

Abstract Submitted
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Long-lived hole spin/valley polarization probed by time-resolved Kerr rotation XINLIN SONG, University of Michigan, SAIEN XIE, KIBUM KANG, JIWOONG PARK, Cornell University, VANESSA SIH, University of Michigan — Time-resolved Kerr rotation and photoluminescence measurements are performed on MOCVD-grown monolayer tungsten diselenide (WSe_2). We observe a long-lived Kerr rotation signal (around 80 ns) at 10 K, which is attributed to spin/valley polarization of the resident holes. This polarization is robust to transverse magnetic field (up to 0.3 T) due to spin-orbit spin stabilization. Temperature-dependent photoluminescence measurements show a transition from free exciton emission to localized exciton emission as the temperature decreases. Wavelength-dependent measurements reveal that only excitation near the free exciton energy generates this long-lived spin/valley polarization. The long polarization lifetime supports the promise of transition metal dichalcogenides for proposed spintronic and valleytronic devices and opens new investigations aimed at controlling spin/valley polarization in the valence band. (Nano Lett., 2016, 16(8), pp 5010-5014)

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