

# Experimental Characterization of Flame Dynamics in a Sequential H<sub>2</sub> Aero Engine Combustor (RQL) with a Micromix Main Stage

Type: Semester Thesis/ Forschungspraktikum / Research internship  
Content: experimental  
Possible start: now / 12.03

## Job Description

The “Flightpath 2050” report documents Europe’s vision for aviation to achieve a drastic reduction in pollutant emissions of NO<sub>x</sub>. Rich-Quench-Lean combustors (RQL) are a chamber design which produce lower NO<sub>x</sub> emissions and are currently in use with kerosene. The fuel change from kerosene to hydrogen in RQL combustion chambers is considered the next step toward the goal of decarbonization. With this change, combustion instabilities might occur such as the Growl/Rumble phenomenon. This phenomenon describes a low-frequency noise that can damage the engines. Entropy and equivalence ratio waves are suspected as possible causes for this phenomenon.



Figure 1: Lean combustion zone in the RQL combustion test rig

This student thesis is a step toward the investigation of combustion instabilities in an H<sub>2</sub> RQL combustion chamber. Therefore, the Main and secondary combustion stages need to be investigated. This includes experimental work at our combustion test rig to measure flame parameters and post-processing in MATLAB to gain an understanding of flame behaviour.

## Your Tasks

- Operate the test rig together with your supervisor
- Measurement of Flame and Flow quantities
- Gain a fundamental understanding of flame phenomena based on measured data

## Our Requirements

- German B2 or better
- Basic knowledge of fluid mechanics and thermodynamics
- Ability to work independently
- Optional: Experience with LabView, Matlab or Python
- Optional: Experience with aerodynamic or combustion test rigs

## Our Offer

- Gain insight in the fascinating research field of combustion instabilities/thermoacoustics
- Working on highly relevant topics within an international research team

## Contact

If you have any questions or are interested in working with our team, please send your application to Ángel Brito Gadeschi (angel.brito-gadeschi@tum.de).