Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Hofstadter's Butterfly in a Lithographically Defined Super-Lattice CARLOS FORSYTHE, DIEGO SCARABELLI, PATRICK MAHER, Columbia University, KENJI WATANABE, TAKASHI TANIGUCHI, National Institute for Materials Science, Japan, SHALOM WIND, Columbia University, CORY DEAN, The City University of New York, PHILIP KIM, Columbia University — We will present magnetotransport measurements of a gated superlattice formed on hBN encapsulated graphene in which a local gate provides a lattice-like external potential. Recent improvements in lithography have allowed for the patterning of periodic lattice structures with lattice constants of 40 nm or less. While the Hofstadter fractal energy spectrum has been studied previously through the Moire interference pattern between graphene and hBN, it has not been observed in such a tunable environment. Our multi-gate structure allows us to independently set carrier density and lattice strength, allowing us to investigate the competition between multiple allowed states associated with different lattices in our 2DEG. By comparing different lattice geometries we will also present a richer understanding of how lattice symmetry alters the Hofstadter energy spectrum.

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Date submitted: 14 Nov 2013 Electronic form version 1.4