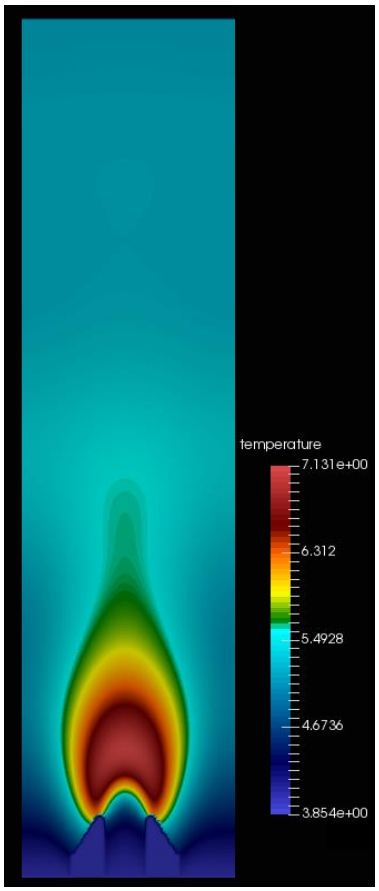
Lehrstuhl für Strömungsmechanik
und Strömungstechnik (LSS)

Masters	Referenz-Nr.: LSS-M??/14	As soon as possible
Modeling reacting flows using novel advection-diffusion lattice Boltzmann schemes		

Short description

During the past decades, lattice Boltzmann has evolved into an efficient tool in modeling fluid systems. The approach has also been extended to model multi-species reacting flows. The classical advection-diffusion LB scheme has been shown to recover classical species transport equations with the Fick approximation. The lattice Boltzmann group at the LSS has developed and implemented a variety of models in an in-house code ALBORZ. These models, as opposed to the simple AD-LBE are mass conserving and can be adapted to recover other approximations such as Hirschfelder for the diffusion term. The code is capable of handling multi-component thermo-chemical properties and detailed chemistry. In the context of this work, ALBORZ will be used to correctly model a set of reacting flow configurations -diluted flames- with detailed chemistry. The results will then be used to benchmark and identify possible sources of error in these models. Limits of numerical stability of such models will also be evaluated and compared to the classical AD-LBE.



Pre-requisites:

- Good knowledge of fluid mechanics
- Practical experience of Computational fluid dynamics
- Basic understanding of multi-species flows
- Good English proficieny
- Basic knowledge in c++ programming

Supervision

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Classification: Experimental ☐ Numerical ☑ Theory/Litterature☐