The observation of the novel stripe phase in Bi2Te3

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Topological insulators (TI) with a single Dirac cone exhibit a novel half- integer quantum hall effect. This is an ideal system to achieve dissipationless transport in one dimension i.e., a perfect one dimensional (1D) quantum wire. In magnetic TI, 1D modes are predicted at the boundaries between two adjacent ferromagnetic domains. In this study, we present an alternative route to realizing a quantum wire on the surface of TI. Using scanning tunneling microscopy (STM) we have discovered spontaneously occurring striped periodic patterns on the surface of Bi_2Te_3. Landau level (LL) measurements across the stripes reveal anomalous properties close to the Dirac point, and we observed the clear systematic variation of the LL energy across the stripe. We propose the possible realization of the (1D) quantum wire based on the experimental results[1].

[1] Yoshinori Okada *et al.*, in preparation