

Abstract Submitted
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Spin/valley dynamics of resident electrons and holes in gated monolayer WSe₂ PRASENJIT DEY, LUYI YANG, SCOTT CROOKER, NHMFL, Los Alamos National Laboratory, CEDRIC ROBERT, GANG WANG, BERNHARD URBASZEK, XAVIER MARIE, Institut National des Sciences Appliqués, Toulouse, XAVIER MARIE RESEARCH GROUP COLLABORATION — Robust spin-valley coupling is a key prerequisite for next generation spintronic and valleytronic devices. Monolayer transition metal dichalcogenides provide an excellent platform to explore the spin-valley physics of electrons, holes and excitons. In contrast to the short (picosecond) recombination lifetimes of excitons and trions, recent studies of electron-doped MoS₂ and WS₂ monolayers demonstrated surprisingly long (nanosecond) spin lifetimes and spin coherence of resident electrons [1,2]. Here we use continuous wave (CW) and time-resolved Kerr rotation spectroscopy (TRKR) to explore the spin and valley polarization dynamics in electrostatically-gated crystals of exfoliated monolayer WSe₂. Long-lived polarization dynamics of both resident electrons and holes are observed. Measurements as a function of applied magnetic field, temperature, and carrier doping density will be presented. [1] Yang *et al.*, *Nature Phys.* **11**, 830 (2015). [2] Yang *et al.*, *Nano Lett.* **15**, 8250 (2015).

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