Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Temperature dependence of hot electron interlayer transport through a WSe2/MoSe2 heterostructure MAXWELL GROSSNICKLE, FATEMEH BARATI, SHANSHAN SU, ROGER LAKE, VIVEK AJI, NATHANIEL GABOR, Univ of California - Riverside — By synthesizing two-dimensional van der Waals heterostructures from carefully chosen materials, we may engineer semiconductors with remarkable functionality. However, electron transport through the interface between two different atomically thin semiconductors is not well understood. We report on the temperature dependence of the current-voltage characteristics in a tungsten diselenide / molybdenum diselenide heterostructure device. We observe asymmetric current-voltage characteristics and negative differential conductance that changes dramatically as a function of increasing temperature. We develop a detailed model of interlayer electron transfer that fully captures the temperature dependence and accounts for highly efficient interlayer impact excitation by hot carriers.

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Date submitted: 11 Nov 2016 Electronic form version 1.4