

Abstract Submitted
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Transition from Quantum Hall metal (QHM) to localized Hall insulator (LHI) in graphene¹ LIYUAN ZHANG, Brookhaven National Laboratory, YAN ZHANG, Stony Brook University, MAXIM KHODAS, Brookhaven National Laboratory, EMILIO MENDEZ, Stony Brook University, TONICA VALLA, IGOR ZALIZNYAK, Brookhaven National Laboratory, BROOKHAVEN NATIONAL LABORATORY COLLABORATION, STONY BROOK UNIVERSITY COLLABORATION — Graphene provides a new system to study the quantum Hall effect (QHE) of two-dimensional Dirac-like electronic excitations. We had investigated experimentally the magneto-transport in single layer graphene close to the charge neutrality point (CNP). We found that QHE regimes at low carrier density depend markedly on the mobility of graphene devices. In our high mobility samples, we had observed a breakdown of the $N=0$ Quantum Hall state and the appearance of the insulating behavior at high magnetic field and low temperature. We also obtained an evidence of a well-defined transition from the Quantum Hall metal (QHM) to the localized Hall insulator (LHI) with decreasing filling of the $N=0$ Landau level. This is a quantum phase transition, which was already demonstrated in traditional two dimension electron gas system.

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