

# Quantum emitters in atomically thin material



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Room: MAS2.06

This talk will focus on our recent experiments on quantum-emitters that are hosted in a class of atomically-thin material called transition-metal-dichalcogenide (TMDs). A range of quantum-emitters, from trapped single atoms to nanosized quantum dots in the solid-state, are being studied in the quantum optics community for purposes of basic science, nanoscale sensing, and potential quantum communication technologies. I will describe how the 2D-nature of the host material we work with brings unique and important advantages for achieving these goals, for example the ease of incorporating into nanophotonic structures. I will then discuss the quantum-emitter arrays that we have been able to create through nanoscale strain engineering, and how we have used a van der Waals heterostructure device for electrically exciting them. Finally, I will show our preliminary results for charge control of the quantum-emitters, which holds promise for quantum network applications and interfacing with other quantum devices, such as superconducting qubits.

[1] Palacios-Berraquero, C. P. et. al. Large-scale quantum-emitter arrays in atomically thin semiconductors. Nat. Commun. 8, 15093 (2017)

[2] Palacios-Berraquero, C. P. et. al. Atomically thin quantum light-emitting diodes. Nat. Commun. 7, 12978 doi: 10.1038/ncomms12978 (2016).