Abstract Submitted
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**Electron-hole transport and photovoltaic effect in gated $MoS_2$ Schottky junctions**[1] ANTHONY BOYD, Georgetown University, MARCIO FONTANA, Georgetown University, Federal University of Bahia, TRISTAN DEPPE, MOHAMED RINZAN, AMY LIU, MAKARAND PARANJAPE, PAOLA BARBARA, Georgetown University — Atomically thin molybdenum disulfide has emerged as an attractive material for novel nanoscale optoelectronic devices due to its reduced dimensionality and large direct bandgap. Since optoelectronic devices require electron-hole generation/recombination, it is important to be able to fabricate ambipolar transistors to investigate charge transport both in the conduction band and in the valence band. Although $n$-type transistor operation for single-layer and few-layer $MoS_2$ with gold source and drain contacts was recently demonstrated..., transport in the valence band has been elusive for solid-state devices. Here we show that a multi-layer $MoS_2$ channel can be hole-doped by palladium contacts, yielding $MoS_2$ $p$-type transistors [1]. When two different materials are used for the source and drain contacts, for example hole-doping Pd and electron-doping Au, the Schottky junctions formed at the $MoS_2$ contacts produce a clear photovoltaic effect [1].

[1] M. Fontana, T. Deppe, A. Boyd, M. Rinzan, A. Liu, M. Paranjape, and P. Barbara, *Photovoltaic effect in gated $MoS_2$ Schottky junctions*, in, arXiv:1206.6125v1 [cond-mat.mtrl-sci]

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