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Bi_{1-x}Sb_x(110): A non-closed packed surface of a topological insulator LUCAS BARRETO, WENDELL SIMOES E SILVA, MALTHE STENSGAARD, SØREN ULSTRUP, MARCO BIANCHI, XIE-GANG ZHU, MATTEO MICHIARDI, MACIEJ DENDZIK, PHILIP HOFMANN, Department of Physics and Astronomy, Aarhus University, Denmark — Topological insulators are characterised by an insulating bulk band structure, but topological considerations require their surfaces to support gap-less, metallic states. Meanwhile, many examples of such materials have been predicted and found experimentally, but experimental effort has concentrated on the closed-packed (111) surface of these materials. Thus, the theoretical picture of an insulating bulk embedded in a metallic surface from all sides of a crystal still needs to be confirmed. Here we present angle-resolved photoemission spectroscopy results from the (110) surface of the topological insulator Bi_{1-x}Sb_x ($x \approx 0.15$). The observed band structure and Fermi contour are in excellent agreement with theoretical predictions and slightly different from the electronic structure of the parent surface Bi(110), in particular around the X_1 time-reversal invariant momentum. We argue that the preparation of surfaces different from (111) opens the possibility to tailor the detailed electronic structure and properties of the topological surface states.

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