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Simulating a movable scatterer in coherent graphene devices[1]
MARIO BORUNDA, JESSE BEREZOVSKY, ROBERT WESTERVELT, ERIC HELLER, Harvard University — We study coherent transport of electrons through a graphene device. At sufficiently low temperatures in mesoscopic samples, this diffusive transport becomes coherent. Thus, small changes in the device, such as modifying the chemical potential or changing the location of impurities, induces electrical conductance fluctuations. The magnitude of these fluctuations has a universal value (of order e^2/h) independent of the quality of the sample and at low temperatures of its size. A recent experiment by Berezovsky et al, employed a liquid-He-cooled scanning probe microscope (SPM) tip to induce a movable scatterer in a graphene device. The experiment found that a small change to the disorder configuration can drastically change the electrical conductance. We present numerical calculations of transport in realistic grapehene devices studied with the SPM technique. We find good agreement with experimental results and report the effects of varying the details of the disorder.

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