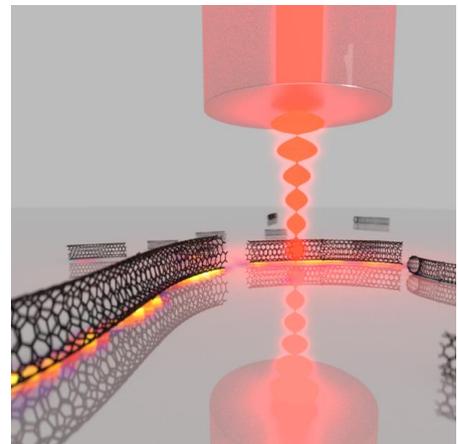


Doctoral Thesis

Cavity quantum electrodynamics and optomechanics with carbon nanotubes

We are inviting applications for a PhD position in the group of Prof. David Hunger (PHI, KIT). We are performing experiments on cavity enhancement of the fluorescence of individual solid state emitters and on cavity-enhanced absorption microscopy. Our vision is to realize simple, robust and scalable quantum interfaces between light and matter. Such interfaces call for ultimate spatio-temporal confinement of light, i.e. the combination of a large quality factor and a microscopic cavity mode volume. Using optical fibers with laser-machined endfacets as mirror substrates, we have realized microscopic cavities with wavelength-scale mode volumes and exceptionally high quality factors. Combined with suitable optical emitters, this provides a competitive cavity QED platform which stands out due to its flexibility and open access.



Recent progress in the growth of freestanding narrow-diameter single-walled carbon nanotubes (CNTs) has demonstrated that this system can show exceptional fluorescence properties, including a strong optical dipole transition, single photon emission characteristics, and close to Fourier limited linewidth even at elevated temperatures. At the same time, CNTs yield mechanical modes with high quality factors and ultra-low mass. This promises an extensive potential for cavity-based experiments, including the achievement of the strong coupling regime, access to novel regimes of cavity optomechanics, and new insight into 1D quantum systems.

We seek for a creative and motivated individual to advance this research project. Experience in the fields of quantum optics, cavity QED, or solid state spectroscopy is advantageous.

Applications should include

- a curriculum vitae (including details about previous research experience and skills, if applicable list of publications)
- academic records (Bachelor, Masters or diploma, including grades)
- an informal statement about your research interest (max. 1 page)
- contact information of at least one potential referee

For further inquiries and applications please contact Prof. David Hunger.