Institut für Technische Verbrennung

RWTH AACHEN UNIVERSITY

Master thesis

Rapid Pre-Defined Turbulence generation using Fractal and Non-Fractal Grids

Simulation of a turbulent jet

Topic is suitable for

✓ Master thesis

Field of activity

Turbulence generation

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Last updated on

10.11.2023

In this study, we will investigate the generation of turbulence in the near field behind a tailored grid using direct numerical simulations (DNS) and large eddy simulations (LES). The turbulence generated by the grid depends on the structure and nature of the grid. Various grids have been established in the literature, with fractal grids particularly successful in generating turbulence. However, which grids are suitable for a defined turbulence generation in the near field is still unclear. This question will be investigated as part of this thesis to subsequently examine the turbulence-chemistry interaction under high-pressure conditions and establish a suitable grid for experimental studies in a high-pressure reactor as part of our simultaneous experimental study.

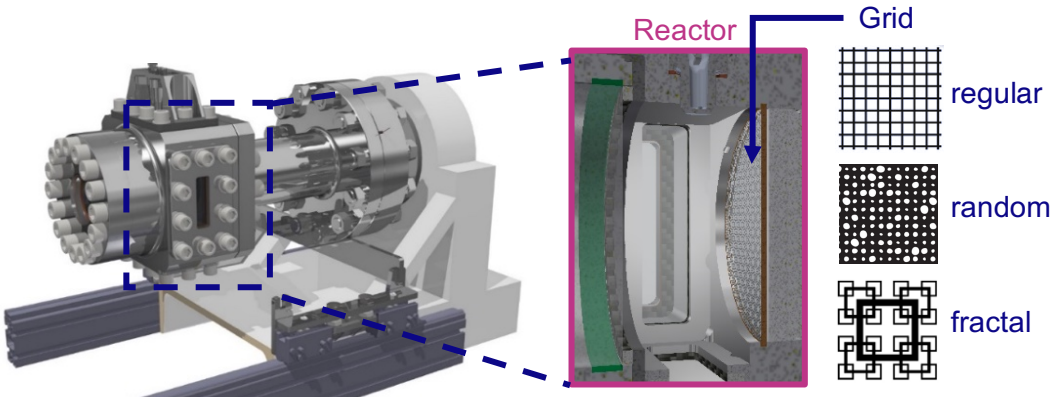

Figure 1. Turbulence generation using tailored grids in a high-pressure reactor.

Your tasks

- ◊ Design the numerical setup
- ◊ Perform DNS and LES on super-computers using our high-performance code
- ◊ Perform statistical analysis and assess grid-generated turbulence
- ◊ Investigate the turbulence-chemistry interaction using different grids

You can expect

- ◊ An exciting and challenging research topic with direct application relevance
- ◊ A motivated team assisting you during your thesis
- ◊ To deepen your knowledge in programming and numerical modeling

If you are interested, this thesis can be combined with a Hiwi position. Contact us for more details.

This thesis does not quite fit your ideas? Feel free to contact us to customize this topic or to find an alternative thesis.