

## Master's thesis

*Subject Microsystems Engineering / Embedded Systems Engineering, Clean Room, Photolithography, WET- / DRIE-Etching, SU-8 Silicon/Glass-Wafer Bonding, Flow Boiling*

# Manufacturing & Characterization of High-Precision Silicon/Glass Micro-Channels for Two-Phase Flow Boiling



Two-phase boiling in micro channels is one of the most promising cooling applications of the future, especially for supercomputers, CPUs, IGBTs and PEM fuel cells. A great deal of research is therefore currently being done to better understand this complex process and, ideally, to be able to influence it in a targeted manner. At the Chair of Microsystems Design, a state-of-the-art measurement setup is available for this purpose.

The aim of this Master's thesis is to produce high-precision microchannels in silicon technology, in which two-phase boiling is then to be investigated. A glass lid with different sensor/actuator arrays developed at the KvM Chair is to be bonded to the silicon channels using SU-8 photoresist. These sensor/actuator arrays will be electrically contacted via spring contacts and synchronized with the optical signal of a high-speed camera.

### Tasks

- Design and fabrication of silicon microchannels in the cleanroom
- SU-8 bonding of glass lids with sensor-/ actor arrays on top of the silicon microchannels
- Integration of the microchannels with bonded glass lids into the available measurement setup
- Investigation of two-phase flow boiling in the manufactured high-precision silicon microchannels utilizing a high-speed camera and the sensor-/ actor arrays on the glass lids

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