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Mechanical Exfoliation and Electron Transport of Topological Insulator Nanoribbons SEUNG SAE HONG, WORASOM KUNDHIKANJANA, Department of Applied Physics, Stanford University, JUDY CHA, Department of Materials Science and Engineering, Stanford University, KEJI LAI, Department of Applied Physics, Stanford University, DESHENG KONG, Department of Materials Science and Engineering, Stanford University, ZHI-XUN SHEN, Department of Applied Physics, Stanford University, YI CUI, Department of Materials Science and Engineering, Stanford University — Bismuth selenide (Bi_2Se_3), a stoichiometric material of a single Dirac-cone band structure, is one of the most promising candidates to realize the topologically non-trivial surface state protected by time reversal symmetry. Especially, many exotic physical phenomena are predicted to emerge in low dimensional nanostructures of Bi_2Se_3, such as the crossover between 3D to 2D topological insulator. Due to the weak Van der Waals interaction between adjacent quintuple layers (QLs), Bi_2Se_3 can be exfoliated down to a few QLs. We will present the mechanical exfoliation of topological insulator nanoribbons by an atomic force microscope (AFM) tip, which enables ultra-thin topological insulator down to a single QL. Electron transport measurement on low dimensional topological insulator will be also discussed, as well as the conductivity mapping experiment using a microwave scanning probe technique.

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