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**Electric field control of the magnetic order parameter of magnetic pillars embedded in a ferroelectric matrix** MICHAEL FITZSIMMONS, Oak Ridge National Lab, Q WANG, Argonne National Lab, A CHEN, T LOOKMAN, Q.X. JIA, Los Alamos National Lab, D.A. GILBERT, J.A. BORCHERS, NIST, B HOLLADAY, S SINHA, UCSD — Using polarized beam small angle neutron scattering (SANS) we quantitatively measured the influence of an electric field on correlation of magnetism in a ferroelectric/ferrimagnetic nanocomposite. The nanocomposite consists of ˜12 nm wide pillars of $CoFe_2O_4$ (dark regions, inset figure left), a room temperature ferrimagnet, embedded in a ferroelectric, $BaTiO_3$, matrix (light regions, inset figure right). We used a model-free method to extract the correlations of the magnetic structure from the SANS data (figure below). We found a 700 kV/cm electric field induced a change of magnetization of ˜2% (scattering geometry, inset figure left). We explain our results using a simple representation for free energy that attributes coupling between electric polarization and magnetic order parameters to strain.

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