Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Detection of Pinned Uncompensated Magnetization in Antiferromagnet Using Magnetotransport and Polarized Neutron Reflectometry. PAVEL N. LAPA, Argonne Nat. Lab., Texas A&M Univ., IGOR V. ROSHCHIN, Texas A&M Univ., ARTUR GLAVIC, HAILE AMBAYE, VALERIA LAUTER, Oak Ridge Nat. Lab., K. D. BELASHCHENKO, Univ. of Nebraska-Lincoln, TATIANA EGGERS, Univ. of S. Florida, CASEY W. MILLER, Univ. of South Florida, JUNJIA DING, JOHN. E. PEARSON, VALENTINE NOVOSAD, J. S. JIANG, AXEL HOFFMANN, Argonne Nat. Lab. — Pinned uncompensated magnetization (PUM) in an antiferromagnet (AF) is a keystone of exchange bias and future AF-based spintronic devices. Using magnetotransport and polarized neutron reflectometry (PNR) measurements, PUM is studied in Cu/FeMn/Cu AF-only exchange bias system. For spin valves composed of ferromagnetic (permalloy) and AF (FeMn) layers separated by a conducting buffer (Cu), angular dependence of the resistance is measured in external magnetic field. Scattering on the PUM in the AF yields giant magnetoresistance (GMR) which is used for a quantitative estimate of the PUM in different magnetic fields and at different temperatures. We detected PUM only at the interface of FeMn with the bottom Cu layer. Amazingly, it survives in 110 kOe magnetic field. This is an evidence that the PUM is a part of the staggered AF spin structure of FeMn. The correlation between the results obtained using magnetometry, PNR, and magnetotransport techniques will be discussed. Work is supported by Texas A&M Univ., US DOE MSE (ANL) and BES SUE (ORNL-SNS), NSF-CAREER (USF, RIT), NSF DMR MRSEC (UNL).

Pavel N. Lapa
Argonne Nat. Lab., Texas A&M Univ.

Date submitted: 11 Nov 2016 Electronic form version 1.4