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Materials Research Science and Engineering Center

MRSEC SEMINAR SERIES

Ripples, Quantum Transport and Correlated Phenomena in Few Layer Graphene Membranes

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Location: Marcus Nanotechnology Building, Room 1116

Abstract:

Graphene, a two - dimensional single atomic layer of carbon, has recently emerged as a new model system for condensed matter physics, as well as a promising candidate for electronic materials. Though single layer graphene is gapless, bilayer and trilayer graphene have tunable band gaps that may be induced by out-of-plane electric fields or arise from collective excitation of electrons. Here I will present our results on ripple formation and transport measurements in bilayer and trilayer graphene devices with mobility as high as 400,000 cm^2/Vs. We demonstrate the presence of an intrinsic gapped state in bilayer graphene at the charge neutrality point, evidence for quantum phase tranisition, and stacking-order dependent transport in trilayer graphene. Our results underscore the fascinating many-body physics in these 2D membranes, and have implications for band gap engineering for graphene electronics and optoelectronic applications.