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Mesoscopic Electron Transport in Nanostructured Graphene BARBAROS OEZYILMAZ, D. EFETOV, K. BOLOTIN, M. Y. HAN, P. JARILLO-HERERO, P. KIM, Physics Department, Columbia University — We present experimental results on low energy electric transport studies in mesoscopic graphene quantum devices. Graphene sheets have been fabricated by means of micromechanical exfoliation. Subsequently we define mesoscopic Aharonov-Bohm (AB) rings. The electron interference in such ring shaped graphene ribbons is controlled using a perpendicular magnetic field. We will discuss magnetoresistance oscillations obtained on AB rings with ring width of $\sim$ 50 nm and ring diameters ranging from 300 nm to 3000 nm as a function of both temperature and carrier density. In addition, we present our efforts on locally controlling the carrier density in graphene sheets. The latter are patterned into ribbons of $\sim$ 100nm width and contacted in a first step with source and drain electrodes. In a second step multiple lithographically-patterned electrostatic local top gates are aligned to each device. We will discuss transport measurements as a function of local gate voltages.

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