

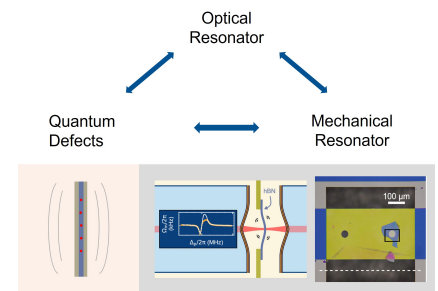
# Master Thesis: 2D Mechanical Resonators for Quantum Technologies

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## Motivation

Ever thought of building vibrating drums out of molecules? Here is the solution: Freely suspended van-der-Waals materials like hexagonal Boron Nitride (hBN) or transition metal dichalcogenides (TMDC) are interesting hybrid physical systems which allow for the mutual coupling of mechanical, electronic, as well as optical degrees of freedom. The electromechanical coupling is mediated by strain, and leads to a modification of the electronic band structure upon mechanical deflection, which allows for the coupling of excitons. These systems are promising platforms in quantum technologies, e.g. for **quantum sensing**, **transduction** and **single photon sources**.



## Scope of Master Project



Based on your skills and interests there is room to set individual focus according to the project requirements. Basically the project will include:

- The project will start with the **fabrication** of 2D mechanical resonators. We will give you the tools at hand to work in a cleanroom including photolithography, imaging tools and exfoliation of 2D materials.
- You will help to improve the fabrication process and there is room for ideas to further develop the platform architecture.
- Together with our **diverse team** you will get deep insights of nanomechanical resonators and van-der-Waals materials.
- You will perform **optical measurements** and gain hands-on experience on optical setups and spectroscopy.

## Your Profile

You are well equipped for this task if:

- You are keen to work in an **interdisciplinary team** of physicists and engineers. You like teamwork and communication.
- You have a background in **physics** or related fields with focus on either optics, nanofabrication, nanomechanics, quantum technologies or similar
- You have already demonstrated your skillfully handling of tweezers. In the lab you are driven by curiosity and guided by your patience.

## Interested ?

Reach out to us!

Please send an email with a **short CV**, **transcript of records** and your **bachelor thesis** to:

[lukas.schleicher@tum.de](mailto:lukas.schleicher@tum.de)

Starting: Early 2025