

Abstract Submitted
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Electronic Structure of Quantum Spin Hall Parent Compound CdTe GUANG BIAN, Department of Physics, Princeton University — Cadmium telluride, a compound widely used in devices, is a key base material for the experimental realization of the quantum spin Hall phase. The electronic structure of CdTe has been studied by various theoretical and experimental methods. However, high-resolution band mapping has been lacking to this date. The detailed low-energy electronic structure of CdTe is thus unavailable, but it is of fundamental importance for understanding the topological properties and trends of this type of materials. We report herein, for the first time, a systematic study of the electronic structure of CdTe by angle-resolved photoemission spectroscopy from well-ordered (110) surfaces. The results are compared with first-principles calculations to illustrate the topological distinction between CdTe and a closely related compound HgTe. In addition, topological phase transition from CdTe to HgTe upon alloying and the massless Dirac-Kane semimetal phase at the critical composition are illustrated by computations based on a mixed-pseudopotential simulation.

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