Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Engineered spatial inversion symmetry breaking in an oxide hetero-structure built from isosymmetric room temperature magnetically ordered components JOHN CLARIDGE, JONATHAN ALARIA, MATTHEW DYER, MATTHEW ROSSEINSKY, PAVEL BORISOV, TROY MANNING, University of Liverpool, SERBAN LEPADATU, MARKYS CAIN, National Physical Laboratory, ELENA MISHINA, NATALIA SHERSTYUCK, N.A. ILYIN, Moscow State Technical University, JOKE HADERMANN, EMAT Antwep, DAVID LEDERMAN, West Virginia University — The oxide heterostructure $[(YFeO_3)_5(LaFeO_3)_5]_{40}$,which is magnetically ordered and piezoelectric at room temperature, has been constructed from two weak ferromagnetic $AFeO_3$ perovskites with different A cations using RHEED-monitored pulsed laser deposition. The polarisation arises by combining ordering on the A site, imposed by the periodicity of the grown structure, with appropriate orientations of the octahedral tilting, according to simple symmetry-controlled rules. Magnetization and MOKE measurements show that the heterostructure's magnetic structure is similar to that of the individual components. Evidence of the polarity was obtained from second harmonic generation and piezoelectric force microscopy measurements. Modeling of the piezoresponse allows extraction of d^{33} (approximately 10 pC/N) of the heterostructure, which is in agreement with DFT calculations.

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Date submitted: 15 Nov 2013 Electronic form version 1.4