

Call for Bachelor's Thesis: Efficient Fiber Coupling of Lasers (experimental optics)

The Integrated Quantum Photonics Group at the Department of Physics is looking for a motivated physics student to join the group for doing a Bachelor's Thesis.

Motivation

Coupling laser light into fibers allows for a flexible use of light in optical experiments. Efficient fiber coupling requires a large overlap of the laser beam mode and the propagating mode of the fiber. In this project, methods for analyzing and modifying beam profiles will be implemented.

In particular, a non-gaussian beam profile of a laser will be characterized by recording images of the locally varying beam profile and evaluating the data in a self-written data analysis script. The results are used as input parameters in another program based on transfer matrix analysis that models the beam waist evolution over a certain distance and the effect of optical components. Finally, a non-gaussian beam will be coupled efficiently into a fiber using a system of lenses calculated from the acquired data.

Furthermore, a fully automated fiber coupling based on motorized mirror mounts and an optimization algorithm will be implemented.

Tasks

Experiment

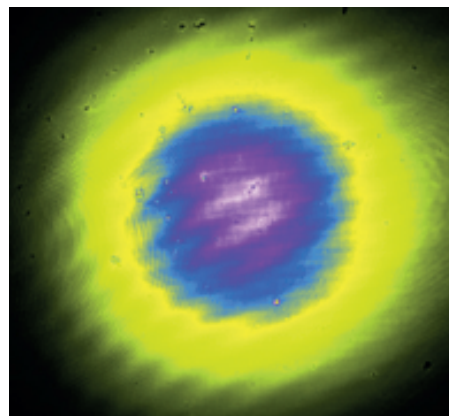
- Characterize beam profiles
- Build automated fiber coupling setup

Theory

- Write a program for data analysis
- Implement a python script for modelling the beam waist evolution in an optical setup based on Gaussian optics and transfer matrix analysis

Requirements

- Highly motivated
- Self-responsible and goal-oriented team player, open for new challenges



Please contact

Laura Orphal-Kobin: orphal@physik.hu-berlin.de

or Dr. Tim Schröder: tim.schroeder@physik.hu-berlin.de

until March 14th 2022

