

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

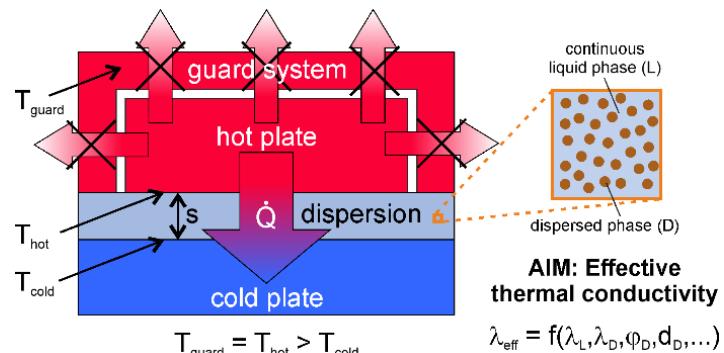
Position as Research Assistant (m/w/d) with the perspective of a doctorate

associated with the research topic

Effective thermal conductivity of dispersions with a continuous liquid phase

Dispersions with a continuous liquid phase are heterogeneous systems consisting of a liquid dispersion medium and a dispersed phase of colloidal particles. A key thermophysical property for the description of heat transfer in dispersions is their effective thermal conductivity (ETC). Based on work carried out at AOT-TP and at other places, it has been possible to refute controversial reports that adding a small amount of solid nanoparticles to liquids can increase the ETC of the resulting “nanofluids” to an exceptionally high level compared to the base fluid. The corresponding debate on the ETC of dispersions is largely linked to the reliability of the experimental methods used. Now that this phase has been overcome, the next step is to identify and quantify the key factors influencing the ETC of nanofluids and similar dispersions.

In a research project funded by the German Research Foundation (DFG), it is the aim to improve the fundamental understanding of the ETC of dispersions with a continuous liquid phase by systematically investigating relevant influencing factors. Here, the focus is on the thermal conductivities of the dispersed and continuous phases as well as the morphology of the dispersed particles and their stability. In addition, influences of a possible thermal contact resistance and the Brownian motion of the particles on the ETC should be analyzed. For this purpose, experimental and theoretical investigations on selected dispersions consisting mainly of solid particles in the nanometer range in a continuous liquid phase are intended. The measurement results obtained with a stationary parallel-plate instrument, together with critically evaluated literature data, serve as a reliable database for analyzing the aforementioned effects on the ETC. Based on the experimental and theoretical considerations, a generalized prediction method for the ETC of dispersions with a continuous phase liquid should be developed.



We are looking for a recently graduated researcher with interests and competences in the field of thermophysical property research by experiment and theory. We offer an interdisciplinary and international working environment allowing for an excellent scientific and personal development.

Start: as soon as possible

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