

Technical project / Bachelor-thesis

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

Photonic Ball lenses on fibers

Valid in 2022 / 2023

Background

Fiber to fiber coupling is always lossy unless a perfect end-to-end connection is realized or ball lenses are placed between the fibers. The drawback is that most often the adjustment of the ball lens has to be done manually. That can be simplified by using ball lenses attached to one fiber end, as shown in figure 1.

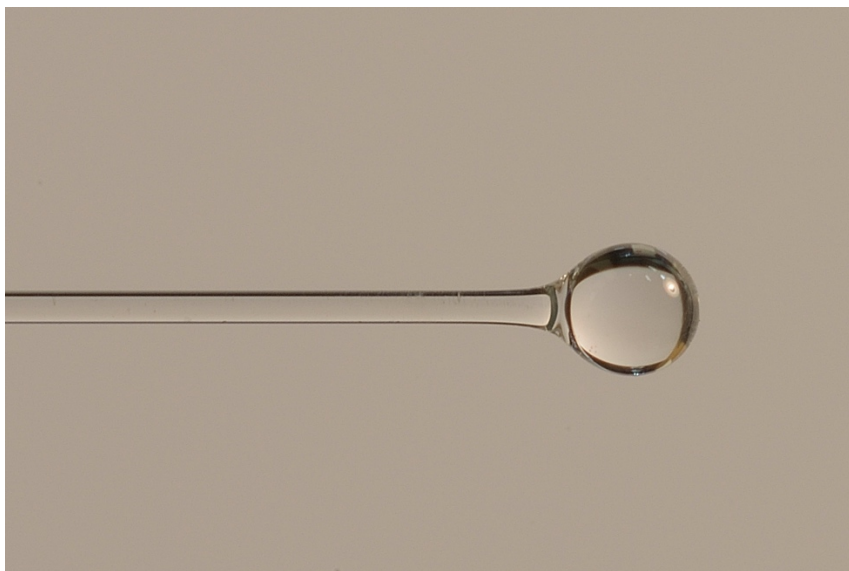


Figure 1: In Emden at the ILO produced fiber ball lens.

The ball lenses can be produced with varying parameters in the laboratories of the ILO in Emden. However, so far no detailed study of the parameters for coupling light into the fiber using the ball lens has been done.

Purpose

Determine the coupling efficiency and insensitivity against tilt, tip and defocus of ball lenses.

Scope

Derive and create a setup suitable for systematic research of the parameters coupling efficiency and the insensitivity against tilt, tip and defocus of fibers with and without ball lenses. The setup shall be used in a follow-up project (Bachelor-Thesis) to optimize the parameters of the ball lenses.

Steps

The following steps are necessary parts of the project

Beginn: tbd
Erstprüfer
Name

Ende / Abgabe: tbd
Zweitprüfer / Betreuer
Name

- Phase A:
 - Project planning in Redmine
 - Time planning with a Gantt-chart
 - Literature review
 - Physical Design of the setup
 - Derivation of Requirements
 - 3D model
 - Experimental tests with one fiber without ball lens and with ball lens
- Phase B:
 - Systematic variations of the ball lenses parameters
 - Derive interdependencies of the parameters
 - 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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Zweitprüfer / Betreuer
Name

Stand: 01.12.2021