

Abstract Submitted  
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**Exchange coupling in permalloy/BiFeO<sub>3</sub> heterostructures**<sup>1</sup> JOHN HERON, University of California, Berkeley, CHEN WANG, Cornell Universtiy, DAVID CARLTON, UC, Berkeley, MARK NOWAKOWSKI, UC, Santa Barbara, MARTIN GAJEK, UC, Berkeley, DAVID AWSCHALOM, UC, Santa Barbara, JEFF BOKOR, UC, Berkeley, DAN RALPH, Cornell University, R. RAMESH, UC, Berkeley — BiFeO<sub>3</sub> is a ferroelectric and antiferromagnetic multiferroic with the ferroelectric and antiferromagnetic order parameters coupled at room temperature. This coupling results in the reorientation of the ferroelectric and magnetic domains as applied voltages switch the electric polarization. Previous studies using ferromagnet/BiFeO<sub>3</sub> heterostructures have shown that the anisotropy of the ferromagnetic layer can be tuned by the ferroelectric domain structure of the BiFeO<sub>3</sub> film [1, 2]. The physical mechanism driving this exchange bias with BiFeO<sub>3</sub> is still under investigation. We use patterned permalloy structures, with varying aspect ratios, on BiFeO<sub>3</sub> thin films to investigate the physics of this interaction. The results of our studies using MFM, PEEM, and MOKE to understand this mechanism as a means to electric field control of magnetic structures will be presented.

[1] H. Bea et al., Physical Review Letters 100, 017204 (2008).

[2] L.W. Martin et al., Nanoletters 8, 2050 (2008).

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