

Allgemeines Physikalisches Kolloquium

Donnerstag, 27.06.2024 - 16 Uhr c.t.



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Controlling Excitons in van der Waals heterostructures with tunable optical cavities

Monolayer transition metal dichalcogenides (TMDC) have emerged as a new and interesting platform for studies of tightly bound exciton in ultimately thin materials. Their giant dipole coupling to optical fields makes them very appealing for implementing novel photonic devices, and for fundamental, as well as quantum photonic investigations in the framework of cavity quantum electrodynamics [1].

For those investigations and applications, flexible, tunable, and user-friendly optical microresonators are key!

I will discuss a technologically advanced implementation of a spectrally tunable, open optical cavity, which can be operated under cryogenic conditions in liquid helium free, magnetic optical cryostats [2], as well as at ambient conditions. It is ideally suited for the study the coherent interaction of light and matter, such as emergent exciton-polaritons in atomically thin materials and van der Waals heterostructures. I will discuss selected experiments, which outline the potential of our developed technology.

References

[1] C. Schneider et al. *Nature Comm.* 9, 2695 (2018).

[2] J. Drawer, V. Mitryakhin et al. *Nano letters*, 23, 8683 (2023)