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Engineering Interlayer Exciton Dynamics in 2D Semiconductor Heterostructures NATHAN WILSON, KYLE SEYLER, PASQUAL RIVERA, XIAODONG XU, University of Washington — Heterostructures (HSs) formed by monolayers of transition metal dichalcogenides (TMDs) have recently emerged as promising 2D analogues to coupled quantum wells formed by 3D semiconductors, with interest arising from a number of novel physical properties. These include valley contrasting physics inherited from the HS's monolayer constituents; the interlayer excitons that form therein, which exhibit lifetimes orders of magnitude longer than the intralayer species due to reduced electron-hole exchange interactions; and the strong many-body interactions which dominate interlayer exciton dynamics. By separating the TMD layers with a thin dielectric spacer, we reduce the electron-hole wavefunction overlap of the interlayer exciton and tune their repulsive dipole-dipole many-body interactions, thus modifying the interlayer exciton dynamics.

Nathan Wilson
University of Washington

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