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Helicity Resolved Raman Scattering of Atomic Layers of Transition Metal Dichalcogenides SHAO-YU CHEN, JUN YAN, Univ of Mass - Amherst — Semiconducting transition metal dichalcogenides (TMDCs) such as MoS_2, $MoSe_2$, WS_2 and WSe_2 are promising two dimensional (2D) materials for electronic and optoelectronic applications. Moreover, the unique capability to manipulate the valley degree of freedom with circularly polarized light has attracted widespread attention for potential applications in valley- and spin-tronics. In this talk we present helicity resolved Raman scattering of TMDC atomic layers. The dominant first order Raman bands, including the low energy breathing and shear modes as well as the high energy zone center optical phonons, are found to either maintain or completely switch the helicity of incident photons. This helicity selectivity due to phonon scattering is interpreted by symmetry of lattice vibrations without involving intervalley scattering. Our results provide a useful tool for characterization of TMDC atomic layers and offer new insights into the connection between photon helicity and valley polarization.

Shao-Yu Chen
Univ of Mass - Amherst

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