Large eddy simulations (LES) with liquid metal flows for concentrated solar, nuclear and fusion power plant applications

General information about liquid metals and research activities at KIT:

KIT has a long tradition of basic and applied research in the liquid metal field in both experimental and simulation fields. For more information, please visit: http://limcka.forschung.kit.edu/index.php

Particular information regarding the master thesis:

A liquid metal facility (DITEFA 2: https://www.inr.kit.edu/english/702.php) is at its final manufacturing stage at INR in Campus North and prior to be commissioned. The experiment is planned to be performed during the summer semester 2019 and winter semester 2019/20. Within this project, large eddy simulations (LES) are needed for further development of the instrumentation and for other purposes.

The **objectives of the master thesis** are

- To run LES simulations of a liquid metal flow in a simple geometry based on the DITEFA facility (see figure on the right)
- To improve existing LES cases by either
  - trying out alternative inlet boundary conditions and analyzing their impact on the flow
  - including heat transfer effects
- To improve an existing computational mesh and to adapt an existing case setup based on the boundary conditions given by the experiment
- To run and post-process the LES
- To write a master thesis and present the results in an oral presentation

When working at INR in Campus North **you may expect**:

- A personalized supervision from beginning to end of your thesis
- A friendly and international working atmosphere in one of the most prestigious research institutes in the liquid metal field in Germany and Europe
- To gain deeper insight into fluid mechanics, heat transfer, numerical analysis, basic turbulence concepts and RANS- and/or LES-turbulence modeling

Further information
Duration: 6 Months
Requirements: Basic knowledge in fluid mechanics of turbulent flows
Beneficial skills: First experience with CFD simulation tools (ANSYS Fluent/CFX and/or OpenFOAM)
Starting Date: immediately
Contact person and supervisor: Dipl.-Ing. Thomas Schaub (thomas.schaub@kit.edu)
Faculty supervisor: Prof. Dr.-Ing. Robert Stieglitz (MACH)

Students from other faculties are encouraged to send applications as well!