

Abstract Submitted
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Local Spectroscopic Characterization of Spin and Layer Polarization in WSe₂ DEVIN MCKENZIE, MATTHEW YANKOWITZ, BRIAN LEROY, University of Arizona — Semiconducting transition metal dichalcogenides, such as WSe₂, exhibit very strong spin-orbit coupling (SOC) at certain band extrema due to large in-plane dipole moments formed by their heavy constituent atoms. The strong SOC links the spin and valley degrees of freedom in monolayers. In bilayers, interlayer hopping is suppressed by this SOC, leading to a spontaneous layer polarization and a coupling of the layer pseudospin with the spin and valley degrees of freedom. We examine these effects by tracking allowed and forbidden electronic scattering pathways in monolayer and bilayer WSe₂ using scanning tunneling spectroscopy. Specifically, we observe a strong suppression of intervalley scattering in both monolayer and bilayer WSe₂ indicative of these band polarizations.

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