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Effect of potential barriers on transport in graphene[1]

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The energy of graphene charge carriers grows linearly with their momentum. This zero-mass behavior, associated with an absence of a forbidden region between electrons and holes, deeply modifies transport properties of electrons across potential steps and barriers. We perform transport measurements in graphene monolayers where the potential profile is tuned by a set of local gates [1,2]. By varying the height and width of potential barriers and the energy of charge carriers, we can test the predictions on the transmissions of the conduction channels across a potential step in graphene. Besides, we observe the effect of disorder and of screening of an external field in graphene. These experiments have a direct consequence in any transport measurement in graphene. We indeed showed that such potential steps naturally develop at the interface between graphene and a metallic electrode [3]. We discuss the effects of these steps in various geometries [4]. In collaboration with N. Stander, J.A. Sulpizio, Physics Department, Stanford University, Stanford, CA 94025, USA; and J. Cayssol, D. Goldhaber-Gordon, CPMOH, UMR5798, Université de Bordeaux, 33405 Talence, France.

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[3] B. Huard, N. Stander, J.A. Sulpizio, D. Goldhaber-Gordon, **Phys. Rev. B**, **78**, 121402 (R) (2008)
[4] J. Cayssol, B. Huard, D. Goldhaber-Gordon, (to appear soon)

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