Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Geometric Effect on Quantum Anomalous Hall State in Magnetic Topological Insulator YANXIA XING, Department of Physics, Beijing Institute of Technology, Beijing 100081, China — An intriguing observation on the quantum anomalous Hall (QAH) effect in a magnetic topological insulator (MTI) is the dissipative edge states. With the aid of non-equilibrium Green's functions,the QAH effect in an MTI with a three dimensional effective tight-binding model is studied.We predict that due to geometric structure in the third dimension z,the unideal contact between terminal leads and central scattering region induces the backscattering in the central Hall bar,as the function of split gates. Such backscattering leads to a nonzero longitudinal resistance and quantized Hall resistance, which would explain the dissipative edge states in experiments.A further numerical simulation prove above prediction as well.These results are rewarding on future experimental observations and transport calculations based on first principe.

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Date submitted: 08 Oct 2015 Electronic form version 1.4