

Laser processing of materials

Flexible duration 4-8 weeks Start date for spring: prefer before March 10

Project description:

We have been using a commercial CO₂ laser engraver to make semiconductor threads inside glass cladding into single crystals. (Think optical fiber, but bigger, and with a core suitable for longer wavelengths than glass can transmit). We want to extend our scanning capability to include rotating the fiber during the process.

There are a couple of possible implementation methods – one involving piezoelectric “stepper motors”, and one using an analog high-speed drill. We will test the samples to determine what difference they make in the recrystallization process, whether we can promote different optical behavior in the fiber and whether it will permit recrystallization of larger samples than has been possible to date.

The project can be just a short investigation of the possibility of machining the glass around the semiconductor, or something that continues and involves NanoLab analysis of the core semiconductor and a possible master's oppgave. Either individual students, or pairs of students interested in working together can apply.

Skills/interests/activities: For the analog motor, this project will require establishing mounting, alignment and monitoring procedures – much of which is mechanical design, working with the machine shop, etc. For the piezo motor, learning to run the software, figuring out how to mount the fiber, and the effects of the laser treatment will be important. Depending on the time that the student can commit, inclusion in the nanolab/XRD analysis of the crystals will be part of the project, though these aspects will probably be done in collaboration with a PhD student or a post-doc. Speaking English is not a requirement – both Norwegian and English are used in the lab, but comprehension of written papers and instructions in English is necessary.

Contact: Ursula Gibson, ursula.gibson@ntnu.no, D5-159