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Spectromicroscopy study of surface morphology and quasiparticle dynamics in suspended graphene KEVIN KNOX, MEHMET YILMAZ, Columbia University, SHANCAI WANG, Renmin University of China, ALBERTO MORGANTE, Trieste University, DEAN CVETKO, University of Ljubljana, ANDREA LOCATELLI, ONUR MENTES, MIGUEL NINO, Elettra Synchrotron, PHILIP KIM, RICHARD OSGOOD, Columbia University — We report angle-resolved photoemission and electron diffraction measurements of single crystal exfoliated graphene obtained at the Nanospectroscopy beamline at the Elettra synchrotron light source. Although typical exfoliated graphene sample sizes prohibit the use of conventional UHV techniques, we have used micro-spot low-energy electron diffraction (μLEED) and micro-spot angle-resolved photoemission (μARPES) to probe this unique 2D system. μLEED measurements provide information about the surface morphology of monolayer and multilayer graphene sheets, which are not atomically flat, but microscopically corrugated. Our photoemission measurements reveal details of the quasiparticle spectrum in the vicinity of the Fermi level. We will discuss modifications to the bare band dispersion due to electron-electron interactions and departure from the standard Fermi liquid model for quasiparticle lifetime. Results from suspended graphene will be compared to results from samples supported on SiO_2.

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