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STM of graphene on boron nitride

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Graphene on hexagonal boron nitride (hBN) has been shown to have significantly improved mobility and charge inhomogeneity based on electrical transport measurements. Using scanning tunneling microscopy, we have observed that the surface roughness is reduced by one order of magnitude as compared to graphene on SiO_2 devices. Near the Dirac point, graphene breaks up into a series of electron and hole puddles due to potential fluctuations. Using scanning tunneling spectroscopy, we have shown that the potential fluctuations are also reduced by an order of magnitude on hBN. The ultraflat and clean nature of graphene on hBN devices allows for the observation of scattering from buried step edges. The energy and spatial dependence of the scattering gives information about the dispersion relation of graphene and the chiral nature of the quasiparticles. In this talk, I will also discuss our recent spectroscopy measurements on hBN.