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Abstract for an Invited Paper
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Controlling excitons in 2D semiconductor heterostructures.[1]

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Two dimensional (2D) semiconductor transition metal dichalcogenides (such as $MoSe_2$ and WSe_2) host excitons with large 500 meV binding energies that interact strongly with light. In recent years, the development of bilayer heterostructures that host spatially indirect interlayer excitons has led to the discovery of moire' excitons, and control of valley polarized exciton currents. I will discuss our recent progress investigating the temperature dependent moire' trapping and deterministic nanoscale trapping of interlayer excitons in $MoSe_2$-WSe_2 heterostructures. In particular, we report a transition temperature of the interlayer exciton photoluminescence intensity that has opposite behaviors for heterostructures with near 0 and near 60 degree relative twist angle. I will also describe our recent demonstration of nanoscale interlayer exciton traps that have potential applications to quantum information science applications.

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