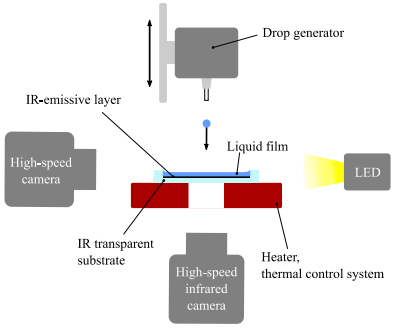
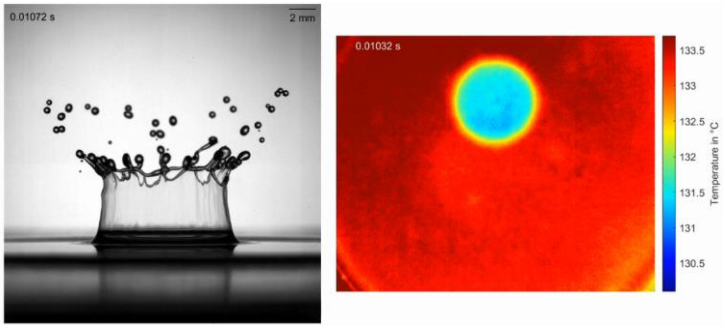
Master Thesis

"Splash characterization during the non-isothermal drop impact on a heated liquid film"

Spray impact on thin wall films is an important process in many industrial applications e.g. spray cooling or internal combustion. In this process the single drop impact is an integral part. The drop impact is shaped by hydro- and thermodynamic mechanisms. One of the outcomes is a corona splash where numerous secondary drops are developing which can have a significant influence on the overall process. Its understanding and prediction therefore is of great importance.

This thesis involves the investigation of the corona splash experimentally. With an already existing experimental setup with high-speed imaging, drop impact experiments should be performed. The operational parameters should be varied systematically to investigate different influences. This is achieved by using different liquids (water, silicone oils, etc.) and by changing other parameters like film temperature, film thickness etc. Afterwards the measurements are evaluated with image processing algorithms. A focus of the evaluation lies in extending existing models for the splashing threshold and additionally in analyzing the secondary spray (drop size and velocity distribution).





Requirements:

- High motivation and interest in experimental work
- General knowledge of fluid dynamics
- Hands-on experience with sensors, high speed cameras and image-processing is beneficial

Tasks:

- Modify existing experimental setup if needed
- Perform drop impact experiments under various experimental conditions
- Evaluation with a focus on the corona splash (secondary spray distribution, splashing threshold)

Starting time: as soon as possible

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