

Master's thesis project

Cavity optomechanics on a coupled micro-drum set



<https://pixy.org/542092/>

In this project you will dive into the interesting field of cavity optomechanics. We create micrometer scale mechanical devices made from silicon nitride, using advanced nanofabrication techniques here on campus: imagine a drum, but now more than 10 000x smaller! So small that it can be played utilizing the momentum of photons, the so-called radiation pressure.

You will also use light to extract information about mechanical properties - like their quality factors and resonance frequencies. What happens to these properties when many of the drums are coupled? That will be the key question of your project. We apply a novel technique to perform usually very extensive measurements on rather short time scales.

We already have some working samples, so you can directly start and go ahead with the measurements. But you will also have the chance to learn many aspects of nanofabrication and make your own devices in the cleanroom, then measure them, and analyze the data.

Project details

The project is perfectly suited for Quantum Science & Technology (QST), Applied and Engineering Physics (AEP) and Condensed Matter Physics (KM) students, but if you follow another track, we are still interested in hearing from you. The same applies if you are from a different department, or a different university. Being curious and wanting to get a feeling for what doing *real* research is about is the most important factor. There are no formal requirements on courses taken. The project has the following components:

- Nanostructures (experimental) ~70%
- Optics (experimental) ~30%

What do we offer?

Our group works on experiments for quantum technology in the broadest sense. In particular, we focus on nano- and optomechanics, as well as on on-chip photonics for integrated quantum optics experiments. We are relatively small, so you will be working together with almost all group members. For more information about us, also take a look at our website: www.qtech.ph.tum.de.

Interested?

We love to hear from you and will be more than happy to answer any questions that you may have on this project. The first step is to contact us, so that we can discuss this (or other) projects with you in person; just come by in Rm. 3071 or send an e-mail to menno.poot@tum.de.

