

Master – Thesis

16.05.2023

## Development of an evaluation tool for the determination of concentration fields in fluid streams via Laser induced fluorescence (LIF)

### Description

A Matlab/Python tool is to be developed to analyze the mixing of multiphase fluid flows on the basis of scalar fields using quantities such as the concentration of individual phases. We are using a 2D-PIV- System to image and calculate velocity vector fields so far. The thesis goal is to upgrade the PIV-System to a LIF-System using the available double-pulse Nd:YAG laser (532 nm) and the sCMOS camera.

In order to calculate the concentration fields from digital images taken by the sCMOS camera, the intensity values of the individual pixels or interrogation windows have to be converted into the corresponding size by means of calibrated images. The designed software has to be validated through various experiments in the tech lab.

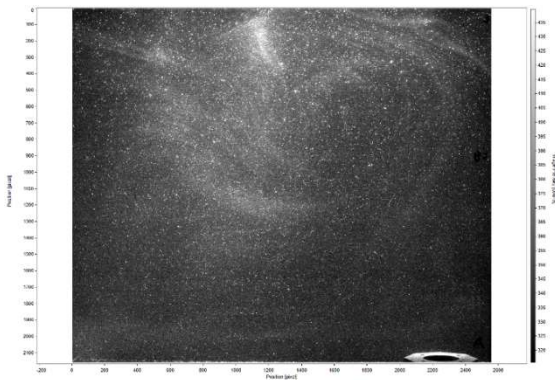


Figure 1: Image for evaluation by Particle Image Velocimetry (PIV); Source: RES

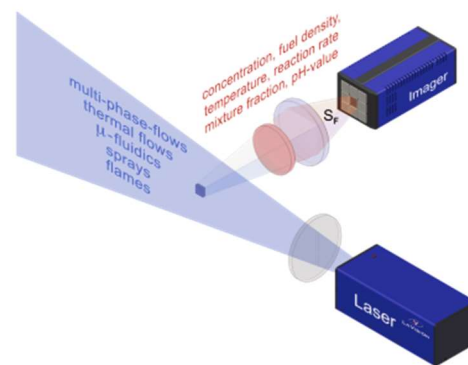


Figure 2: Laser induced fluorescence (LIF); Source: LaVision

### Tasks

- Literature research
- Development of the necessary experiments for calibration and validation
- Programming the software tool in Matlab/Python
- Calibration of the recorded pictures
- Validation of the derived scalar fields

### Requirements

- Basic programming skills (Matlab, Python,...)
- Good practical skills and motivation for works in the tech lab

If you think you are the right candidate to solve this task please contact me. You can **start the thesis anytime**. Looking forward to get to know you.

### Contact

Bernhard Huber

Professur für Regenerative Energiesysteme

Schulgasse 16, 94315 Straubing, Raum 0.A10

Telefon: +49 (0) 9421 187-114

E-Mail: b.huber@tum.de