

Abstract Submitted
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MBE growth of topological insulator Bi₂Se₃ and Bi₂Te₃ films

TONG ZHANG, 1. Center for Nanoscale Science and Technology, NIST, Gaithersburg, MD, 2. Maryland NanoCenter, UMD, College Park, MD, NIV LEVY, YOUNG JAE SONG, JUNGSEOK CHAE, JOSEPH A. STROSCIO, Center for Nanoscale Science and Technology, NIST, Gaithersburg, MD — Three-dimensional (3D) topological insulators are a new state of quantum matter with a band gap in bulk but gapless states on the surface. The surface states with spin helicity can be the host of many striking quantum phenomena. In this work, we use ultra-high vacuum molecular beam epitaxy to grow atomically flat topological insulator (TI) Bi₂Se₃ and Bi₂Te₃ films. High quality TI films were obtained using epitaxial graphene on SiC as a substrate for TI growth. The growth dynamics was characterized by real time reflection high-energy electron diffraction (RHEED). The growth condition was optimized by adjusting for proper flux rate and substrate temperature while monitoring the RHEED patterns. In situ Auger spectroscopy and scanning tunneling microscopy (STM) measurements at 5K are used to study the as-grown films for their stoichiometry and defect density. We expect these MBE grown samples will provide a good candidate for studying the topological surface states and related phenomena, which will be studied using scanning tunneling spectroscopy at millikelvin temperatures [1]. 1. Y. J. Song et al., Nature 467, 185 [2010].

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