

Abstract Submitted
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Hole doping of p-type thin topological insulators INNA KORZHOVSKA, LUKAS ZHAO, ZHIYI CHEN, HAIMING DENG, LIMIN HUANG, City College of New York - CUNY, SIMONE RAOUX, JEAN JORDAN-SWEET, IBM Research - Yorktown, MYRIAM SARACHIK, STEPHEN O'BRIEN, LIA KRUSIN, City College of New York - CUNY — Recent studies of intrinsically n-type topological insulator (TI) Bi_2Se_3 demonstrated that doping with Cu introduces electrons into this system, and that in the narrow range of doping $\text{Cu}_x\text{Bi}_2\text{Se}_3$ becomes a superconductor below T_c 5 K. It is presumed that Cu intercalates into Van der Waals gaps in the tetradymite structure of layered Bi_2Se_3 , although this remains to be confirmed. We report on hole doping experiments on the naturally p-type Te-based TIs: thin films of Bi_2Te_3 and nanocrystalline plates of Sb_2Te_3 . The samples were iodine doped either during the growth or by the exposure to iodine vapor. Transport measurements on films indicate a very unusual T^3 temperature dependence of longitudinal resistivity. It drops significantly below 30 K with decreasing temperature, although the drop appears arrested by a metal-insulator transition in the 300 mK range. Magnetization measurements on nanoplates indicate the development of large diamagnetic signal. These results will be discussed in comparison with the superconductivity obtained by Cu doping in Bi_2Se_3 . * Supported in part by NSF-DMR-1122594.

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