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Planar Tunneling Spectroscopy of Graphene Nanodevices JOEL I-JAN WANG, LANDRY BRETHEAU, Massachusetts Institute of Technology, USA, RICCARDO PISONI, Massachusetts Institute of Technology, USA/Politecnico di Milano,Italy, KENJI WATANABE, TAKASHI TANIGUCHI, National Institute for Materials Science (NIMS), Japan, PABLO JARILLO-HERRERO, Massachusetts Institute of Technology, USA — 2-D Van-der-Waals mesoscopic physics have seen a rapid development in the last 10 years, with new materials each year added to the toolbox. Stacking them like Lego enables the combination of their individual electronic properties. In particular, hexagonal boron nitride, which is an insulator, gives the possibility to perform planar (2-D to 2-D) tunneling spectroscopy within this type of heterostructures. Unlike standard transport measurements, tunneling spectroscopy enables to probe the electronic properties in the energy domain. Moreover, since planar tunneling probes a large area of the system, global quantum features such as quantum Hall effect, superconducting proximity effect or quantum confinement can be investigated. In this talk, we will present implementation of heterostructures consisting of graphene, hexagonal boron nitride, and graphite, fabricated for planar tunneling spectroscopy. In order to reveal the intrinsic properties of materials, the fabrication scheme aims at preserving the pristine nature of the 2-DEGS as well as minimizing the doping introduced by external probes. As a demonstration, measurements of these devices in normal states, high magnetic field environment, and induced superconducting state will be presented.

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