Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Electronic and photo-electronic transport in sputter deposited MoS_2 film MILINDA WASALA, SUJOY GHOSH, JIE ZHANG, JULIANNA RICHIE, DIPANJAN MAZUMDAR, Department of Physics, Southern Illinois University Carbondale IL-62901, USA, SWASTIK KAR, Department of Physics, Northeastern University, Boston, MA-02115, USA, SAIKAT TALAPATRA, Department of Physics, Southern Illinois University Carbondale IL-62901, USA — Here we report on the electrical transport as well as photo response of large area sputter deposited few-layers of thin MoS_2. Temperature dependent (55 K -275K) electronic conductivity measured on these samples show evidence of 2D Variable Range Hopping (2D-VRH) mechanism within 100K-275K. Photoconductivity measurements investigated using a continuous laser of λ =658nm (E=1.88eV), over a broad range of illuminating laser intensity, P (0.19μW <P <11μW). The steady state photocurrent (I_{ph}) indicates a fractional power dependence on laser intensity. The highest responsivities obtained in these films are found to be $\sim 0.2 AW^{-1}$.The frequency (with Laser pulse frequency range 1Hz-200Hz) dependent photocurrent will be presented and discussed. This work is supported by the U.S. Army Research Office through a MURI grant # W911NF-11-1-0362 and NSF-PIRE OISE-0968405.

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Date submitted: 13 Nov 2014 Electronic form version 1.4