hand in the latter is the 'spin scattering' interface between the overlayer and substrate. This has led to many studies to understand the magnetic evolution of very thin transition metal films on semiconductor substrates, most notably Fe on GaAs. Here we will report on the recent and ongoing high flux grazing X-Ray diffraction studies of in-situ grown Fe films on prepared GaAs(001) surfaces at the Advanced Photon Source. Extended specular diffraction data has been fit with kinimatic calculations to model the vertical structure of the film and interface. In plane grazing diffraction investigates the in-plane Fe relaxation process. This data has been coupled with pregrown Al capped Fe films also on GaAs(001) prepared at University of Arizona. The films have been annealed at incremental temperatures and have been studied with BLS in order to correlate the magnetic in–plane anisotropic nature with the in-plane film strain.

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