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Tip-induced Coulomb gap in scanning tunneling microscopy experiment on graphene YUE ZHAO, JUNGSEOK CHAE, CNST/NIST;Maryland Nanocenter, Univ, of Maryland, College Park, SUYONG JUNG, KRISS, Korea, CORY DEAN, Dept. of Electrical Engineering, Dept. of Mechanical Engineering, Columbia Univ., LEI WANG, YUANDA GAO, JAMES HONE, Dept. of Mechanical Engineering, Columbia Univ., JOAO RODRIGUES, SHAFFIQUE ADAM, Graphene Research Centre, NUS, Singapore, TAKASHI TANIGUCHI, KENJI WATANABE, NIMS, Japan, KENNETH SHEPARD, Dept. of Electrical Engineering, Columbia Univ., ANDREA YOUNG, PHILIP KIM, Dept. of Physics, Columbia Univ., NIKOLAI ZHITENEV, JOSEPH STROSCIO, CNST/NIST — Graphene is a two-dimensional-electron-gas (2DEG) system exposed at the surface, which allows scanning tunneling microscopy (STM) to investigate the electron-electron interactions associated with the Dirac nature on a local scale, with a variety of tuning knobs, such as carrier density, spatially varying disorder potential, and applied magnetic field. However, the electron-electron interaction in graphene is sensitive to the disorder details. Moreover, a tip induced potential can significantly complicate the interpretation of details in the tunneling spectra. Utilizing high mobility graphene devices with low residual disorder, we can minimize the effect of local potential fluctuation, to better understand the role of tip-induced potentials in the measurement. We report the observation of large energy gaps and modification to Landau level (LLs) spectra, which are due to the spatially inhomogeneous density profile caused by tip gating.

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