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Ferromagnetism in vanadium doped thin films of a topological insulator Bi_2Te_3[1] LUKAS ZHAO, ZHIYI CHEN, INNA KORZHOVSKA, HAIMING DENG, City College of New York - CUNY, SIMONE RAOUX, JEAN JORDAN-SWEET, IBM Research - Yorktown, MYRIAM SARACHIK, LIA KRUSIN-ELBAUM, City College of New York - CUNY — Recent first-principle calculations predict a new class of ferromagnetic systems that are distinctly different from the conventional dilute magnetic semiconductors. A novel ferromagnetic topological insulator (ferro-TI) state can be obtained when topological insulator are doped with certain transition metal elements. In the the quasi-2D limit these ferro-TIs are expected to support a quantized anomalous Hall effect. Here we report on electrical and magnetic characterization of vanadium doped thin ($\sim$ 50 nm) films of a topological insulator Bi_2Te_3. Films were grown by *rf* sputtering on S_3N_4/Si substrates with lithographically pre-patterned contact pads. Low-temperature in-plane and Hall resistivity measurements were performed in magnetic fields up to 5 T fields. We find that below 100 K, V-doped films display *negative linear magnetoresistance*, which at lower temperatures becomes hysteretic. Hall resistivity is also hysteretic, suggesting an unusual ferromagnetic ordering below 10 K. Moreover, V-doping turns the *p*-type conduction in as-grown films into *n*-type. The doping and thickness dependence of these effects will be discussed.

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