Electron Interference in Ballistic Graphene Nanoconstrictions

We realize nanometer size constrictions in ballistic graphene nanoribbons grown on sidewalls of SiC mesa structures. The high quality of our devices allows the observation of a number of electronic quantum interference phenomena. The transmissions of Fabry-Perot-like resonances are probed by in situ transport measurements at various temperatures. The energies of the resonances are determined by the size of the constrictions, which can be controlled precisely using STM lithography. The temperature and size dependence of the measured conductances are in quantitative agreement with tight-binding calculations. The fact that these interference effects are visible even at room temperature makes the reported devices attractive as building blocks for future carbon based electronics.

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