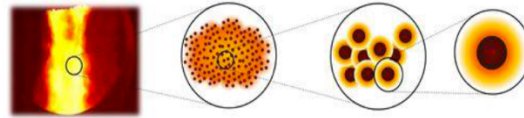


Bachelor / Master thesis - HiWi / Project work



Direct Numerical Simulation and analysis of Oxy-fuel Biomass Combustion

To simulate a solid fuel-powered powerplant on a large scale, understanding the physics of combustion on a particle scale is necessary. Recently, increasing the combustion efficiency by reducing the pollutant emissions and CO₂ capture by using the oxy-fuel combustion for solid fuels has been the main focus of solid fuel combustion research. Since solid particle combustion is a transient and multiphase phenomenon, simulations require detailed models to describe these fuels' behavior under combustion conditions. Our research team aims to study this transient behavior in different conditions and provide accurate models for improving large-scale simulations. Therefore, modeling the ignition, combustion, and pollutant formation of solid fuels such as biomass in laminar and turbulent flows are the main focus of this project. Examples of the configurations, which are investigated, are shown in Figure 1.

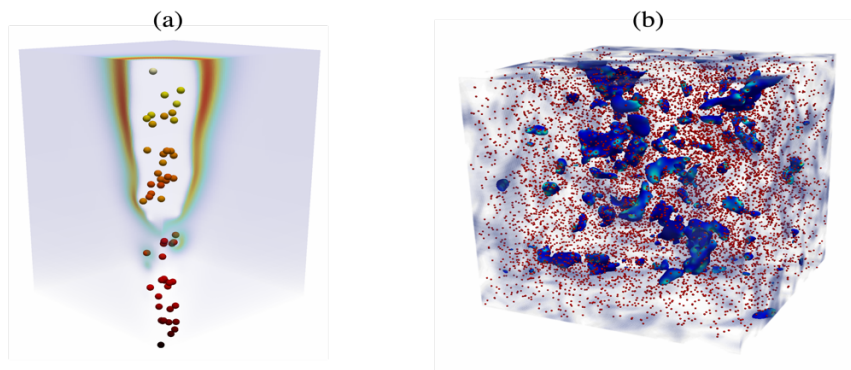


Figure 1: a) Particle jet simulation in laminar configuration. b) Ignition in single and group particle configuration in a turbulent box

Your Tasks:

- Working with combustion models and pollutant models in pulverized fuel combustion.
- Running different simulations for performing parametric studies in different configurations.
- Post-processing and analyzing the result data of the simulations.

Ideal candidate should:

- Have a basic understanding of Combustion and Fluid Dynamics or eager to learn fast.
- Be interested and familiar with programming.
 - Preferably MATLAB and Python (Fortran or C++ are a plus).
- Be familiar with Linux basics and comfortable working with the RWTH cluster.
- Have good communication skills and teamwork spirits.

⇒ **There is also a possibility to link the HiWi work to a thesis!**



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