Abstract Submitted
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Andreev Reflection Spectroscopy on Bismuth- Chalcogenide Topological Insulators[1] C.R. GRANSTROM, I. FRIDMAN, University of Toronto, J.Y.T. WEI, University of Toronto, Canadian Institute for Advanced Research, H. LEI[2], C. PETROVIC, Brookhaven National Laboratory, R.X. LIANG, University of British Columbia — Andreev reflection (AR) is the basic mechanism underlying the superconducting proximity effect which, at the interface between a topological insulator (TI) and a spin-singlet superconductor, can give rise to Majorana-like states. Despite this basic importance, little is known about how AR is affected by the unique attributes of a three-dimensional TI, namely the linear dispersion and spin-momentum locking of its surface states. In this study, we use both s-wave and d-wave superconducting tips [1] to perform AR spectroscopy on variously flux-grown Bi_2Se_3 and Bi_2Te_3 single crystals. The AR measurements are complemented by in-situ scanning tunneling spectroscopy, down to 300 mK and up to 9 T, in order to determine the doping level and characterize both the sample surface and tip condition. Our data are analyzed in terms of the characteristic band structure of Bi-chalcogenides, to elucidate how it affects the AR process.

[1] C. S. Turel et al., Appl. Phys. Lett. 99, 192508 (2011)

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