

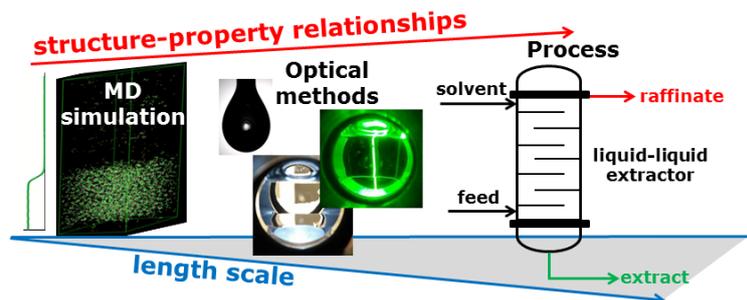
The Institute of Advanced Optical Technologies – Thermophysical Properties (AOT-TP) offers a

Position as Doctoral Researcher (m/f)

for a research project with the tentative title

Interfacial Tension and Viscosity of Biphasic Liquid Systems by Experiments and Molecular Simulations

In many processes of chemical and energy engineering, biphasic liquid systems can be found. These systems consist of two immiscible liquids and are thus associated with phase boundaries. While such ordinary liquid-liquid systems are thermodynamically unstable and separate into the two phases with a defined interface, emulsions exhibit a continuous liquid phase with dispersed small droplets which can be thermodynamically stabilized by surfactants. Understanding the physics at the interfaces and in the bulk of biphasic liquid systems is of practical importance. In liquid-liquid extraction processes, for example, a solvent is used to extract the valuable solute product from the feed stream. Stable emulsions and so-called microemulsions with dispersed micelles having typical diameters of less than 100 nm are currently of interest for thermal insulation and polymerization applications. For process modeling and product design in connection with biphasic liquid systems, detailed knowledge on their thermophysical properties interfacial tension and viscosity is necessary. These properties are considered in important dimensionless numbers of heat and mass transfer. Besides its relevance for the physics of interfaces, the interfacial tension is an important property for engineers affecting wetting, hydrodynamics, and the stability of as well as droplet size in emulsions.



At AOT-TP, advanced measurement and simulation techniques are continuously developed and applied for the accurate determination of thermophysical properties of fluids. The major task of the doctoral researcher is to contribute to a fundamental understanding of biphasic liquid systems by studying their thermophysical properties interfacial tension and viscosity. Objects of investigations are systematically selected liquid-liquid systems and emulsions related to chemical and energy engineering. For deriving structure-property relationships for these systems, optical measurement methods and molecular dynamics (MD) simulations should be further developed and combined. While the macroscopic properties obtained by light scattering from interfaces as well as by the pendant drop method are needed to verify the results from the molecular simulations, the latter results support the interpretation of the experimental data on a molecular level. These findings should serve for the development of engineering models for the macroscopic properties of biphasic liquid systems.

For the research project, we are looking for a graduated researcher with interests in chemical and energy engineering, thermophysical properties, and optical metrology. We offer a multidisciplinary and international working environment with excellent potential for scientific and personal development. We are interested in starting the corresponding cooperation on January 1, 2019.

If you are interested, please contact and forward your application documents to

Prof. Dr.-Ing. habil. Andreas Paul Fröba
 Institute of Advanced Optical Technologies - Thermophysical Properties (AOT-TP)
 Friedrich-Alexander-University Erlangen-Nürnberg (FAU)
 Paul-Gordan-Straße 6, 91052 Erlangen, Germany
 Email: andreas.p.froeba@fau.de
 Phone: +49-9131-85-29789