Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Controlling Exchange Bias in FeMn with Cu IGOR V. ROSHCHIN, DOGAN KAYA, PAVEL N. LAPA, Texas A&M University, PRIYANGA JAYATHILAKA, HILLARY KIRBY, CASEY W. MILLER, University of South Florida —
One of the puzzles of exchange bias (EB) that remains unsolved is the origin and role of uncompensated magnetization (UM) in the antiferromagnet (AF). We offer a way of controlling the *intrinsic* EB in FeMn by growing it in contact with Cu. The multilayers of Ta(5 nm)/[Cu(5 nm)/FeMn($\boldsymbol{t}$)]$_{10}$/Ta(5 nm) with 5 nm $<\boldsymbol{t}<$15 nm are deposited by RF and DC magnetron sputtering on top of Si/SiO_2. The hysteresis loops at 10 K for field-cooled Cu/FeMn multilayers are EB-shifted, while the samples without Cu exhibit no EB. Unlike the "classical" EB observed at the interface of AF-ferromagnet (FM) bilayer systems, this EB is "intrinsic" to this system with no separate FM layer. The exchange bias field, H_{E} scales with the inverse thickness of FeMn. This fits Malozemoff's model,[1] where the thickness of the FM is replaced with the thickness of FeMn, which supports that the role of the FM is played by the UM which scales with the thickness of the FeMn film. Coercivity (H_{C}) and H_{E} dependences on the FeMn thickness and temperature are similar to those for Cu/FeMn/Co samples. [2] This suggests that the *intrinsic* EB in Cu/FeMn may be determining the EB in AF-FM samples. The role of Cu in the intrinsic EB in FeMn will be discussed. Work is supported by TAMU-CONACyT Collaborative Research Program, and by NSF (at USF).

[1]A. P. Malozemoff, Phys. Rev. B **35**, 3679 (1987), **37**, 7673 (1988).
[2]B. T. Bolon, *et al.*, J. Magn. Magn. Mat. **309**, 54 (2007).

Igor V. Roshchin
Texas A&M University

Date submitted: 09 Nov 2012 Electronic form version 1.4