Seminar announcement

Tuesday, May 21, 2024
1:30 pm
WSI, Seminar room S 101
Exclusively in person

"Quantum optics meets microscopy
An ultra-sensitive micro-resonator platform by Qlibri"

Due to their small size, individual nanoscale systems provide weak interaction with light and therefore often escape direct observation. This often limits insights into individual nanosystems and therefore slows research in the fields of nanotechnology, material science, drug design, and pharmaceutical diagnostics.
To overcome these limitations Qlibri uses optical micro-resonators, a technology pioneered in quantum optics. In these resonators, light passes a sample up to 100.000 times and thereby enhances weak signals. By means of micro-cavities with a small mode waist and a scanning microscopy approach, sensitive spatially resolved absorption measurements near the diffraction limit can be performed (Nat. Comm. 6, 7249, 2015). By optimizing the mechanical stability and by developing integrated electronics, extinction cross section of 1nm2 can be imaged in real time. The potential of this new type of microscopes is illustrated by hyperspectral imaging of individual carbon nanotubes, TMD heterostructures, and label free imaging of ultrathin tissue sections. Based on this technology Qlibri also developed an ultra-stable and cryogenic open-access micro-cavity platform for quantum optics experiments with solid state systems. This platform can be tuned to any kind of quantum emitter and can be used to enable efficient single-photon sources, strong coupling, and even quantum computing.

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