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Second Harmonic Generation and Two-Photon Absorption in Few-Layer Transition Metal Dichalcogenides KYLE SEYLER, JOHN SCHAIBLEY, SANFENG WU, JASON ROSS, XIAODONG XU, University of Washington — Atomically thin crystals of transition metal dichalcogenides (TMDs) have recently stimulated great interest due to their 2D optoelectronic properties, including strongly bound and tunable excitons and trions, and valley polarization and coherence. To date, most research efforts have been focused on the linear optical properties of TMDs. However, the recent observation of strong second harmonic generation and two-photon absorption in TMD monolayers suggests that the non-linear optical properties may provide important insights into the excitonic physics of TMDs and lead to the observation of new phenomena. Here we present results of two-photon absorption and second harmonic generation experiments on monolayer and bilayer WSe₂, under varied incident photon energy, photon polarization, and external electric field. We discuss the implications of these results on our understanding of the 2D excitonic physics in few-layer TMDs.

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