Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Quantum Hall effect in tunable superlattice in graphene SUDIPTA DUBEY, MANDAR DESHMUKH, Department of Condensed Matter Physics and Materials science, Tata Institute of Fundamental Research, Mumbai — Superlattice in graphene is created by a bottom gate and an array of top gates pinned to the same potential. The difference in charge density between region with and without top gate creates the amplitude of superlattice potential and thus can be tuned by the gate voltage. The superlattice period is 150 nm. We study the effect of magnetic field in this array of p-n junctions when the magnetic length is smaller than the superlattice period. Depending on the gate voltage applied in the top and bottom gate, the edge states circulate in the same or opposite direction. As the filling fraction in the adjacent region can be controlled, we can tune the backscattering between alternate regions by changing the charge density in the region between them. When the gate voltages are so tuned that we have electrons and holes in the adjacent region, the edge states circulating in the opposite direction in the p and n region bring electrons and holes at the p-n interface. In this regime, we observe a large longitudinal resistance.

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Date submitted: 15 Nov 2013 Electronic form version 1.4