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## Strong interactions of lattice-polaritons in 2D quantum materials

*Wednesday, 25 September 2024 11:00 (30 minutes)*

The optical nonlinearities of most materials are exceedingly small, which often requires fairly intense light fields with many photons to observe notable nonlinear effects. On the other hand, the possibility to enhance optical nonlinearities to the level of individual photons holds a number of interesting prospects, scientifically as well as technologically. Here, two-dimensional, atomically thin systems of quantum emitters offer a promising approach to enter this regime of quantum nonlinear optics.

This talk will focus on two complementary platforms based on (i) ultracold atoms in optical lattices and (ii) excitons in Moiré superlattices of twisted bilayer quantum materials. In particular, I will outline different ideas of how the interaction between such spatially confined quantum emitters can be exploited to enhance nonlinearities and generate strong effective interactions between lattice-polaritons. Perspectives and implications for experiments and potential applications will also be discussed.

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