

Masterarbeit Nr.: LSS-M??

Aufgabenstellung für die Masterarbeit von:

TITLE: **Spray simulations using Eulerian Methods**

The properties of spray and in particular the Droplet Size Distribution (DSD) with associated velocities play an essential role for a variety of processes, e.g., in Internal Combustion Engines and in spray coating. Controlling the DSD is essential to reduce pollutant emission and energy consumption. It is thus becoming increasingly important to predict numerically the DSD. While Lagrangian methods have been traditionally used for this purpose, a purely Euler-Euler approach would be attractive to reduce further the needed computing times, provided accurate results might be obtained. For this purpose, moment-based methods shall be used in this project to solve the underlying Population Balance Equation, like QMOM (*Quadrature-based Method of Moments*) and derived versions. The properties of the population are described with corresponding kernels to represent growth, coalescence, breakage...

Basic versions of this method are available in commercial tools like ANSY-Fluent as well in Open-Source software like OpenFOAM. Own implementations are available as well in our group.

Objectives:

- Understand QMOM and related approaches as well as they implementation
- Carry out spray simulations for prescribed geometry and process parameters
- Analyze the results taking into account all relevant issues like accuracy, stability, computational requirements and compatibility with further models (e.g., wall film models)

Supervision:

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Beginning: ASAP

