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High-Temperature Andreev Tunneling in the Surface States of a Topological Insulator PARISA ZAREAPOUR, ALEX HAYAT, SHU YANG FRANK ZHAO, MICHAEL KRESHCHUK, ACHINT JAIN, Department of Physics and Institute for Optical Sciences, University of Toronto, ZHIJUN XU, ALINA YANG, G.D. GU, CMP&MS Department, Brookhaven National Laboratory, SHUANG JIA, ROBERT CAVA, Department of Chemistry, Princeton University, KENNETH BURCH, Department of Physics and Institute for Optical Sciences, University of Toronto — Topological insulators (TIs) are materials with high spin-orbit coupling that possess conductive helical surface states. In order to study the exotic properties of the TI surface states, it is favorable to work with TIs that have a low bulk conductivity and exhibit insulating behavior. Bi2Te2Se has been confirmed to have a high bulk resistivity, and it still shows Shubnikov-de Haas oscillations originating from the two-dimensional surface states. We report the observation of coherent Andreev tunneling into the surface states of Bi2Te2Se in high-temperature superconductor (Bi2Sr2CaCu2O8+δ)/Bi2Te2Se junctions fabricated by mechanical bonding method. The differential conductance measurements will be presented in various temperatures and magnetic fields. The characterization of the zero-bias conductance peak observed, suggests that we are tunneling into the surface states of the TI rather than the bulk states.

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