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Zero-field Dissipationless Chiral Edge Current in Quantum Anomalous Hall State CUI-ZU CHANG, Massachusetts Inst of Tech-MIT, WEI-WEI ZHAO, DUK Y. KIM, The Center for Nanoscale Science and Department of Physics, The Pennsylvania State University, PENG WEI, Francis Bitter Magnet Lab and Physics Department, Massachusetts Institute of Technology, J. K. JAIN, CHAOXING LIU, MOSES H. W. CHAN, The Center for Nanoscale Science and Department of Physics, The Pennsylvania State University, JAGADEESH S. MOODERA, Francis Bitter Magnet Lab and Physics Department, Massachusetts Institute of Technology — The quantum anomalous Hall (QAH) state is predicted to possess, at zero magnetic field, chiral edge channels that conduct spin polarized current without dissipation, and thus holds great promise for future high-performance information processing. In this talk, we will discuss our transport experiments that probe the QAH state with gate bias and temperature dependences, by local and nonlocal magnetoresistance measurements. This allows us to unambiguously distinguish the dissipationless edge transport from transport via other dissipative channels in the QAH system. Our experiments confirm a fundamental feature of the QAH state, namely the dissipationless transport by edge channels in zero applied fields, which will be crucial for future chiral interconnected electric and spintronic applications. This research is supported by the NSF grants (DMR-1420620, Penn State MRSEC; in MIT by DMR-1207469 and the STC Center for Integrated Quantum Materials under NSF grant DMR-1231319) and by ONR Grant N00014-13-1-0301.

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