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Tuning Quantum Oscillations of Dirac Surface States on the Topological Insulator Bi_2Te_2Se by Ionic Liquid Gating[1] JUN XIONG, YUE-HAW KHOO, SHUANG JIA, ROBERT J. CAVA, NAI PHUAN ONG, Princeton University — An *in-situ* method to tune the chemical potential near the Dirac Point (DP) of a topological insulator (TI) would greatly facilitate several key experiments. However, in as-grown crystals of Bi-based TIs, the chemical potential μ lies high above the DP. Using liquid gating on 50-μm thick crystals of Bi_2Te_2Se, we demonstrate that μ can be tuned by a factor of 6 by observing changes to the Shubnikov-de Haas (SdH) period. A surprise is that the SdH amplitudes increase sharply with gating. Liquid gating allows the n=1 Landau level to be accessed, and the π-Berry phase to be determined with improved accuracy. We will discuss reversibility of liquid gating, and how we may distinguish the purely gating action from chemical reaction.

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