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Logarithmic voltage bias dependence in ferromagnetic two-dimensional topological insulators JONATHAN WARD, K. SHAIN, D. NANDI, G.H. LEE, Department of Physics, Harvard University, Cambridge, MA, 02138, CUI-ZU CHANG, Francis Bitter Magnet Lab, Massachusetts Institute of Technology, Cambridge, MA, 02139, K. HUANG, Department of Physics, Harvard University, Cambridge, MA, 02138, J.S. MOODERA, Francis Bitter Magnet Lab, Massachusetts Institute of Technology, Cambridge, MA, 02139, P. KIM, A. YACOBY, Department of Physics, Harvard University, Cambridge, MA, 02138 — The quantum anomalous Hall effect has recently been demonstrated in thin films of $(BiSb)_2Te_3$ with Vanadium doping. We report the first e-beam lithographically defined devices from this ferromagnetic two-dimensional topological insulator. Transport measurements show that, when the bulk is gated into a conducting state, longitudinal resistance and Hall resistance have logarithmic dependence on source-drain voltage bias and temperature. As this system may be a suitable platform for Majorana fermions, it is critical to understand the logarithmic dependence as it occurs around zero bias. We present a model to explain the observed logarithmic dependence near zero bias and address other sources of logarithmic dependence that are not present in the device.

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