Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Ferromagnetic-Semiconductor Interfacial Order Suppression: Self Assembled Fe_3Ga Island Structures on GaAs(001) PHILIP RYAN, JONG WOO KIM, Ames Laboratory, JUSTIN SHAW, National Institute of Standards and Technology, CHARLES FALCO, University of Arizona, LAHSEN ASSOUFID, RICHARD ROSENBERG, DAVID KEAVNEY, Argonne National Laboratory, AMES LABORATORY TEAM, NIST COLLABORATION, UNIVERSITY OF ARIZONA COLLABORATION, ARGONNE NATIONAL LABORATORY COLLABORATION — The practical development of spintronics requires a new class of multifunctional microelectronic components, involving electronic device mechanisms dependent upon ferromagnetic materials. The Fe-GaAs(001) system has been extensively studied as the prototypical spin injection junction for spintronic device mechanisms. Increasing spin injection efficiency has been calculated to be dependent upon the structural order of an abrupt interfacial junction between a ferromagnet and semiconductor. Room temperature low coverage Fe deposition on GaAs(001) reveals the formation of fully strained, epitaxial Fe_3Ga domains. An iron interfacial layer adheres fully coherent to the buried substrate surface. The adlayer is mediated through the back-bonding of the Fe to substrate terminating As. This structural environment is tied to the suppression of interfacial order.

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Date submitted: 29 Nov 2008 Electronic form version 1.4