

# CMP Seminar

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## Tunable excited states in moiré superlattices

In van der Waals bilayers, the strict requirement of lattice matching at the interface is lifted. The periodic changes in atomic alignment lead to the formation of an in-plane superlattice, known as the moiré superlattice. The twist angle acts as a unique knob to control the material properties. Instead of focusing on the correlated ground states often discussed in the literature, I will discuss how excited states and collective excitations are modified. The lifetimes of bound electron-hole pairs (i.e. excitons) can be varied by one order of magnitude when the twist angle of a MoSe<sub>2</sub>/WSe<sub>2</sub> bilayer is varied from 1° to 3.5°. The phonon spectra evolution in MoS<sub>2</sub> bilayers reflects lattice reconstruction over a surprisingly large range of twist angles from zero to 6°. If time permits, I will share some new results on topological magnons that exhibit long lifetimes near the Brillouin zone boundary.

Zoom Link: <https://msu.zoom.us/j/92073802920>

Zoom Password: 199627

Monday, April 18<sup>th</sup>, 2022, at 4:10 p.m.

Host: Xianglin Ke