

Abstract Submitted  
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**Positive Exchange Bias in GdFe/NiCoO Thin Films**<sup>1</sup> JUSTIN OLAMIT, KAI LIU, UC Davis — Thin films of GdFe/NiCoO are one of the few systems that exhibit positive exchange bias [1-4]. In this study, we show that the positive bias in Gd<sub>x</sub>Fe<sub>1-x</sub>/NiCoO is sensitive to the GdFe composition and the field cooling sequence. In particular, the hysteresis loops are often bifurcated due to the existence of multiple phases: a low anisotropy phase with a single reversal in small fields and a higher anisotropy phase with a single or double loop, depending on the GdFe stoichiometry. In Fe-rich samples, increasing the cooling field causes the low anisotropy phase to shift from negative to positive bias and the double-loop high anisotropy phase to shift toward negative bias. In Gd-rich samples, the low anisotropy phase is always positively biased and the single-loop high anisotropy phase is always negatively biased for all cooling field strengths. These behaviors are a result of the parallel and antiparallel couplings between different magnetic phases of GdFe with the NiCoO layer. [1] J. Nogues, *et al.*, Phys. Rev. Lett. **76**, 4624 (1996). [2] S. Mangin, *et al.*, Phys. Rev. B **68**, 140404 (2003). [3] X. Ke, *et al.*, Appl. Phys. Lett. **84**, 5458 (2004). [4] D. Z. Yang, *et al.*, Phys. Rev. B **71**, 144417 (2005).

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