Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Photocurrent measurements in Coupled Quantum Well van der Waals Heterostructures made of 2D Transition Metal Dichalcogenides. ANDREW JOE, LUIS JAUREGUI, ALEX HIGH, ALAN DIBOS, ELGIN GULPINAR, KATERYNA PISTUNOVA, HONGKUN PARK, PHILIP KIM, Harvard University, Physics Department — , Luis A. Jauregui, Alex A. High, Alan Dibos, Elgin Gulpinar, Kateryna Pistunova, Hongkun Park, Philip Kim Harvard University, Physics Department -abstract- Single layer transition metal dichalcogenides (TMDC) are 2-dimensional (2D) semiconductors van der Waals (vdW) characterized by a direct optical bandgap in the visible wavelength (˜2 eV). Characterization of the band alignment between TMDC and the barrier is important for the fabrication of tunneling devices. Here, we fabricate coupled quantum well (CQW) heterostructures made of 2D TMDCs with hexagonal Boron nitride (hBN) as an atomically thin barrier and gate dielectric and with top and bottom metal (or graphite) as gate electrodes. We observe a clear dependence of the photo-generated current with varying hBN thickness, electrode workfunctions, electric field, laser excitation power, excitation wavelength, and temperature. We will discuss the implication of photocurrent in relation to quantum transport process across the vdW interfaces.

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Date submitted: 24 Nov 2015 Electronic form version 1.4