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Scanning tunneling microscopy and spectroscopy of graphene.¹ GUOHONG LI, ADINA LUICAN, EVA Y. ANDREI, Department of Physics and Astronomy, Rutgers University, Piscataway, New Jersey 08854, USA — We report low temperature high magnetic field scanning tunneling microscopy and spectroscopy on a graphene sheet suspended above a graphite substrate by extended defects. The measurements provide the first observation of the V-shaped density of states in zero field and of the Landau level (LL) spectrum in finite fields. The LL spectrum consists of a single sequence exhibiting square root dependence on field and level-index, and contains a zero energy LL attesting to the chiral nature of the Dirac Fermion quasiparticles. The density of states reflects important effects due to electron-phonon interactions and to confinement. These include a reduced Fermi velocity, a small (10 meV) gap at the Dirac point, splitting of the n=0 LL at relatively low fields and a new negative energy state that emerges from the Fermi level and splits away linearly with increasing field.

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