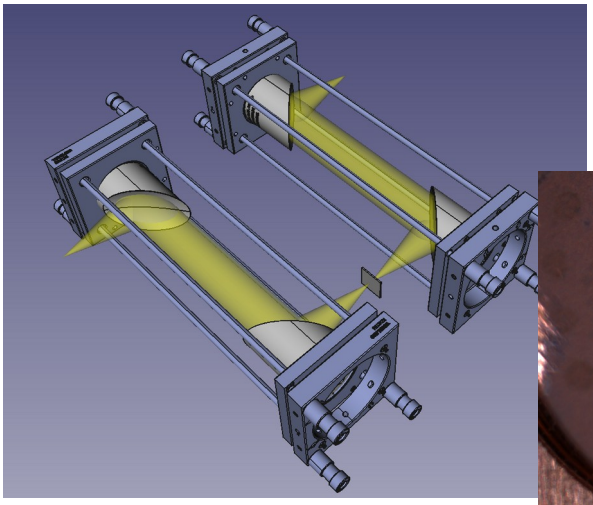
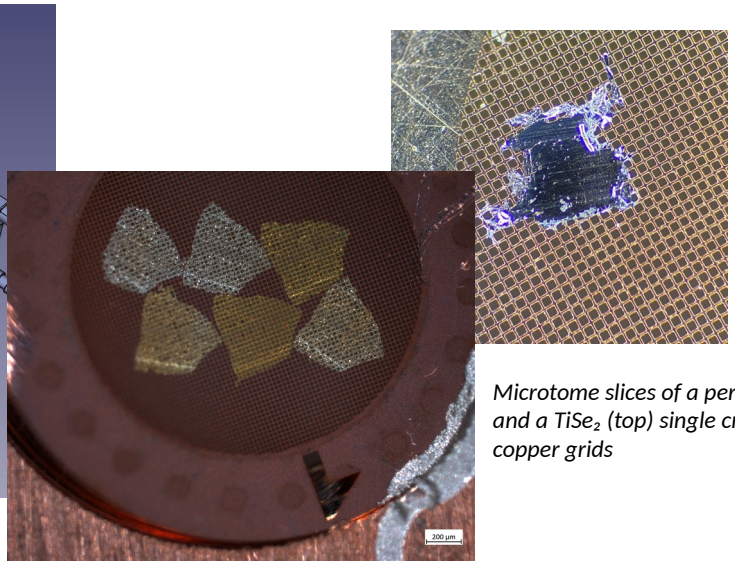
Building a µ-Transmission Spectrometer for the Characterization of Thin Single Crystals

The absorption spectrum of a material is a key property in materials research. It helps test whether new semiconductor materials are suitable for optoelectronic applications. When studying crystalline samples, often only very small crystals are available. However, commercial absorption spectrometers usually require samples that are several centimeters in size. As a result, researchers often use polycrystalline thin films instead, which means losing important information about the crystal orientation.

In this project, a µ-transmission spectrometer will be built to study thin samples with lateral sizes of just a few hundred micrometers. It will be tested and used to study different semiconductor materials such as organic single crystals and TMDCs.



Technical drawing of the planned setup



Microtome slices of a perylene (left) and a $TiSe_2$ (top) single crystal on copper grids

Your Tasks:

- Build and optimize a µ-transmission spectrometer
- Develop a routine for data analysis
- Prepare and optically characterize thin single-crystal samples

Requirements

- Good hands-on skills
- Careful and precise working style
- … and of course, an interest in experiments!

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