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Stacking Faults and Topological Kink States in Bilayer Graphene
ADAM TSEN, DENNIS WANG, Columbia University, JIWOONG PARK, Cornell University, ABHAY PASUPATHY, PHILIP KIM, Columbia University — For bilayer graphene, the lowest energy configuration consists of two mirror-symmetric stacking orders (AB and BA), which are connected by a lattice translation. In large-area bilayer systems grown by chemical vapor deposition, domains of both stacking configurations have been observed with transmission electron microscopy (TEM), and the boundaries were found to form by the continuous strain of one layer with respect to the other. Here, we perform similar TEM measurements on bilayer graphene prepared by mechanical exfoliation and observe identical stacking faults. These structures may present important ramifications for the electronic properties of such systems. In particular, they are predicted to support topologically protected, gapless kink states, and so their presence may explain the difficulty in opening a substantial transport gap in bilayer graphene even under large electric fields. We also present preliminary transport measurements on individual stacking faults resolved by TEM.

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