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Sharp Landau Levels in Scanning Tunneling Spectroscopy of Epitaxial Graphene on SiC(000 -1) DAVID MILLER, KEVIN KUBISTA, GREGORY RUTTER, MING RUAN, WALT DE HEER, PHILLIP FIRST, Georgia Institute of Technology, JOSEPH STROSCIO, Center for Nanoscale Science and Technology, NIST — Monolayer graphene has unique electronic properties stemming from a low-energy band structure that is linear, with chiral Dirac quasiparticles. In a magnetic field, the Landau level (LL) energies for graphene E_n vary proportional to $\sqrt{nB}$, where n is the LL index. Conversely, Bernal-stacked bilayer graphene and graphite have parabolic dispersion at low energies, resulting in $E_n \propto B$. In this talk we measure the LL spectrum of the top graphene layer directly via scanning tunneling spectroscopy (STS) at a 4.3 K. We show that for $\approx$ 10-layer epitaxial graphene grown on SiC(000 -1), the spectrum exhibits very sharp peaks (including a strong n=0 peak) spaced as $E_n \propto \sqrt{nB}$. This spectrum indicates that the rotational stacking in multilayer epitaxial graphene effectively decouples the layers, producing single-layer graphene behavior. Work supported in part by NSF, NRI-INDEX, and the W. M. Keck Foundation.

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