Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Electrically-tunable exciton-plasmon coupling in van der Waals heterostructures YOU ZHOU, Department of Physics, Department of Chemistry and Chemical Biology, Harvard University, ALEXANDER HIGH, GIOVANNI SCURI, Department of Physics, Harvard University, ALAN DIBOS, School of Engineering and Applied Sciences, Harvard University, LUIS JAUREGUI, KRISTIAAN DE GREVE, DOMINIK WILD, MIKHAIL LUKIN, PHILIP KIM, Department of Physics, Harvard University, HONGKUN PARK, Department of Physics, Department of Chemistry and Chemical Biology, Harvard University — Two dimensional transition metal dichalcogenide monolayers (TMDMs) are promising candidates for integrated optoelectronic devices. TMDMs can be stacked onto other van der Waals materials and the resulting heterostructures can be transferred onto various functional substrates. In addition, TMDMs exhibit tightly-bound, direct-gap excitons, which can be electrostatically controlled by applying a gate voltage. In this work, we employ such response to realize integrated on-chip optical modulators by coupling excitons in tungsten diselenide (WSe_2) based van der Waals heterostructures to plasmonic waveguides fabricated on single crystalline silver. The enhanced light-matter interaction in the integrated nanoplasmonic waveguide-TMDM system allows us to realize high-performance non-resonant electro-optic switches that function both at 4 K and at room temperature.

You Zhou
Department of Physics, Department of Chemistry and Chemical Biology, Harvard University

Date submitted: 11 Nov 2016 Electronic form version 1.4