

Technical project / Bachelor-thesis

Vorname Name, Matr.-Nr. 700 (xy CPs)

Optomechanical Design of a photonic crystal fiber module

Valid in 2022 / 2023

Background

Photonic crystal fibers (PCF) are important components in short-pulsed laser systems and are the basis for Laser frequency combs (LFC). LFC are versatile tools for a wide range of applications in spectroscopy and optical metrology.

The PCF can be tailored to the needs of the operator. However, the cutting and afterwards the tapering result in a short fiber (a few 10 mm) which are quite sensitive to shocks. The pump laser must be focused onto the center of the PCF very precisely otherwise the PCF can burn. Accordingly, we want to take the PCF out of the tapering machine and place it very precisely in a module that comprises an in- and an outcoupling lens.

The handling can be done using a 5 axis stage as shown in figure 1:

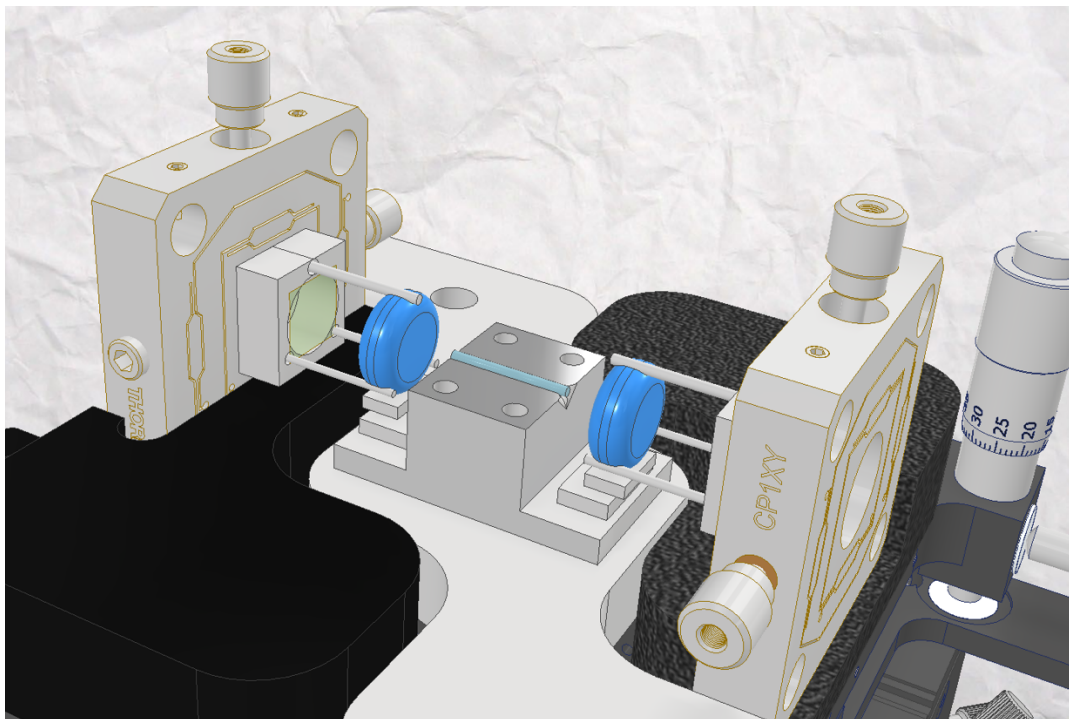


Figure 1: Preliminary sketch of the PCF module and placement.

Purpose

Layout, design and purchasing of a PCF module.

Beginn: tbd
Erstprüfer
Name

Ende / Abgabe: tbd
Zweitprüfer / Betreuer
Name

Stand: 01.12.2021

Scope

From the requirements a physical design can be derived. This shall be realized in a CAD model. The manufacturing of the component shall be planned and carried out. The module shall be setup and tested in a follow-up project (Bachelor-Thesis).

Steps

The following steps are necessary parts of the project

- Phase A:
 - Project planning in Redmine
 - Time planning with a Gantt-chart
 - Create a specification sheet
 - Physical Design
 - Derivation of Requirements
 - 3D model
- Phase B:
 - Choosing, purchasing of components
 - Setup & Alignment of the Module
 - Experiments with a stabilized laser
- Report

Contacts to other institutes or industrial companies can be developed during the project.

Beginn: tbd
Erstprüfer
Name

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