Gate Hysteresis in Graphene on Mica

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A lot of effort is being made in order to understand the interaction between graphene and its substrate, and to find new and possibly better materials.
Here, we are investigating the use of muscovite mica. The layered structure allows perfect basal (001) cleavage with atomically flat terraces, and using mechanical exfoliation, very thin crystals can be created and used as a substrate and gate dielectric. It has been shown that under ambient conditions, dipole oriented water films can grow on the surface of mica [1]. When graphene is placed on mica, these water films get trapped and can be visualized using SPM [2]. We investigate the effect of using mica as a substrate for graphene on its transport properties. The measurements show a very large hysteresis with respect to the gate voltage, which we probe using dual gated devices, with both mica and hexagonal boron-nitride dielectrics.

References:

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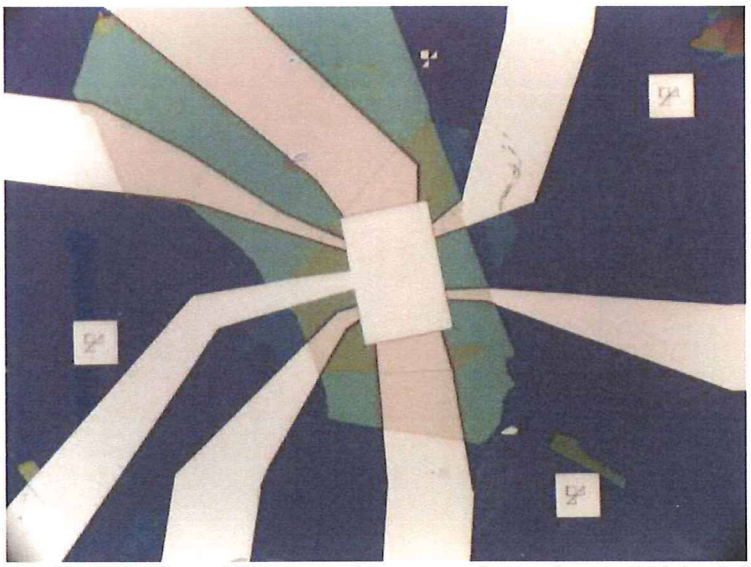

Fig. 1: A double gated graphene device. The monolayer graphene is sandwiched between mica and hexagonal boron nitride