Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Magnetic flux superperiods in fractional quantum Hall interferometers F.E. CAMINO, Brookhaven National Laboratory, P.V. LIN, V.J. GOLDMAN, Stony Brook University — Superperiodic Aharonov-Bohm oscillations in conductance of $e/3$ quasiparticles have been reported in three Fabry-Perot interferometer devices. Superperiods are observed in the FQH regime, when filling 1/3 edge channel encircles an island of 2/5 FQH fluid. Etch trenches define the devices, which consist of a 2D electron island connected to the 2DES bulk via two wide constrictions. An oscillatory signal in the conductance is observed when tunneling occurs in the constrictions. The width of the 1/3 edge channel weakly depends on the size of the device, on the other hand, the enclosed 2/5 island area varies by a factor of 4. We compare the magnetic field periods in the different size devices and review the evidence that the flux period is $5h/e$. [1] The FQH edge channel structure essentially depends on the 2D electron density profile. We discuss the self- consistent density profile in the device defined by the etch trenches. We also discuss electron depletion due to electric field of front gates, which is not screened efficiently by 2D electrons and thus leads to a smaller gradient of the confining potential than the mesa etch. [1] F. E. Camino et al., PRB 72, 075342 (2005); W. Zhou et al., PRB 73, 245322 (2006); P. V. Lin et al., PRB (in press, 2009).

Vladimir J. Goldman

Date submitted: 29 Dec 2009 Electronic form version 1.4