

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Visualizing the condensation of graphene whispering gallery modes into Landau levels in real-space CHRISTOPHER GUTIERREZ, DANIEL WALKUP, FERESHTE GHAHARI, Center for Nanoscale Science and Technology, NIST / Maryland NanoCenter, University of Maryland, College Park, KENJI WATANABE, TAKASHI TANIGUCHI, National Institute for Materials Science, NIKOLAI B. ZHITENEV, JOSEPH A. STROSCIO, Center for Nanoscale Science and Technology, NIST — Recent methods for the creation of circular p–n junctions in graphene have opened the door to investigating the effects of spatial confinement on Dirac fermions, such as the formation of whispering gallery modes (WGMs). These quasi-bound modes can be confined even further into highly-degenerate Landau levels by the application of a perpendicular magnetic field. Here we use scanning tunneling microscopy and spectroscopy (STM/STS) to investigate the effects of increasing magnetic field on the graphene WGMs in graphene/boron nitride heterostructures. Using detailed differential conductance (dI/dV) mapping we directly visualize the condensation of the distinct WGMs into degenerate Landau levels. We further show that residual disorder allows for the imaging of cyclotron orbits and circular edge modes.

Christopher Gutierrez
Center for Nanoscale Science and Technology, NIST

Date submitted: 10 Nov 2016

Electronic form version 1.4