Typ: Bachelor or Master Thesis

Datum: possible at any time

Betreuung: M.Sc. Alexander Schwarzwälder

Investigation of Coalescence Mechanisms of Picolitre Drops on Fibers with High-Speed Camera and Self-Developed Tools for Image Analysis

In mist filtration, fiber-based coalescers serve as a well-established method for filtering droplets present in mist. The filtration process comprises distinct steps, delineating the influence of droplets on fibers, the creation of fluid structures, and the transport of liquid. Coalescence, where smaller droplets merge into larger ones, is a pivotal mechanism in the formation of fluid structures, hence the term “coalescing filter”.

In order to investigate mechanisms inside depth filters on a microscopic level, investigations are often reduced to single fibres. In this study, the droplet-fiber interaction of a vibrating fiber in a flow channel will be investigated. For this purpose, tiny droplets in the picolitre range are to be placed on a fiber. The handling of these media on a microscopic level is a major challenge of the experiments. Cutting-edge high-speed optics and self-programmed tools for image analysis, including object tracking and contact angle analysis (Matlab or Python), will be employed to identify mechanisms of the droplet-fibre interaction.

If you are generally interested in micro fluidics, filtration and image postprocessing I would be happy if you send me an email or give me a call. Afterwards, we can work together to align the thesis according to your interests and wishes.

What I can offer you:

- I maintain an intensive mentoring relationship with my students with regular appointments (if requested) and I’m always available to support with problems
- I give my students the freedom to contribute their own ideas to the final project

Your tasks include:

- Depending on the specific topic CAD modelling of 3D-printed parts for the test rig
- Developing an understanding for optical systems
- Development of tools for image analysis
- Creation and tracking of a project plan for your thesis

What should you bring to the job:

- Having fun to try and learn new things
- Ability to communicate
- goal-oriented working
- Basic knowledge of C++, MATLAB or Python is beneficial

Contact Information

Alexander Schwarzwälder, M.Sc.
E-Mail: alexander.schwarzwaelder@kit.edu
Tel.: +49 721 608-46573
Straße am Forum 8
Geb. 30.70, Raum 109
76131 Karlsruhe