Linear band dispersion in multilayer epitaxial graphene grown on the SiC(000-1) C face

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Epitaxial graphene (EG) onto SiC is extremely promising for applications because it makes feasible carbon electronics while circumventing carbon nanotubes problems, i.e. scalability and contact problems. It is possible to grow exceptional quality graphene on both Si and C faces of SiC. For multilayer epitaxial graphene (MEG) grown on the C-face, a unique rotational stacking of the graphene layers causes adjacent graphene layers to be electronically decoupled. A set of nearly independent linearly dispersing bands (Dirac cones) at the graphene K-point are observed, where each cone corresponds to an individual macro-scale graphene sheet. The top layers in MEG are quasi neutral, with the Dirac point within experimental resolution from the Fermi level (about 10meV). This is in contrast to deviations to the linear dispersion observed elsewhere for highly doped EG on the Si-face indicating electron-phonon and electron-plasmon coupling (the Dirac point is 440 meV below E_F). We will provide here direct experimental evidence of these observations using angle-resolved photoemission.

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