Electron transport in graphene with one dimensional local strain

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Graphene has a liner electronic dispersion relation near the Fermi level, leading to remarkable Dirac fermionic behaviors of carriers. One of the Dirac fermionic behaviors is the strain effect, in which lattice strain in graphene induces gauge fields. It was theoretically shown that strain-induced gauge fields can be tailored to modulate electronic states, forming 1D states, confinements and band gaps. [1,2] We focus on the one dimensional *local* strain which leads to the transport gap formation around the Dirac point. We aim to verify experimentally the modulation of electron transport by strain.

By using our original method [3], we fabricate two samples with different spatial variation of one dimensional strain. We confirm the strain by micro Raman spectroscopy (Figure 1), and compare the electron transport of these two samples (Figure 2). In the poster presentation, we report details of the experimental results.

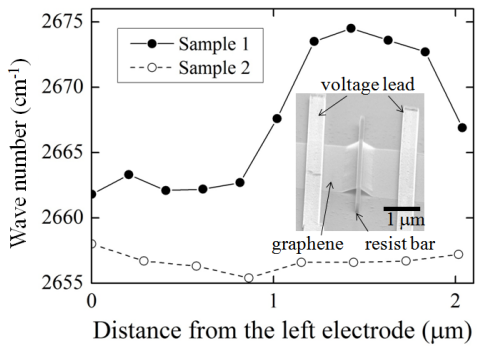

Figure 1. Spatial variation of the wave number of Raman 2D peak as a function of the distance from a voltage lead. Inset is an SEM image of a sample.

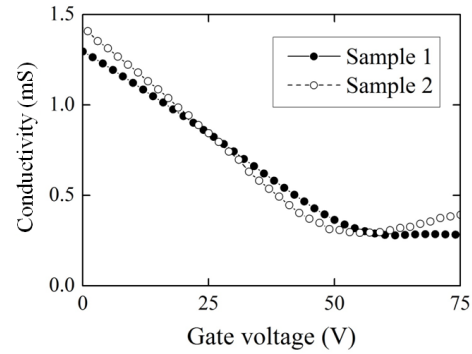

Figure 2. Gate voltage dependence of conductivity for samples 1 and 2.

[1] F. Guinea et al., Nat. Phys. **6**, 30 (2010).
[2] V. M. Pereira and A. H. C. Neto, Phys. Rev. Lett. **103**, 046801 (2009).
[3] H. Tomori et al., Appl. Phys. Express, **4**, 075102 (2011).