Coherent electron transport through graphene nanoconstrictions and nanoribbons

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Graphene nanoconstrictions (GNCs) [1] and nanoribbons (GNRs) [2] have been well studied in graphene with low mobility for many years. Recently, very high mobility GNCs were fabricated [3] and quantized steps of the conductance were observed. Similar quantized steps were also found in GNCs with 'intermediate' mobility but well defined edges [4,5].

We fabricated GNCs and GNRs on hexa-methyldisilazane (HMDS) [5] and of encapsulated graphene with different geometries and mobility. Our study focused on the effects of different fabrication conditions on the electron transport through these samples. Electrical transport measurements allowed us to perform a comparison between theory and experiment, finding a good match between them. The main conclusion is that quantum interference effects play a major in the electrical response of the samples.

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References

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Figures

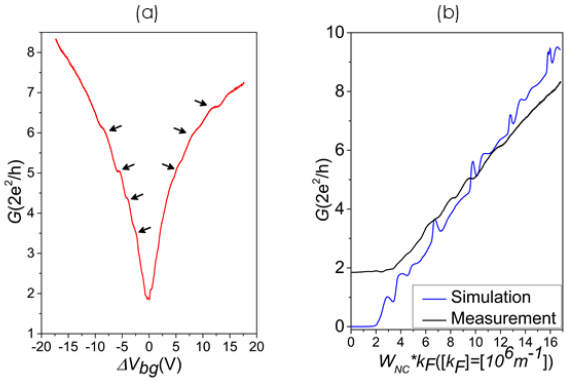

Figure 1: (a) Quantized Conductance in a GNC of 85 nm. (b) Comparison between experiments and numerical simulation.

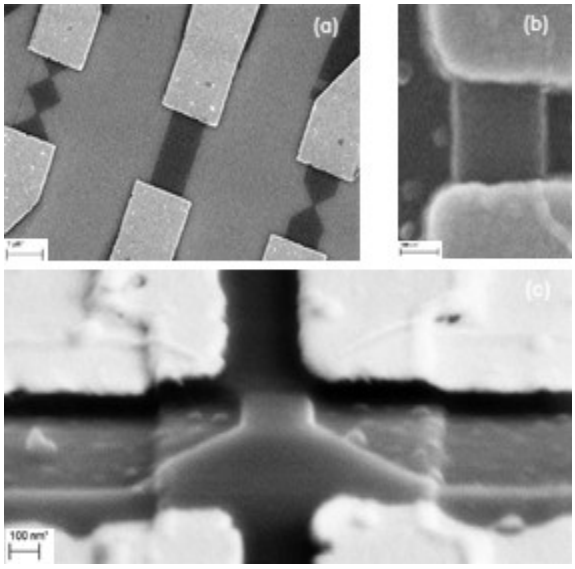

Figure 2 SEM images of (a) GNCs on HMDS, (b) GNR of encapsulated graphene and (c) GNC of encapsulated graphene (tilted image).