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Magnetic Proximity Effect in a Transferred Topological Insulator Thin Film on a Magnetic Insulator[1] XIAOYU CHE, KOICHI MURATA, LEI PAN, QINGLIN HE, GEN YIN, YABIN FAN, Univ of California - Los Angeles, LEI BI, University of Electronic Science and Technology of China, KANG LUNG WANG, Univ of California - Los Angeles — Exotic physical phenomena such as the quantum anomalous Hall effect (QAHE) arise by breaking the time-reversal symmetry (TRS) in topological insulators. However, substantial efforts have been made in improving the temperature for realizing the QAHE via magnetically doping, while the proximity coupling is another approach to develop the magnetic order without the introduction of additional carriers or the presence of local Fermi level fluctuation. Here we demonstrate the experimental signature of magnetic proximity effect in a molecular beam epitaxy-grown TI thin film of Bi2Se3 transferred to a magnetic substrate of yttrium iron garnet using a wet transfer technique. Comparing to the TI/GaAs control sample, the magnetic order is manifested by the anomalous Hall effect in magneto-transport characterization. Furthermore, due to TRS breaking by the proximity effect we observed a constituent weak localization component accompanied with the weak antilocalization behavior. The present work takes a step further toward realizing QAHE at higher temperature and opens up a new path in TI device designs for applications.

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Xiaoyu Che
Univ of California - Los Angeles

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