Wieczorek Group,
Quantum Technology Laboratory,
Department of Microtechnology and Nanoscience (MC2)

Master thesis project
Measurement of ultracoherent nanomechanics

Background Ultrahigh quality factor mechanical resonators (Fig. 1) are central to quantum experiments as well as precision measurements as they reduce decoherence as well as thermal noise. The motion of the resonator can be detected optically using optical interferometry, which converts mechanical motion into a measurable phase shift on the optical light field. This technique is used to determine the mechanical quality factor, which is an important device parameter. To this end, a ring-down measurement is performed, whereby the resonator is driven and subsequently allowed to freely decay (Fig. 2).

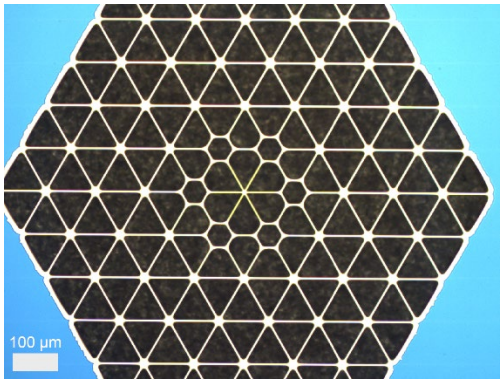

Fig. 1 High-Q nanomechanical resonator.

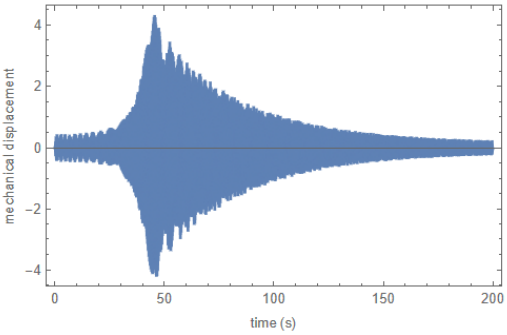

Fig. 2 Ring-down of a nanomechanical resonator.

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The project consists of

- setting up of mechanical ring down measurement techniques for determining the quality factor of nanomechanical resonators,
- developing ways to efficiently excite the resonator without affecting its intrinsic properties, and
- modeling of the optomechanical dynamics.

What will you learn

- Optical set-up's and measurement techniques,
- Physics of high-quality factor nanomechanical resonators and optomechanical devices,
- Teamwork in a stimulating research environment.

Questions? Contacts:

Witlef Wieczorek, Professor, witlef.wieczorek@chalmers.se

Anastasiia Ciers, Researcher, anastasiia.ciers@chalmers.se

Alexander Jung, PhD, alexander.jung@chalmers.se