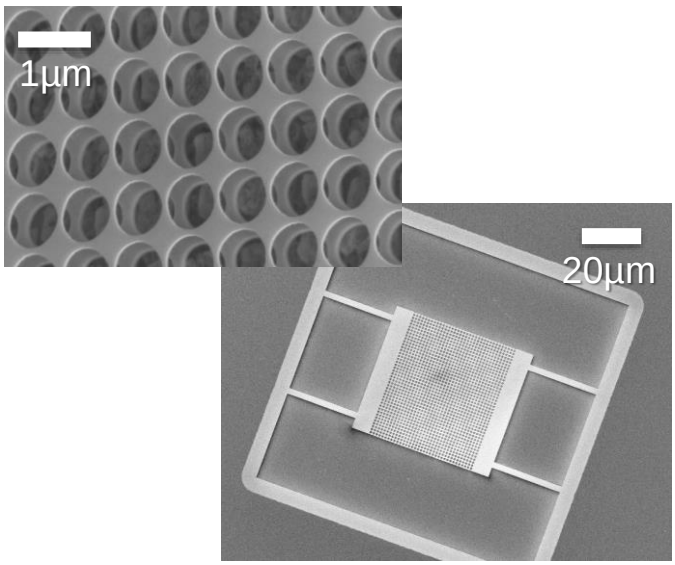
CHALMERS UNIVERSITY OF TECHNOLOGY
Department of Microtechnology and Nanoscience (MC2)
Quantum Technology laboratory

Master thesis projects
Control over mechanical motion for sensing and fundamental studies

Our research group explores the control over mechanical motion – down to the quantum regime – for reaching novel capabilities in sensing and for fundamental studies. We follow different experimental approaches to pursue this exciting endeavor: coupling mechanical motion to light in so-called cavity optomechanical devices and using superconducting magnetic levitation as a means to reach ultralow mechanical dissipation. We offer a Master thesis project in each of these topics.

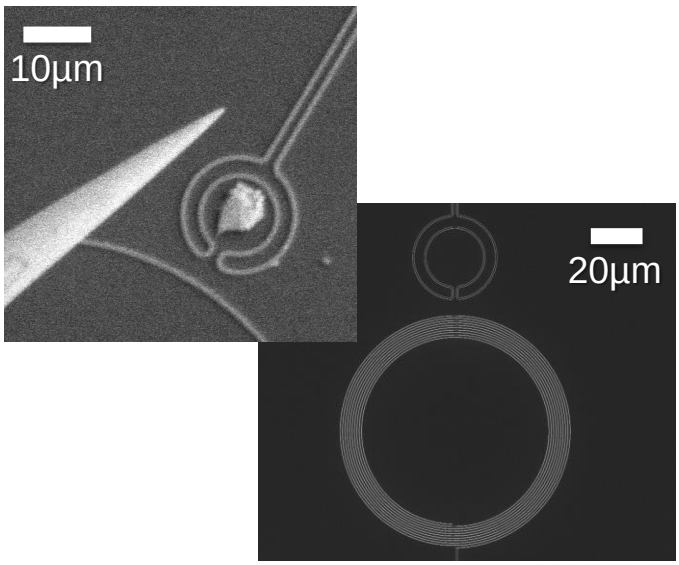
Photonic crystal-based reflectors for cavity optomechanics

The interaction between light and mechanical motion using radiation pressure has already been used to cool mechanical resonators to the ground state of motion. This interaction can be drastically increased by using mechanically compliant, photonic crystal-type reflectors embedded in an optical cavity. The project will look into simulating, fabricating and characterizing such devices in the lab.



Superconducting levitation of micrometer-sized particles

A tiny object levitated in vacuum is the ideal means to minimize mechanical dissipation. Therefore, such an object constitutes an ultra-sensitive device for measuring external forces or accelerations and provides also an opportunity to bring macroscopic objects into quantum states. The project looks into simulating, fabricating and characterizing chip-based traps for superconducting levitation.



For more information: www.wieczorek-lab.com

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