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| KIT-Campus Nord | ITES | Postfach 3040 | 76021 Karlsruhe | **Institut für Thermische Energietechnik  und Sicherheit (ITES)**  Leiter/in: Prof. Dr. D. Banuti  Wiss. Betreuung:  Prof. Dr. D. Banuti  Hermann-von-Helmholtz-Platz 1  76344 Eggenstein-Leopoldshafen  Telefon: 0721 6082-3451  E-Mail: secretary@ites.kit.edu  Web: https://ites.kit.edu |
| **Master Thesis / Bachelor Thesis:**  **Analysis of droplet vaporization  (numerical / theoretical)** |

Droplet vaporization is an everyday process in nature and technology, from rain drops to fuel injection. The process is well described by Spalding’s classical D2 law, which describes how the droplet size diminishes over time.

Recently, a new scaling law and nondimensional parameter have been proposed that generalize this concept to droplets at supercritical pressures, where, formally, a liquid-vapor equilibrium is strictly not even possible and the existence of droplets under debate.

The goal of this thesis is to assess whether the new analysis leads to better predictions of droplet vaporization using numerical simulations and data from the literature.

The thesis requires

- knowledge in thermodynamics / heat transfer / numerical methods

- experience or interest and willingness to learn Python/Jupyter notebooks for data analysis and model implementation in a CFD solver.

Specifically, the work will involve

- literature research on droplet vaporization data

- simulations of droplet vaporization under various boundary conditions

- scaling analysis and assessment

- documentation and dissemination (thesis, presentation, possibly paper) of the work

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