

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Fabry-Perot interferometer in Fractional Quantum Hall regime

AVEEK BID, N. OFEK, M. HEIBLUM, ADY STERN, V. UMANSKY, D. MAHALU, Weizmann Institute of Science — We have measured Aharonov-Bohm/Coulomb blockade oscillations in an electronic Fabry-Perot interferometer in the Fractional Quantum Hall regime. At $\nu = 2/5$, when the inner channel is partially reflected (with the outer channel ($1/3$) being fully transmitted); the total transmission of the device oscillates as a function of magnetic field or modulation gate voltage. This is true also for $\nu = 2, 3, 4$ when the interference is of a partially reflected lower lying channel (with the other channels being either fully transmitted or fully reflected). However, in the outermost channel of all filling factors ($\nu = 1/3, 2/5, 1, 4/3, 2, 3, 4, 5$) we do not see any oscillations as a function of B. This we interpret to be due to interplay between the magnetic field (which tries to modify the area of the compressible island inside the interferometer) and Coulomb energy (which prevents the density of quasiparticles within the island from building up indefinitely). The period of oscillations in modulation gate voltage in the inner channel of $\nu = 2/5$ (partially partitioned) is found to be one-third of that observed in the second channels of the integer filling fractions which probably is an indication that the oscillations are due to the tunneling of quasiparticles of fractional charge $1/3$.

Aveek Bid
Weizmann Institute of Science

Date submitted: 20 Nov 2008

Electronic form version 1.4