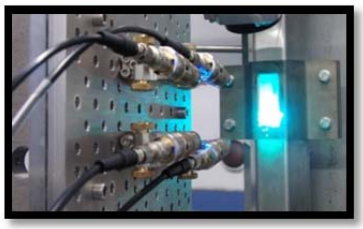
Karlsruhe Institute of Technology (KIT)
Institute of Neutron Physics and Reactor Technology

Master Thesis: Flow velocity prediction in structure channels flows using Laser-Doppler-Anemometry

10/2015

Thermohydraulic effects of asymmetrically heated channel flows play a crucial role for heat exchanging devices of future energy systems. Improved channel designs with structured surfaces facilitate localized heat transfer augmentation and ensure reduced material temperatures and increased durability, even for the estimated high heat flux densities. The heat transfer augmentation is caused by the rib elements inducing a complex and highly three-dimensional unsteady flow field. Shear layer separation, flow reattachment, vortex shedding, unsteady secondary flow motion and boundary redevelopment dominate the flow physics and significantly contribute to the heat transfer enhancement. Ongoing research focuses on the fluid flow characteristics and heat transfer mechanism of asymmetrically heated channel flows to optimize the cooling performance.


The **objective of the master thesis** is the design and development of a simplified channel test section with a one-side heated ribbed wall for Laser-Doppler-Anemometry (LDA) measurements.

The work includes:

- Literature review of fluid mechanics and heat transfer rib-roughened channels, LDA-technique.
- Design and development of a simplified channel with a one-side heated ribbed wall.
- Setup and instrumentation of the test section.
- Performing LDA measurements and analysing the results.
- Writing the master thesis and presentation the results within a scientific colloquium.

Duration: 6 Month
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