Universität Stuttgart
INSTITUT FÜR THERMODYNAMIK DER LUFT- UND RAUMFAHRT
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Student Research Assistant (HiWi)

„Support and investigation of the experimental setup for a test channel using thermographic PIV“

Thermographic Particle Image Velocimetry (thermographic PIV) is a laser-based measurement technique for simultaneous temperature and velocity measurements in fluid flows. This involves determining flow fields using the classical PIV technique and measuring temperature fields using phosphor thermometry. For this purpose, temperature-sensitive phosphor particles (zinc oxide ZnO) are seeded into the flow as tracer particles and excited using a UV laser. This measurement technique is not only to be realised for determining the fluid temperature but wall temperatures are also to be measured using phosphor thermometry.

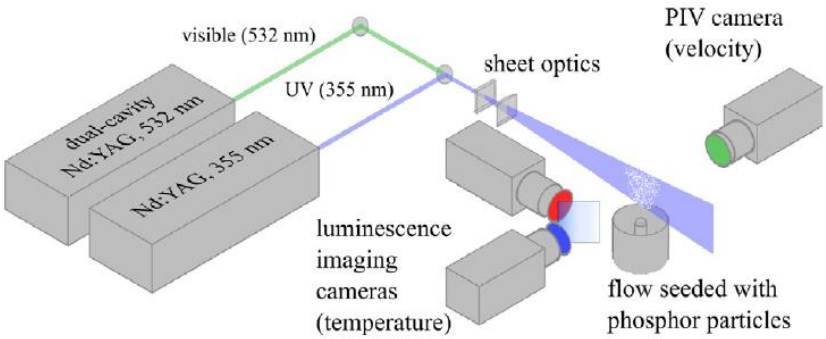

Abb.1: Schematic sketch of a thermographic PIV setup for simultaneous temperature and velocity measurement [1].

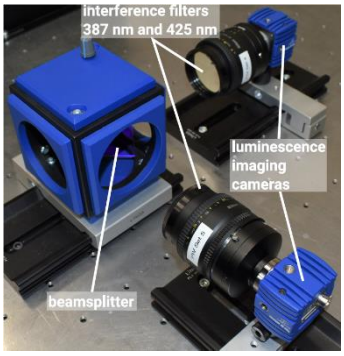

Abb. 2.: Setup of the two phosphor thermometry cameras in the experiment.

As part of this student assistant position, various experimental tasks related to the test channel are involved, and a measurement campaign for the calibration and validation of ZnO particles as a wall temperature measurement technique is to be developed and carried out. This include the investigation of the influence of the particle concentration, the layer thickness on the surface and the aging properties of the ZnO particles. The results are to be analysed and documented using MATLAB.

Requirements:

- Interest in experimental work
- Independent way of working
- Knowledge of heat transfer and MATLAB desirable

Start: as soon as possible

Scope of work: max. 40 h/month

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Literature:

[1] Christopher Abram, Benoit Fond and Frank Beyrau. Temperature measurement techniques for gas and liquid flows using thermographic phosphor tracer particles. *Progress in Energy and Combustion Science*, 64:93–156, 2018.