Friedrich-Alexander-Universität
Technische Fakultät

AOT-TP

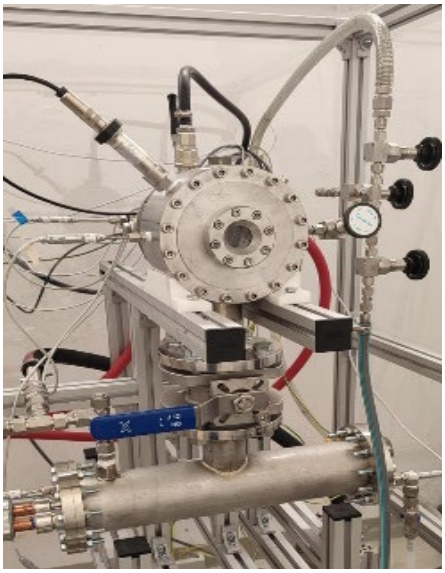
The **Institute of Advanced Optical Technologies – Thermophysical Properties (AOT-TP)** offers a

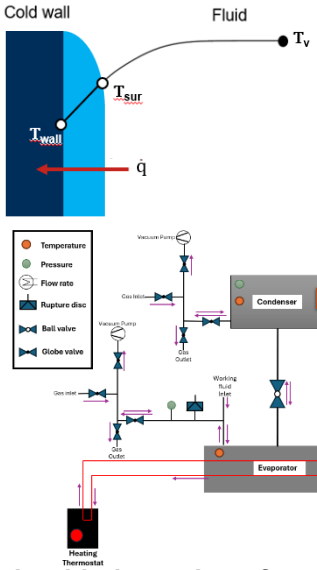
Master Thesis / Internship with consecutive Master Thesis

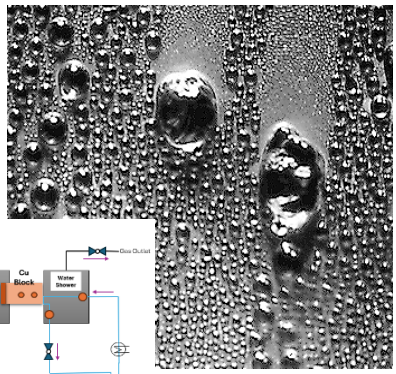
with the tentative title

Dropwise Condensation Heat Transfer of Fluids with Low Surface Tension

The realization of dropwise condensation (DWC) offers the potential to significantly enhance energy efficiency across numerous applications by strongly enhancing heat transfer coefficients compared to filmwise condensation. DWC occurs when droplets form and shed rapidly on a surface. It overcomes the dominant heat conduction resistance in the permanent condensate layer present for filmwise condensation. Therefore, it is particularly effective for fluids that have low surface tension and, at the same time, low thermal conductivity. Although DWC is difficult to realize for low surface tension fluids due to their tendency toward pronounced wetting of solid surfaces, recent developments in surface coating technology pave the way for this application. However, the understanding of how boundary conditions of the condensation process influence the achievable heat transfer coefficients is very scarce and currently under investigation in a DFG-funded research project at AOT-TP. Only with such information, a potential transfer of DWC into applications like advanced cooling systems, more efficient power plants, and innovative thermal management solutions is possible.







The primary objective of this **Master's thesis with the option of a prior internship** is to enhance the fundamental understanding of how parameters like vapor pressure, cooling rates, and the wetting behavior expressed in terms of contact angles influence the resulting heat transfer coefficient during DWC of low surface tension fluids. For realizing DWC, high-performance surface coatings are used. While the main focus of the thesis is on measuring condensation heat transfer coefficients, it can also involve characterizing the wettability of the condensation surfaces by contact angle measurements.

We are looking for dedicated students with a keen interest in heat transfer research and experimental work. 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

Contact: Bara'a Al-khateeb, M.Sc.
Email: baraa.wn.al-khateeb@fau.de
Phone: +49 9131 85-25807