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Enhancement of photocurrent on few-layered p-WSe_2 FET by multi-terminal measurement[1] CARLOS GARCIA, Florida State University/NHMFL, NIHAR PRADHAN, NHMFL, JOSHUA HOLLEMAN, DANIEL RHODES, Florida State University/NHMFL, LUIS BALICAS, STEPHEN MCGILL, NHMFL — Recently, two dimensional materials particularly transition metal dichalcogenides (TMDs) have been extensively studied because of their strong light-matter interactions and extraordinary electrical and optical properties in field-effect transistors (FETs). We investigated the photocurrent response on few-layered p-WSe_2 and $MoSe_2$ FETs in a multi-terminal configuration using a 532 nm laser. Photogenerated current I_{ph} (= I_{light}-I_{dark}) was measured as a function of optical power incident on the sample with varying source-drain bias, V_{ds}, and back gate voltage, V_{bg}. We observed a large enhancement of photocurrent in a four-terminal configuration compared to a two-terminal configuration. The measured two-terminal photoresponsivity (R) and external quantum efficiency (EQE) from our ˜10 layers p-WSe_2 at applied V_{ds} =1V and V_{bg} =10V were ˜18A/W and ˜4000%, respectively. The R and EQE values increased to ˜85 A/W and ˜20000% respectively using a four-terminal configuration. Thus by using a multi-terminal configuration, one can observe an enhanced photocurrent response on few-layered TMDs for potential applications in photo-detection and optoelectronic circuits.

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Carlos Garcia
Florida State University

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