

Abstract Submitted
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Voltage Control of Exchange Bias in a Chromium Oxide Based Thin Film Heterostructure¹ WILL ECHTENKAMP, MIKE STREET, ATHER MAHMOOD, CHRISTIAN BINEK, Univ of Nebraska - Lincoln — Controlling magnetism by electrical means is a key challenge in the field of spintronics, and electric control of exchange bias is one of the most promising routes to address this challenge. Isothermal electric control of exchange bias has been achieved near room temperature using bulk, single crystal, magnetoelectric Cr₂O₃[1,2]. In this study the electrically-controlled exchange bias is investigated in an all thin film Cr₂O₃/PdCo exchange bias heterosystem where an MBE grown ferromagnetic and perpendicular anisotropic Pd/Co multilayer has been deposited on a PLD grown (0001) Cr₂O₃ thin film. Prototype devices are fabricated using lithography techniques. Using a process of magnetoelectric annealing, voltage control of exchange bias in Cr₂O₃ heterostructures is demonstrated with significant implications for scalability of ultra-low power memory and logical devices. In addition, the dependence of the exchange bias on the applied electric and magnetic fields are independently studied at 300K and isothermal voltage-controlled switching is investigated. [1] Xi He, et. al., Nature Mater.9, 579585 (2010). [2] W. Echtenkamp and Ch. Binek, Phys. Rev. Lett. 111, 187204 (2013).

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Will Echtenkamp
Univ of Nebraska - Lincoln

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