Prof. Dr.-Ing. Heinz Pitsch

Templergraben 64
52056 Aachen
phone +49 241 80 94607
fax +49 241 80 92923
email office@itv.rwth-aachen.de

Institut für Technische Verbrennung | RWTH AACHEN UNIVERSITY

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Bachelor-/ Master Thesis

Experimental investigation of hydrogen-methane flames using laser diagnostics

In order to decarbonize combustion processes in the industry, hydrogen is to be used increasingly as a fuel. To ensure efficient and safe operation of the corresponding systems, basic research is being carried out to investigate combustion processes in flames. An important tool for this is the detection of OH radicals in flames as a flame front indicator under different operating conditions. The detection and imaging of these radicals provide information about the structure of flames and the underlying combustion processes. The so-called laser-induced fluorescence of OH radicals, OH-LIF, can be used as a measuring technique.

Within the scope of this work, an OH-LIF measurement set-up is installed to investigate the flames of a slot burner. Detailed measurements with methane flames follow to validate the set-up, as well as further measurements under variation of different parameters, such as the Reynolds numbers or the hydrogen content in the fuel. The measurement results are used to validate simulations and contribute to the development of fuel-flexible burners and combustion systems.

Your tasks:

- Support in setting up the OH-LIF measurement technique
- Carrying out and evaluating measurements in H_2/CH_4 flames for various operating conditions

Requirements:

- Enjoying experimental work
- Independent working
- Basic knowledge of technical combustion desirable
- Knowledge of Matlab is advantageous
- Language skills in German & English

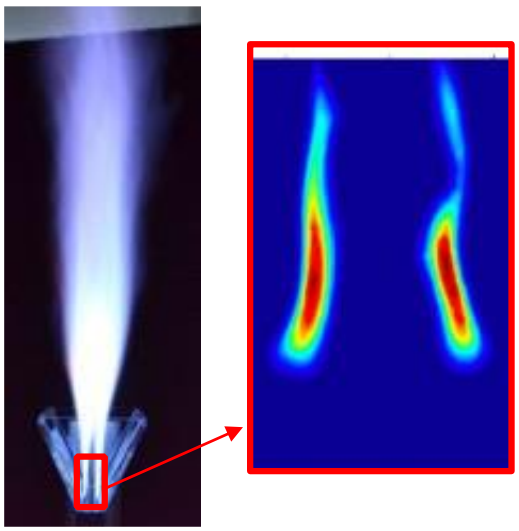

Figure 1: left: CH_4 flame on slot burner; right: OH planar LIF image at Re = 6000. M. S. Mansour et al., Exp. Therm. Fluid Sci. 91, 2018

Contact Person

Florence Cameron, M. Sc.
Tel. +49 241 80 91830
E-Mail: f.cameron@itv.rwth-aachen.de

For more information, please also visit our website:

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