# Studien- / Diplomarbeit oder Bachelor / Master Thesis

CFD Simulations on Multi-channel Cooling of IFMIF High Flux Test Module

Background

The International Fusion Materials Irradiation Facility (IFMIF) is designated to generate a materials irradiation database for the future fusion reactors. Some of the test specimens are housed inside the High Flux Test Module (HFTM) where a high damage rate will be achieved. In order to maintain a defined irradiation temperature of the test specimens, the HFTM needs to be actively cooled to remove the heat generated by irradiation and by the auxiliary electrical heaters.

HFTM   HFTM Container   Rigs & Specimens
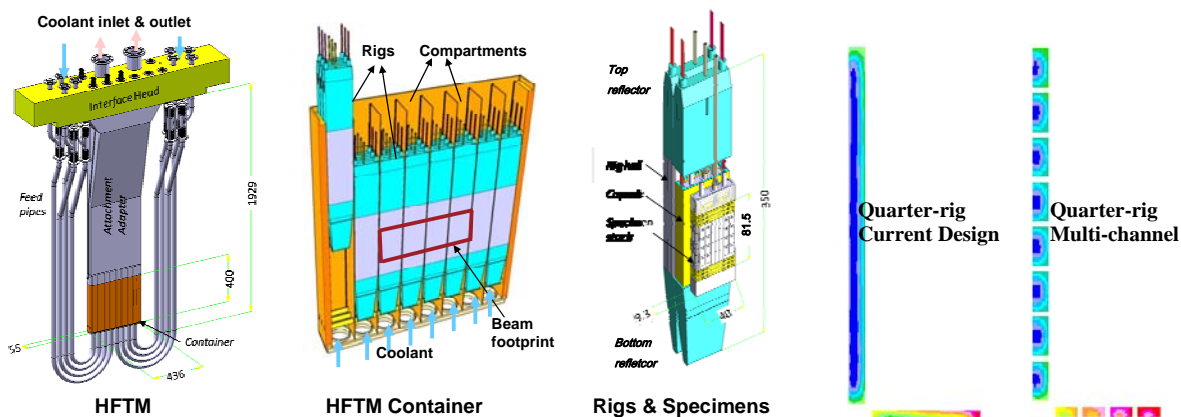
Tasks

The main task of this diploma-thesis is to optimize the multi-channel geometry by means of CFD simulations. Detailed tasks include

1) Get familiar with project IFMIF, turbulence models & CFD tools;
2) Literature study on single-phase forced convective heat transfer in miniature channels and multi-channels;
3) CFD simulations & optimizations:
    a. Geometry simplification: HFTM composed of hundreds of parts made of several types of materials;
    b. Mesh generation: software **Ansys-ICEM**;
    c. Problem specifications, running simulation & post processing: **Star-CD**, **Ansys-CFX** or **Star-CCM+**;
    d. Verification, validation & optimization;
4) Writing thesis

Requirements

Interested in CFD simulations; basic knowledge of fluid mechanics & heat transfer.

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