Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Fabrication of Electronic Fabry-Perot Interferometer in the Quantum Hall Regime SIMAS GLINSKIS, SANGHUN AN, WOOWON KANG, Univ of Chicago, LEO OCOLA, Argonne National Lab, LOREN PFEIFFER, KEN WEST, KIRK BALDWIN, Princeton University — A fabrication method for electronic quantum Hall Fabry-Perot interferometers (FPI) is presented. Our method uses a combination of e-beam lithography and low-damage dry-etching to minimize creation of charged traps and deposition of impurities in the FPI devices. Optimization of the quantum point contacts (QPC) is achieved via systematically varying the etch depth and monitoring the device resistance after each etch session. Etching of the device is stopped and gates are metallized when a desired value of resistance is obtained. This helps to ensure that the QPCs are neither insulating (etched too deep) nor too conductive (etched too shallow). The target values for device resistance at the end of the etching procedure are determined using the statistics of resistance values compiled from all the previous FPI devices fabricated from the same wafer. Our approach allows for a systematic tuning of the QPC potentials so that the strength of quantum interference signal can be optimized.

Simas Glinskis
Univ of Chicago

Date submitted: 09 Jan 2014 Electronic form version 1.4