



# Seminarankündigung

**Dienstag, 25. November 2014**

**15:00 Uhr**

**WSI, Seminarraum S 101**

## **“Advanced single-photon sources and scanning-cavity microscopy with fiber-based optical microcavities”**

State of the art optical microcavities store light within volumes of wavelength scale for millions of optical cycles. Such spatio-temporal confinement of light can dramatically enhance light-matter interactions. To provide this capability on an accessible platform, we have developed microscopic Fabry-Perot cavities based on laser-machined optical fibers. The design achieves small mode volumes and large quality factors, combined with full tuneability and open access to the cavity field.

In a first experiment, we employ fiber cavities to realize efficient and narrow-band single-photon sources by means of Purcell enhancement of fluorescence emission. We study colour centers in diamond nanocrystals such as the nitrogen vacancy center and explore a large range of cavity parameters to assess different regimes of the cavity enhancement.

In the context of sensitive microscopy, we investigate microcavities for their use in scanning imaging applications. Multiple interaction of probe light with a sample placed inside a cavity promises an increase in sensitivity on the order of the cavity Finesse, reaching values  $>100000$  for fiber cavities. We demonstrate scanning-cavity microscopy, which provides spatially and spectrally resolved maps of various optical properties of a sample with high sensitivity. The method should enable studies of a large variety of nanoscale samples, such as individual non-flourescent macromolecules and weakly absorbing nanoparticles.

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