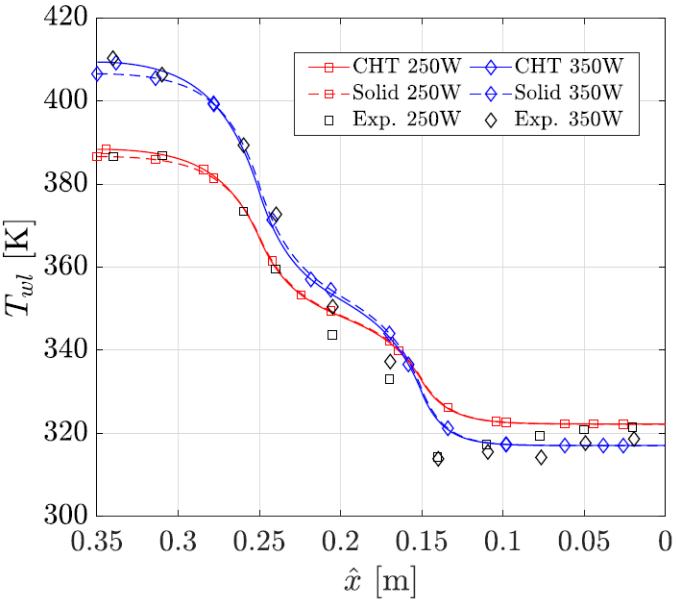
Institute for Turbomachinery and Flight Propulsion
TUM School of Engineering and Design
Department of Aerospace and Geodesy

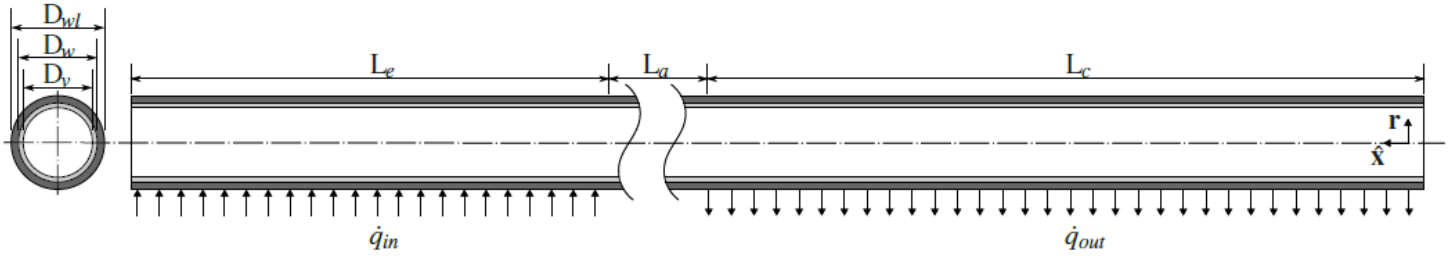
Parametric Investigation of Screen-Wick Heat Pipe Characteristics

Heat pipes are efficient passive heat transport devices that work through the principle of cyclic, continuous phase change. Their current range of applications is quite large, from personal laptops to nuclear reactors. Open questions remain on their applicability to aeronautical engine components as providers of localized structural cooling. To bridge this gap, this thesis starts from an existing, validated modeling approach and aims to further the understanding of the operation and capabilities of such devices when different geometries, wick meshes and working fluids are used. Additionally, the limitations of the modeling approach should be investigated as part of the effort.

The work will be carried out numerically and consists mostly of modifying and applying an existing process chain based on *Ansys Fluent*. Two models are available, a solid-equivalent and a fully resolved CHT one. The student will have the opportunity to work closely with both and thereby solidify their numerical skills and physical understanding of fluid mechanics and heat transfer.



Source: Luz and Gümmer (2025)



Requirements:

- Previous experience with numerics (pref. *Ansys* suite)
- Good knowledge of Fluid Mechanics and Thermodynamics
- Good programming skills (pref. C/C++, Matlab, Unix bash)
- Independent working style

Type of work: Theoretical/numerical Master/Diploma thesis.

Start: Immediate, adjustable upon mutual agreement.

If you are interested in working on this topic, please send an email to the address listed below with your full application. Please provide a CV with relevant experiences and your current transcript of records. Any other relevant documents (certificates, recommendation letters, etc.) are welcome.

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