SEMINAR: Electrical and Optical Manifestations of Flat Band Physics in van der Waals Semiconductors Abstract

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SMR

Understanding and controlling correlated and topological states in low-dimensional semiconductors requires experimental tools that can reveal hidden electronic degrees of freedom with high sensitivity.

In this talk, I will present how out-of-plane tunneling currents provide such access. Using this approach, we achieved the electrical detection of flat electronic bands in van der Waals semiconductors, directly resolving their density of states trend. I will then show how the same technique enabled the electrical detection of light's chirality in an achiral system and uncovered the longstanding prediction of spin polarization at the valence band edge of InSe. These findings highlight how tunneling spectroscopy can uncover otherwise inaccessible aspects of band-structure physics. I will conclude with a brief outlook on our latest efforts, which aim at contactless transport in 2D semiconductors and novel optical probes in hybrid heterostructures.

Hosted by: Frank Koppens