



## Bachelor's or Master's Thesis

Experimental Investigation of Droplet Impact on Thin Films Using  $\mu$ PIV/ $\mu$ PTV Measurement Methods

The Droplet Dynamics research group at the Institute of Aerospace Thermodynamics (ITLR) at the University of Stuttgart is searching for a dedicated and motivated thesis candidate for the DROPIT subproject SP-C1/C5. The objective of the thesis is to contribute to the exploration of macroscopic and microscopic flow phenomena associated with the impact of droplets on thin liquid films, particularly focusing on the crown crater.

Due to the relatively fast fluid movements in the extremely thin film and the time-varying process (transient behavior), there are significant demands on measurement methods to accurately resolve the flow. In this regard, the impacting droplet is mixed with small particles, and their movements are tracked using  $\mu$ PIV and  $\mu$ PTV measurement methods.

A crucial prerequisite for the experimental investigations is the precise temporal and spatial resolution of the flow. A functional test stand with appropriate evaluation routines has already been developed for this purpose. The goal of the thesis is to expand the existing parameter space through further experimental parameter studies. Following the investigations, macroscopic features in the crown crater will be determined through the velocity field using the existing MATLAB routine. Finally, an existing evaluation routine will be enhanced to make microscopic observations.

### Task:

- Literature review and familiarization with the topics of droplet dynamics,  $\mu$ PIV,  $\mu$ PTV, and GDPT
- Conducting experimental investigations on the droplet-film interaction at the test rig
- Analysis using existing MATLAB routines
- Further development and implementation of existing evaluation routine
- Written documentation and presentation of the results in a seminar

### Requirements:

- Enrolled student in a natural science or engineering program
- Proficient in German or English, both written and spoken
- Strong programming skills in MATLAB or a comparable programming language

### Wünschenswerte Kenntnisse:

- Advanced programming skills in MATLAB

### Dauer/-Umfang:

- Starting immediately (February 2024)
- The work is to be carried out at the ITLR and should be completed within 4-6 months.

If interested and for further information

Molina Vogelsang, Pablo, M.Sc.

(ITLR, Room.1.115, Tel. 0711/685-62314, [pablo.molina-vogelsang@itlr.uni-stuttgart.de](mailto:pablo.molina-vogelsang@itlr.uni-stuttgart.de))

[https://www.project.uni-stuttgart.de/dropit/research/ta-c\\_drop\\_liquid\\_interaction/](https://www.project.uni-stuttgart.de/dropit/research/ta-c_drop_liquid_interaction/)

