Scalar potential tuning and effects on electron focusing in deterministically strained graphene

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Abstract

Strain engineering plays an important role in modern electronics and future flexible electronics. Specifically, strain directly influences the optical and electronic properties of a material [1]. Graphene, a single layer of carbon atoms with strong in-plane chemical bonds, is an ideal candidate for strain engineering of the *bulk* properties [2]. Here, we present optical and transport experiments as a function of uniaxial strain in fully encapsulated graphene using a bending setup shown in the figure below [3]. We find that the entire differential conductance curve measured versus the backgate voltage is shifted to lower values, consistent with a strain-induced scalar potential in the device. In the second part we will present electron focusing experiments in devices with different geometries, allowing us to investigate the effects of strain and strain gradients on the electron trajectories in close to ballistic graphene and bi-layer graphene devices.

References

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Figures

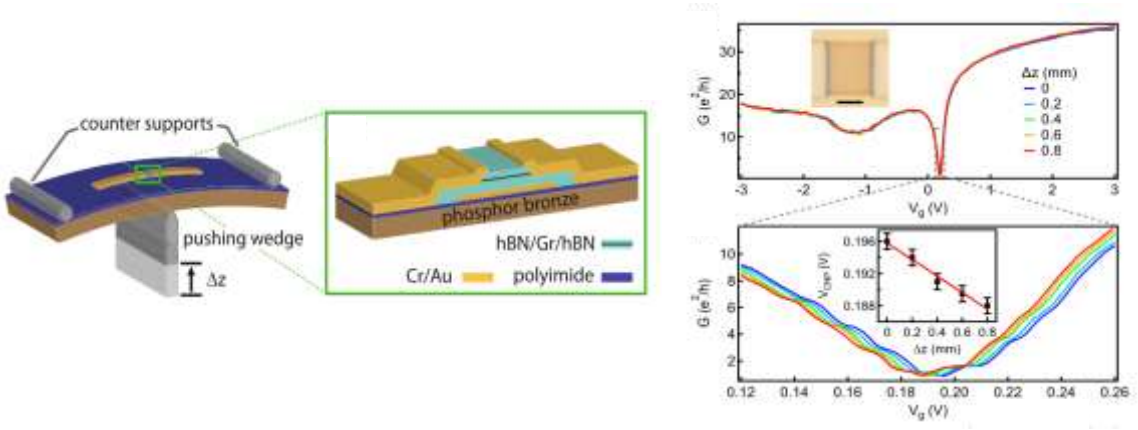

Figure 1: Left: Schematic of our bending setup and hBN encapsulated graphene device. Right: Two terminal conductance of a graphene junction plotted for different displacements Δz, which is linearly related to the induced strain.