



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

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