MSc Thesis Project.

Automation of free space seed coupling to a high power rod amplifier.

Introduction: NKT Photonics develops fiber laser and photonic crystal fiber devices for imaging, sensing and material processing applications. Their products are pulsed lasers such as supercontinuum sources, low noise fiber lasers and distributed temperature sensor systems and a wide range of fiber and fiber devices for costumer defined application. In NKT Photonics development laboratories, they often have to couple optical fibers, having different parameters. This could be a comm. fiber, which have to be connected to an amplifier rod (fiber). This requires bulk optics components and a cumbersome alignment procedure.

In the Optical Sensor Technology Group at DTU Fotonik (DTU Risø Campus) we are working with classical optics and statistical optic tools for designing optical sensors, which address industrial or consumer applications.

In this project, NKT Photonics intends to construct a bulk optical setup to accommodate an efficient coupling between different fibers. The setup will be based on motorized/electrically adjustable components, which can alignment and optimize the coupling efficiency automatically.

In this master project, the student will use the raytracing matrix formalism to describe the bulk optics, incorporating the requirements to the numerical apertures of the two fibers. The student will construct and develop the bulk optical setup, develop the software for controlling the motorized components and demonstrates the automatic alignment of the coupling between two relevant fibers. The student will be likely to consider different optimization algorithms. Optionally, the student could be involved in calculating optical modes in the fibers. The programming will be carried out in LabView or Python. Most of the practical work will be carried out in NKT Photonics laboratories in Birkerød.

Prerequisites: 34020/34021

Practical details: ECTS-points for the MSc students: 30.

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