Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Reflection of Dirac Plasmons by Topological Line Defects in Bilayer Graphene ZACHARIAH ADDISON, Univ of Pennsylvania, BOR-YUAN JIANG, GUANGXIN NI, UCSD, JING SHI, XIAOMENG LIU, FRANK ZHAO, PHILIP KIM, Harvard University, EUGENE MELE, Univ of Pennsylvania, MICHAEL FOGLER, UCSD, DIMITRI BASOV, Columbia University — We report experimental and theoretical studies of local optical conductivity of AB-BA domain walls in bilayer graphene. Scanning near-field nanoscopy is employed to find and image these topological defects. It reveals characteristic interference patterns of graphene plasmons that are launched by the scanned tip of the nanoscope and scattering by the domain walls. To explain these observations we compute the electron structure, the carrier density, and the optical conductivity profiles across the domain walls. We find that the band structure exhibits position-dependent splitting of the Dirac points in energy and momentum, which generates an anisotropic modulation of both real and imaginary parts of the conductivity. The magnitude and the direction of the anisotropy depends on the whether the domain wall is shear or tensile. These calculations are combined with electromagnetic modeling of the tip-sample interaction and a qualitative agreement with experiment is found.

Zachariah Addison
Univ of Pennsylvania

Date submitted: 10 Nov 2016 Electronic form version 1.4