Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Electric Field and Structural Phase Transition Induced Magnetization Effects in BaTiO3-FeRh Heterostructures Probed using Polarized Neutron Reflectometry[1] STEVEN BENNETT, THOMAS WARD, MICHAEL BIEGALSKI, Oak Ridge National Laboratory, TONY WONG, The University of Tennessee, ZHIQI LIU, HAILE AMBAYE, ARTUR GLAVIC, VALERIA LAUTER, Oak Ridge National Laboratory — The ability to change the magnetic state of a material with an electric field opens up a plethora of possible devices in spintronics and memory applications. A strong candidate material for such a control is FeRh, whose magneto-structural phase transition from antiferromagnetic (AFM) to ferromagnetic (FM) at T≈350K, has shown to be controllably changed by an electric field when grown on ferroelectric BaTiO3 (BTO). It has been suggested that this shift is largely due to the -0.47% in plane compressive strain induced by the piezoelectric BTO. Here we show a sharp repeatable change in magnetization as the system is heated/cooled through the tetragonal to orthorhombic (280-290K) and orthorhombic to rhombohedral (180-205K) crystalline phase transitions of BTO. To further characterize the effect polarized neutron reflectometry (PNR) was used to evolve the depth profile of magnetization in FeRh within the temperature vicinity of these transitions with and without the application of electric field.

[1]This work was carried out at the Center for Nanophase Materials Sciences (CNMS) and the Spallation Neutron Source (SNS) supported by the Scientific User Facilities Divisions, Office of Basic Energy Sciences, DOE

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Date submitted: 17 Nov 2014 Electronic form version 1.4