Ph.D. defence A. MOSTOVOV

Quantum Shot Noise in Graphene

23rd of april 2014 at 10:30
amphi Bloch, Bât. 772 Orme des Merisiers

Graphene is an amazing material, that opens the way for multiple applications but also should manifest several intriguing fundamental properties. In particular, the value of the Fano factor in graphene remains an open question. A theoretical model, allowing to calculate the Fano factor in ideal (ballistic) graphene was proposed by *Tworzydlo et al., 2006*. This model predicts the value of the Fano factor equal to ⅓ at the Dirac point and the noise suppression far from it. In diffusive graphene (that is much easier achievable experimentally) the Fano factor was investigated numerically by several authors (*San-Jose et al., 2007*, *Lewenkopf et al., 2008*, *Logoteta et al., 2013*) and the values of the Fano factor also near ⅓ but with different dependence on Fermi energy were predicted. Conclusions of the first experimental works (*DiCarlo et al., 2008* and *Danneau et al., 2008*), addressing this problem, didn't lead to an enough broad understanding of it and a further investigation was required. We have conducted an experimental study of the Fano factor in a diffusive mono-layer graphene device. In our experiment we intended to maximally reduce the parasitic contributions to the detected signal by performing four-point voltage noise measurement as well as by using cross-correlation detection. The extracted values of the Fano factor are in agreement with the above-mentioned simulations and are consistent with the experimental results by *Danneau et al.*

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