

Studien- / Bachelor- / Masterarbeit

Resolved Simulation and Modeling of Oxy-Fuel Combustion

Abstract

We are interested in developing multi-scale models for solid fuel combustion under oxy-fuel atmosphere. Applying a bottom-up strategy, first we investigate solid fuel combustion by performing particle resolved simulations (Fig. 1). Combustion of spherical and ellipsoid porous particles under various gas compositions will be studied. The main objective is to resolve solid-gas interface which undergoes surface reactions. For such a reactive multi-phase problem, we have developed numerical algorithms to compute mass, momentum, and energy transfer accurately. Accordingly we offer the following work plan for highly motivated students.

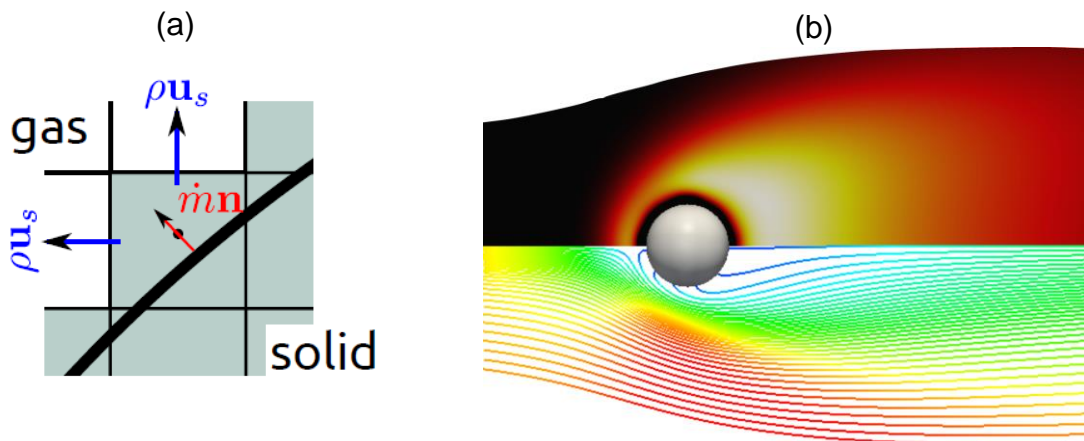


Fig. 1 (a) Velocity boundary condition due to the mass flux from reactive interface, (b) heat release distribution and stream lines around a reactive particle

Work plan

- Becoming familiar with the relevant algorithms in our in-house code
- Testing the developed numerical algorithms with the experimental results
- Performing series of simulations for combustion of spherical and ellipsoid porous particles under various gas compositions
- Literature review of the available models for solid fuel combustion
- Post-processing of results to develop new mass, momentum, and heat transfer models

☺ **There is possibility to combine this work with HiWi !**

The ideal candidates have

- High motivation to learn new numerical algorithms
- Basic knowledge in a programming language
- Responsibility and interest to develop new idea

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