Poster-1-7

Quantum sensing of correlated electrons in moiré hétérostructures

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Quantum sensing is a fast developing area, where properties specific to the quantum realm are exploited to get more accurate data on a much sensitive scale. We present a new sensing scheme aimed at in-depth studies of the highly tunable moiré Transition Metal Dichalcogenides (TMDs). The technique aims to probe local phenomena as well as large-scale electronic correlations, which are prominent in these systems. We obtain this precision by studying dipolar intraleyers excitons through the degree of circular polarisation obtained by photoluminescence (PL), which allows to not average over domains or disorder. As a case study, we will present our PL results on a dual moiré hétérostructure of WSe2/MoSe2/WSe2 and compare them to reflectance results and simulations. We could observe spectral jumps of IX with blue- and red-shifts, occuring at what we identified to be certain rational fillings of the electronic moiré lattice. These results introduce moiré confined IX excitons as a powerful tool to refine our understanding of light-matter interactions in systems with complex electronic structures.