University of Stuttgart
Institute of Nuclear Technology and Energy Systems

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Chair of Nuclear Technology and Reactor Safety

Masterthesis

Numerical and experimental investigation of a convective air flow in a chimney

Objective:
The task of the work includes the numerical and experimental determination of the temperature and velocity profile of an airflow in a chimney for the cooling of a finned two-phase closed thermosyphon (TPCT) bundle.

Background:
As part of the research project "Analytical and experimental investigation of closed two-phase thermosiphons for passive heat removal from spent fuel pools", a longitudinal finned TPCT bundle (see Fig. 1) is investigated at IKE to increase the convective heat transfer due to the enlarged heat transfer surface. Therefore, the temperature and velocity profile of the convective air flow in the chimney shall be modelled and analysed numerically. Subsequently, the numerical results have to be validated by means of experimental data.

Procedure:
- Familiarization with the fundamentals of TPCTs,
- Co-work on the construction and measurement instrumentation of the chimney,
- Numerical modelling of the cooling process of the TPCT,
- Fundamental measurement campaigns to determine the temperature and velocity profile at selected TPCT's operation temperatures,
- Comparison of numerical and experimental results,
- Evaluation and classification of the results,
- Written elaboration and oral presentation.

Requirements:
- Interest in numerical and experimental work,
- Basic knowledge in measurement techniques and/or in CFD software desirable,
- German **or** English language skills.

Start: ab sofort

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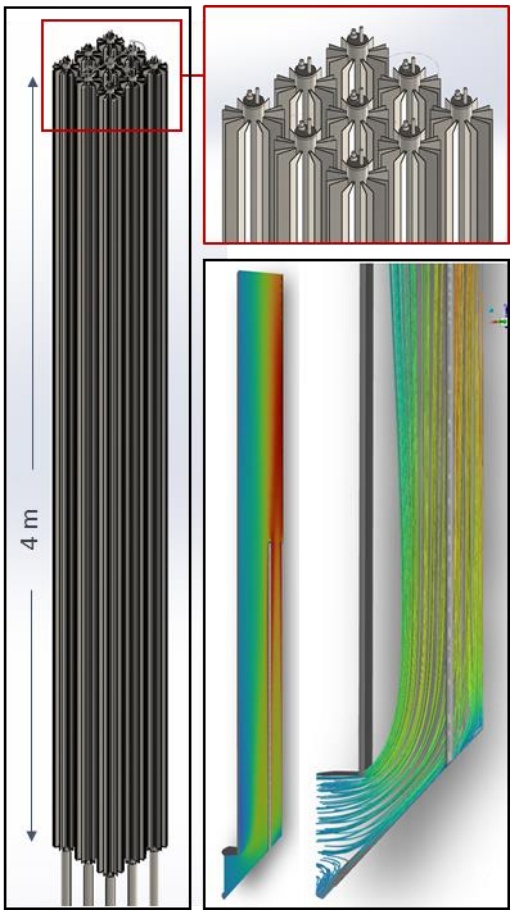

Fig 1: Sketch of the test section for thermal investigations on convective heat transfer at a finned TPCT (a) and exemplary temperature and velocity profile in the chimney (b)

IKE

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