

University of Stuttgart Institute of Nuclear Technology and Energy Systems

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## **Objective:**

The aim of this work is to optimise the design of a potassium heat pipe, assemble it, prepare it for testing, perform all the suitable experiments and analyse the generated data.

### **Background:**

This research is part of the "MISHA – Passive Cooling of Innovative Micro Nuclear Reactors" project, focusing on the heat transfer performance of high-temperature potassium heat pipes. The heat pipe features a capillary structure combining a narrow gap with wire mesh, expected to outperform other conventional designs in terms of capillary action and thermal performance.

## Approach:

- Conduct a literature review on relevant topics such as contact angle, effective pore radius, capillarity, and the behaviour of molten metals.
- Optimize key design parameters, including gap width, mesh type, and number of mesh layers.
- •Theoretical and experimental evaluation of the pipe properties.
- Heat pipe assembly and testing using the existing experimental facilities.
- Preparation of a written report and oral presentation in the IKE student seminar.

#### **Requirements:**

- Strong motivation for hands-on experimental work.
- Working knowledge of MATLAB, Python and Labview.
- Excellent command of English.
- Start: from 01.07.2025 or later
- Contact: MSc. Ruggero Meucci Pfaffenwaldring 31 • 70569 Stuttgart Ruggero.Meucci@ike.uni-stuttgart.de +49 (0) 711 685- 60786

# **Master Thesis**

Design, Assembly and Testing of a Potassium Heat Pipe



Fig. 1: Example of an experimental setup for high temperature heat pipe performance measurement.





The University of Stuttgart would like to increase the proportion of women in the scientific field and is therefore particularly interested in applications from women. Severely disabled persons are given priority in the case of equal suitability.