Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Photoresponsive memory device based on Graphene/Boron Nitride heterostructure SALMAN KAHN, JAIRO VELASCO JR, LONG JU , DILLON WONG , JUWON LEE, HSIN ZON TSAI , Department of Physics, University of California, Berkeley, TAKASHI TANIGUCHI , KENJI WATANABE , Advanced Materials Laboratory, National Institute for Materials Science, ALEX ZETTL, FENG WANG, MICHAEL CROMMIE, Department of Physics, University of California, Berkeley — Recent technological advancements have allowed the stacking of two dimensional layered material in order to create van der Waals heterostructures (VDH), enabling the design of novel properties by exploiting the proximal interaction between layers with different electronic properties. We report the creation of an optoelectronic memory device using a Graphene/Boron Nitride (hBN) heterostructure. Using the photo-induced doping phenomenon, we are able to spatially "write" a doping profile on graphene and "read" the profile through electrical transport and local probe techniques. We then utilize defect engineering to enhance the optoelectronic response of graphene and explore the effect of defects in hBN. Our work introduces a simple device architecture to create an optoelectronic memory device and contributes towards understanding the proximal effects of hBN on Graphene.

Salman Kahn
Department of Physics, University of California, Berkeley

Date submitted: 14 Nov 2014 Electronic form version 1.4