Abstract Submitted
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Robust ferromagnetism in V doped ultrathin three dimensional topological insulator Bi_2Te_3 films[1] CUI-ZU CHANG, MIT, WEI-WEI ZHAO, PSU, BADIH A. ASSAF, Northeastern University, FERHAT KATMIS, PENG WEI, MIT, DON HEIMAN, Northeastern University, MOSES H. W. CHAN, PSU, JAGADEESH S. MOODERA, MIT — Motivated by the discovery of quantum anomalous Hall effect in Cr doped (BiSb)2Te3 ferromagnetic topological insulator (TI) films,1 high quality vanadium (V) doped three dimensional (3D) TI Bi2Te3 films were successfully grown via molecular beam epitaxy on etched Si(111) and heat treated insulating SrTiO3 (111) substrates. Anomalous Hall effect measurements and magnetization studies found that a robust long range out-of-plane ferromagnetic order occurs in ultrathin Bi2-xVxTe3 films down to 5QLs. There was systematic dependence of ferromagnetism on the concentration of V. However, the ferromagnetic order was observed to be insensitive to the carrier type and density. Upon the application of a bottom gate electric field to reduce the carrier density, the anomalous Hall resistance increased, while the coercivity was unaffected. These observations are in contrast to that seen in conventional dilute magnetic semiconductors (DMSs). Our observation might lead to the carrier independent control of anomalous Hall voltage in ferromagnetic TIs and that could form the basis for magneto-electronics and spintronics applications. References:[1] Cui-Zu Chang et al. Science. 340, 167 (2013).

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Cui-Zu Chang
FMBL,MIT, Cambridge, MA 02139

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