FRM II
Forschungs-Neutronenquelle
Heinz Maier-Leibnitz

Technische Universität München

The Forschungs-Neutronenquelle Heinz Maier-Leibnitz (FRM II) aims to convert its fuel from highly enriched uranium (HEU) to lower enriched uranium. This program is part of worldwide efforts to minimize the usage of HEU in research reactors. For this reason, a parameter study is set up in order to define possible compatible FRM II core designs for conversion.

In this context, the Forschungs-Neutronenquelle Heinz Maier-Leibnitz (FRM II) is looking for a

M.Sc. student in physics or engineering (m/f/d)

in the working group “Reactor Physics”.

Your responsibilities

The working group “Reactor Physics” at FRM II is actively working on identifying and optimization of the fuel assembly. In order to reach the goal of a core with the lowest enrichment possible, a systematic parameter study is set up that aims to identify possible and compatible core designs. As a first essential step, several 3D Computational Fluid Dynamics (CFD) codes to be used for high performance research reactors are available to perform a code-to-code verification based on experimental results. The usage of CFD tools implies a significant difference from traditional methods and therefore, the validation and verification of such CFD calculations is crucial. Abaqus CFD, a commercial software, is one of the potential candidates for such verification. One of the very few available experiments suited for validation is the Gambill Test, performed to support the High Flux Isotope Reactor (HFIR) program. This test involves measurement of heat transfer coefficients for forced convection of water flowing through an electrically heated rectangular channel.

The proposed M.Sc. thesis aims to push the CFD validation process by:

- Getting familiar with the thermohydraulic modelling in Abaqus CFD
- Meshing the Gambill Test section in Abaqus CAE
- Modelling the Gambill Test in Abaqus CFD
- Comparison of the Abaqus simulation results with the Gambill Test experimental results and other CFD calculations

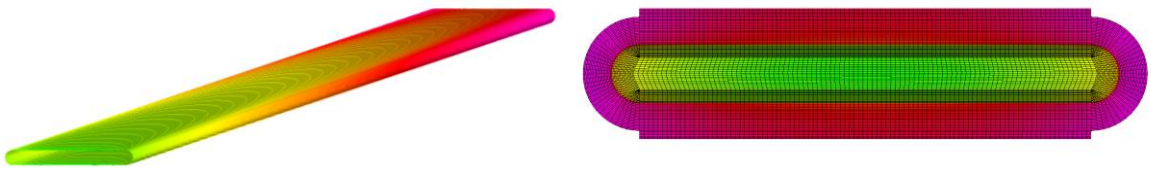

Figure: Gambill Test model in Ansys CFX (another CFD code). The temperature profile of the solid-fluid interface (left) and the temperature profile of the solid and fluid domain at the outlet together with the mesh (right).

This position offers a stimulating scientific atmosphere within an international collaboration project with the leading experts in the field. Day-to-day work is done under optimal supervision by the research group at FRM II.

General coding knowledge is an advantage.
For more questions regarding the project, please contact Dr. Christian Reiter (christian.reiter@frm2.tum.de) or Kaltrina Shehu (kaltrina.shehu@frm2.tum.de).

Application

Applicants should send a cover letter and motivation statement with research interests and expertise, including a curriculum vitae and a current attestation of grades to christian.reiter@frm2.tum.de.