Friedrich-Alexander-Universität
Technische Fakultät

The **Institute of Advanced Optical Technologies – Thermophysical Properties (AOT-TP)** offers a

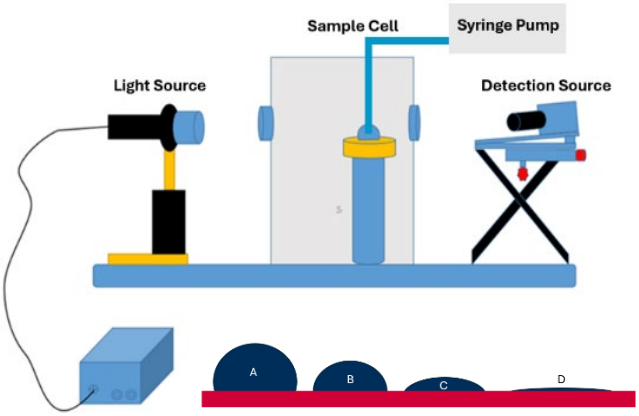
Master Thesis / Internship with consecutive Master Thesis

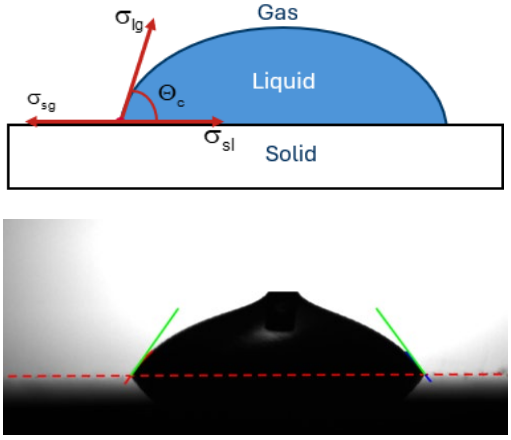
with the tentative title

Wettability Characterization by the Measurement of Contact Angles and the Contact Angle Hysteresis Close to Condensation Conditions

Wettability is defined as the ability of a liquid to maintain contact with a solid surface, resulting from intermolecular interactions between the liquid, the solid, and the surrounding gas phase. It is a key property in surface science and usually quantified by the **static contact angle,** i.e. the equilibrium angle formed at the 3-phase line, as well as by the **contact angle hysteresis**, i.e. the difference between the advancing and receding contact angles measured at dynamic conditions. Understanding wettability helps in designing and optimizing materials by controlling how liquids interact with solid surfaces.

In the present case, contact angle data are needed in connection with **dropwise condensation heat transfer**. The shape of condensate droplets formed on a cooled wall has a significant impact on the conduction heat transfer resistance through them, where besides droplet size, the contact angle is the dominating influencing parameter. Therefore, the primary objective of the announced work is to measure contact angles and contact angle hysteresis for different fluids on various coated solid samples close to condensation conditions.





For this, we are seeking a motivated student with a keen interest in experimental work to join our research team within an **internship with a consecutive Master's thesis**, or **directly with a Master's thesis**. The main tasks are building up, testing, and using an already planned measurement cell in which sessile drops can be created under well-defined conditions. An optical arrangement for acquiring contact-angle images of the droplets is available. For their analysis, a predeveloped Matlab code needs to be further improved to allow for accurate and automated contact angle measurements, where the obtained results need to be interpreted in terms of wettability behavior. Basic skills in Matlab are welcome, but not mandatory. We offer a diverse, multidisciplinary, and international working environment with excellent opportunities for scientific and personal development.

Start of the thesis: As soon as possible

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