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One-dimensional edge states in Bi(111) bilayer grown on Sb₂Te₃¹
YAOYI LI, SHIVANI RAJPUT, DUSHYANT TOMER, LIAN LI, Univ of Wisconsin, Milwaukee — Well-ordered Bi bilayer islands with zigzag edges are grown epitaxially on Sb₂Te₃(111) film by molecular beam epitaxy. Scanning tunneling microscopy imaging shows that the Bi film assumes the lattice of the Sb₂Te₃, thus is coherently strained. Tunneling spectroscopy further reveals robust edge states, confirming it as a two-dimensional topological insulator. This is consistent with first-principles calculations that indicate the preservation of the topological nature of the Bi bilayer and edge states with only an energy shift even in the presence of strong interaction between Bi and Sb₂Te₃. These findings suggest that the interface between 2D and 3D TIs can be a promising platform to synthesize new topological matter.

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