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Local control of antiferromagnetic domains in Cr_2O_3 ¹ S. ADENWALLA, UDAY SINGH, W. ECHTENKAMP, CH. BINEK, Univ of Nebraska - Lincoln — We have used a $\text{Cr}_2\text{O}_3/\text{Pd}/(\text{Co}/\text{Pd})_3$ exchange biased heterostructure to measure the spatial distribution of anti-ferromagnetic (AFM) domains in magneto-electric AFM Cr_2O_3 . The AFM Cr_2O_3 possesses a residual roughness insensitive surface magnetization below its Néel temperature (T_N 307K) This surface magnetization couples to the ferromagnetic material (Co/Pd) and results in exchange bias. Cooling the Cr_2O_3 from above its Néel temperature in different magnetization states of the ferromagnet results in the formation of AFM domains in Cr_2O_3 . The AFM domains in the Cr_2O_3 were mapped by a spatial map of the exchange bias of the ferromagnet for the sample cooled in various remnant conditions of Co/Pd and at different temperatures. Local control of AFM domains was achieved by first, controlling the magnetization of Co/Pd multilayers and cooling below the Neel temperature, resulting in a single AFM domain, and then, subsequently writing a reversed AFM domain using the heat from a 6 mW focused laser beam. Scanning the laser beam allows for the writing of any domain pattern with a spatial resolution of 5 μm , limited only by the focusing optics.

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Uday Singh
Univ of Nebraska - Lincoln

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