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Visualizing local electronic properties of defects in magnetic topological insulators[1] WENHAN ZHANG, Rutgers Univ, DAMIEN WEST, Rensselaer Polytechnic Institute, Y. QIU, Y.S. HOR, Missouri University of Science and Technology, S.B. ZHANG, Rensselaer Polytechnic Institute, WEIDA WU, Rutgers Univ, WEIDA WU TEAM, S.B. ZHANG TEAM, Y.S. HOR TEAM — Quantum anomalous Hall effect (QAHE) manifests as a quantized dissipationless Hall conduction due to chiral edge state circulating along the edge of 2D electron systems without external magnetic field. This effect relies on strong spin-orbit coupling and ferromagnetism. QAHE has been experimentally realized in both Cr-doped and V-doped $(Sb_{1x}Bi_x)_2Te_3$, which are magnetic topological insulators (TIs). V-doped $(Sb_{1x}Bi_x)_2Te_3$ exhibits higher Curie temperature and much less zero-field longitudinal resistance. Despite several earlier studies on these materials, it is still unclear why V is better than Cr for QAH effect. Here we present scanning tunneling microscopy and spectroscopy (STM/STS) studies in conjunction with first principle calculations on the local electronic properties in both $Cr_xSb_2Te_3$ and $V_xSb_2Te_3$ single crystals. Preliminary STM/STS results indicate the local properties of defects strongly influence the magnetic ordering in doped TIs, which is crucial for robust QAHE at elevated temperature.

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