

Optical Properties of Semiconductor moiré Crystals

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A new type of superlattice, known as the moiré superlattice, form when two monolayers of van der Waals materials are stacked to form a heterostructure. A periodic energy modulation, as well as distinct optical selection rules, give rise to rich optical properties that remain largely unexplored in semiconductor moiré crystals. I will discuss how the moiré potential in twisted transition metal dichalcogenide bilayers changes the exciton resonances and diffusion in a manner controllable by the twist angle. Additional insights are obtained by comparing heterostructures prepared with either chemical vapor deposition or mechanical stacking. There are many exciting opportunities for exploring fundamental condensed matter physics and novel optoelectronic devices such as an array of single-photon emitters in these moiré crystals.

