Abstract Submitted
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Superconductivity in a topological insulator Sb_2Te_3[1] LUKAS ZHAO, HAIMING DENG, MILAN BEGLIARBEKOV, INNA KORZHOVSKA, ZHIYI CHEN, JEFFREY SECOR, LIA KRUSIN-ELBAUM, CCNY — We report an observation of superconductivity in a topological material Sb_2Te_3 synthesized under modest pressure ($\sim$ 5.5 MPA) that has the zero-field superconducting transition temperature $T_c = 8.3$ K – the highest among any topological systems reported thus far. High resolution TEM and XRD Rietveld refinement analysis of the superconducting crystals show that while there is a 0.2% elongation of the lattice parameter in the c-direction, the rhombohedral van der Walls unit cell structure is preserved. The upper critical field H_{c2} anisotropy is surprisingly small, only ~ 1.5, much smaller than the crystalline anisotropy of ~ 8. This anisotropy appears consistent with the paramagnetically limited critical field, given the reported large value ($\sim$ 10) of the g-factor. The diamagnetic state of this new superconductor is also unusual, since even in the normal state the system supports large orbital currents. We will discuss our observations in the context of topological superconductivity and Dirac energy-momentum dispersion of the surface states.

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