Master thesis project
Cavity optomechanics with photonic crystal reflectors

Our research group explores the control over mechanical motion – down to the quantum regime – for reaching novel capabilities in sensing and for fundamental studies. This project exploits the coupling of mechanical motion to light in so-called cavity optomechanical devices\(^1\) (see image on the left). This coupling has already been used to cool mechanical resonators to the ground state of motion\(^2\), but new applications can be reached once the optomechanical interaction becomes much stronger.

Mechanically compliant, photonic crystal-type reflectors\(^3\) (see image on the left) embedded in an optical cavity are a system that promises to increase the coupling appreciably\(^4\).

This Master thesis project will focus on the characterization of single- and double-layer photonic crystal slabs. This includes measurements of optical and mechanical properties of the slabs accompanied with simulations of these properties to understand the measurement results. During the thesis you will learn the physics behind optomechanical systems, their simulation in FEM, their fabrication and how to perform optical measurements in the lab.

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