

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Enhanced magneto-ionic switching of interface anisotropy in Pt/Co/GdOx films AIK JUN TAN, UWE BAUER, GEOFFREY BEACH, Massachusetts Inst of Tech-MIT, BEACH GROUP TEAM — Voltage control of magnetic anisotropy is of great interest for reducing the switching energy barrier in spintronic devices. It has recently been shown that electric field-driven oxygen ion migration near the interface of ferromagnet/oxide bilayers can lead to very large changes in magnetic anisotropy [1], but these changes required elevated temperature and a voltage dwell time on the order of minutes. Here, we examine magneto-ionic switching in ultrathin Co/GdOx films with perpendicular anisotropy, in which the the GdOx gate dielectric acts as an oxygen ion conductor. We examine the switching efficiency as a function of GdOx layer thickness and electrode geometry, and show that the voltage, operating temperature, and switching timescale can be significantly reduced by optimizing the GdOx thickness and defect structure. We demonstrate reversible toggling of magnetic properties for >50 cycles, and correlate the magnetic switching behavior with changes in the electrical properties of the GdOx. 1. U. Bauer et al., arXiv:1409.1843v1(2014)

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Date submitted: 14 Nov 2014

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