Abstract Submitted
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**Graphene "butterflies"** G.L. YU, A. MISHCHENKO, R. V. GORBACHEV, L.A. PONOMARENKO, R. JALIL, J.S. TU, C. R. WOODS, D.C. ELIAS, K.S. NOVOSELOV, A.K. GEIM, School of Physics and Astronomy, University of Manchester, Manchester M13 9PL, UK — By stacking different 2D crystals on top of each other, some astonishingly properties and new phenomena may be shown. Typically, when graphene is transferred onto atomically flat boron nitride substrate with a certain angel, a moire pattern may come into being. Within this superlattice structure, elections will rearrange themselves to make multiple clones of Dirac fermions. At higher field even more clones would be created, accordingly, the pattern of Hofstadter butterfly can turn out. Here, both of the resistive and capacitive measurements are used to research the Hofstadter spectrum experimentally. Resistive measurement shows the longitudinal conductivity has 1/B oscillations independent of carrier density, while the Hall Effect repeatedly changes its sign with B. Quantum capacitance measurement is employed to examine directly the density of states (DoS) in graphene superlattice devices and its evolution into a clear Hofstadter spectrum. In both case, self-similarity could be observed at the fractions where the magnetic sates begin to entwine, forming a Hofstadter-like pattern. While many more minigaps are observed in the capacitance measurement.

Geliang Yu
School of Physics and Astronomy, University of Manchester,
Manchester M13 9PL, UK

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