Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

1D-1D Coulomb drag in a 6 Million Mobility Bi-layer Heterostructure SIMON BILODEAU, McGill University, DOMINIQUE LAROCHE, Sandia National Laboratories, JIAN-SHENG XIA, University of Florida, MIKE LILLY, JOHN RENO, Sandia National Laboratories, LOREN PFEIFFER, KEN WEST, Princeton University, GUILLAUME GERVAIS, McGill University — We report Coulomb drag measurements in vertically-coupled quantum wires. The wires are fabricated in GaAs/AlGaAs bilayer heterostructures grown from two different MBE chambers: one at Sandia National Laboratories (1.2M mobility), and the other at Princeton University (6M mobility). The previously observed positive and negative drag signals are seen in both types of devices, demonstrating the robustness of the result. However, attempts to determine the temperature dependence of the drag signal in the 1D regime proved challenging in the higher mobility heterostructure (Princeton), in part because of difficulties in aligning the wires within the same transverse subband configuration. Nevertheless, this work, performed at the Microkelvin laboratory of the University of Florida, is an important proof-of-concept for future investigations of the temperature dependence of the 1D-1D drag signal down to a few mK. Such an experiment could confirm the Luttinger charge density wave interlocking predicted to occur in the wires. Sandia National Laboratories is a multiprogram laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL8500.

Simon Bilodeau
McGill Univ

Date submitted: 05 Nov 2015 Electronic form version 1.4