Friedrich-Alexander-Universität
Technische Fakultät

Department of Chemical and
Biological Engineering (CBI)
Chair of Energy Process Engineering
Prof. Dr.-Ing. Jürgen Karl

Thesis (Bachelor/Master)

Development of a Software Tool for the Thermodynamic Design of Oscillating Heat Pipes (OHPs)

Content:

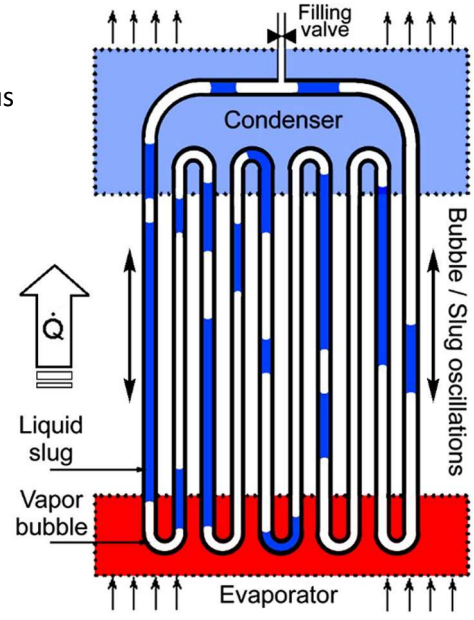
Oscillating heat pipes (OHPs) are closed, passive two-phase heat exchangers. Compared to conventional heat pipes, OHPs are not limited by capillary pressure or boiling limits, and exhibit excellent operational performance under highly dynamic operating conditions. For a reliable design, the characteristic operating limits must be calculated based on geometry, operating conditions, and employed fluid. A user-friendly software program, including a GUI, for determining these operating limits is to be developed as part of a thesis.

Tasks:

- Literature review on OHP operating limits, thermophysical fluid properties, and existing design approaches
- Development of a database containing parameterized thermophysical properties of common OHP fluids, such as organic fluids, refrigerants, alkali metals, and cryogens
- Development of software (Python or Excel/VBA) to calculate the operating limits established in the literature for a given OHP design across the relevant temperature range of the working fluid, with an interactive user interface and graphical representation of the limit curves
- Validation of the tool using literature data, as well as written documentation, preparation, and presentation of the results

Prerequisites:

- Good understanding of heat and mass transfer mechanisms
- Solid programming skills (Python or VBA/Excel)
- Interest in software development with a direct practical focus
- Working language: German or English



Start of thesis work: ongoing

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