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**Electronic structures of topological insulators with non-conventional terminations**[1] XIEGANG ZHU, YUN ZHANG, WEI FENG, BINGKAI YUAN, XINCHUN LAI, Science and Technology on Surface Physics and Chemistry Laboratatory, Mianyang 621700, Sichuan, P. R. China — Until now, most works on topological insulators focus on the natural cleaving surfaces, *i.e.*, conventional terminations. However, researches on the non-conventional surfaces of TIs are hindered due to the difficulties in preparation of those surfaces and the existence of large number of dangling bonds on those surfaces. What is more, due to the complications in the surface lattice structures, DFT calculations on the non-conventional surfaces are not favorable. In this work, by adopting the tight binding method based Green's Function, we systematically studied the surface states of non-conventional terminations of topological insulator Bi2Te3 and Bi2Se3. By using MBE, we manage to prepare topological insulator Bi2Te3 thin films with fractional quintuple layer (FQL) termination. Scanning tunneling microscopy (STM) reveals that the as-grown Bi2Te3 thin films may not necessarily terminate at the Van der Waals gap between two adjacent quintuple layers. The electronic structures of the FQL surfaces are studied in combination with quasi-particle interference (QPI) by scanning tunneling spectroscopy (STS). Our results suggest that the topological nature of SSs be preserved on non-conventional terminations. The robustness of the topological SSs is also demonstrated.

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