

Abstract Submitted
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β -Ag₂Te: A topological insulator with strong anisotropy¹ LAN WANG, AZAT SULAEV, PENG REN, BIN XIA, QINGHUA LIN, TING YU, CAIYU QIU, School of Physical and Mathematical Science, Nanyang Technological University, Singapore, SHUANG-YUAN ZHANG, MING-YONG HAN, Institute of Material Research and Engineering, Singapore, ZHIPENG LI, WEI GUANG ZHU, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, QINGYU WU, YUAN PING FENG, LEI SHEN, Department of Physics, National University of Singapore, Singapore, SHUN-QING SHEN, Department of Physics, The University of Hong Kong, Hong Kong, China — We present evidence of topological surface states in β -Ag₂Te through first-principles calculations, periodic quantum interference effect and ambipolar electric field effect in single crystalline nanoribbon. Our first-principles calculations show that β -Ag₂Te is a topological insulator with a gapless Dirac cone with strong anisotropy. To experimentally probe the topological surface state, we synthesized high quality β -Ag₂Te nanoribbons and performed electron transport measurements. The coexistence of pronounced Aharonov-Bohm oscillations and weak Altshuler-Aronov-Spivak oscillations clearly demonstrates coherent electron transport around the perimeter of β -Ag₂Te nanoribbon and therefore the existence of topological surface states, which is further supported by the ambipolar electric field effect for devices fabricated by β -Ag₂Te nanoribbons. The experimentally confirmed topological surface states and the theoretically predicted isotropic Dirac cone of β -Ag₂Te suggest that the material may be a promising material for fundamental study and future spintronic devices.

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