Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Electric Field Controlled Magnetism in $BiFeO_3$/Ferromagnet Films M.B. HOLCOMB, Y.H. CHU, L.W. MARTIN, M. GAJEK, J. SEIDEL, R. RAMESH, UC Berkeley, A. SCHOLL, Advanced Light Source, LBNL, A. FRAILE-RODRIGUEZ, Swiss Light Source, PSI — Electric field control of magnetism is a hot technological topic at the moment due to its potential to revolutionize today's devices. Magnetoelectric materials, those having both electric and magnetic order and the potential for coupling between the two, are a promising avenue to approach electric control. $BiFeO_3$, both a ferroelectric and an antiferromagnet, is the only single phase room temperature magnetoelectric that is currently known. In addition to other possibilities, its multiferroic nature has potential in the very active field of exchange bias, where an antiferromagnetic thin film pins the magnetic direction of an adjoining ferromagnetic layer. Since this antiferromagnet is electrically tunable, this coupling could allow electric-field control of the ferromagnetic magnetization. Direction determination of antiferromagnetic domains in BFO has recently been shown using linear and circular dichroism studies. Recently, this technique has been extended to look at the magnetic domains of a ferromagnetic grown on top of BFO. The clear magnetic changes induced by application of electric fields reveal the possibility of electric control.

Mikel Holcomb
UC Berkeley

Date submitted: 30 Nov 2007 Electronic form version 1.4