Abstract Submitted
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Observation of oscillatory relaxation in the Sn-terminated surface of epitaxial rock-salt SnSe {111} topological crystalline insulator[1] WENCAN JIN, Columbia Univ, SURESH VISHWANATH, Cornell Univ, JIANPENG LIU, Univ., of California, Santa Barbara, LINGYUAN KONG, Institute of Physics, China, RUI LOU, Renmin Univ., of China, ZHONGWEI DAI, Univ., of New Hampshire, JERZY SADOWSKI, BNL, XINYU LIU, Univ., of Notre Dame, HUAI-HSUN LIEN, ALEXANDER CHANEY, Cornell Univ, JUNZHANG MA, TIAN QIAN, Institute of Physics, China, JERRY DADAP, Columbia Univ, KARSTEN POHL, Univ., of New Hampshire, SHANCAI WANG, Renmin Univ., of China, JACEK FURDYNA, Univ., of Notre Dame, HONG DING, Institute of Physics, China, HUILI XING, Cornell Univ, RICHARD OSGOOD, Columbia Univ — Topological crystalline insulators have been recently observed in rock-salt SnSe {111} thin films. Previous studies have suggested that the Se-terminated surface of this thin film with hydrogen passivation is a preferred configuration. In this work, synchrotron-based angle-resolved photoemission spectroscopy, along with density functional theory calculations, are used to demonstrate conclusively that a rock-salt SnSe {111} thin film has a stable Sn-terminated surface. These observations are supported by low energy electron diffraction (LEED) intensity-voltage measurements and dynamical LEED calculations, which further show that the Sn-terminated SnSe {111} thin film has undergone an oscillatory surface structural relaxation. In sharp contrast to the Se-terminated counterpart, the Dirac surface state in the Sn-terminated SnSe {111} thin film yields a high Fermi velocity, 0.50×10^6m/s, which may lead to high-speed electronic device applications.

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