

Master-Thesis/Bachelor-Thesis/ADP/Hiwi

Development of a hydrogen combustor for high-temperature, high-pressure, and high-turbulence conditions

Motivation & Background

As global climate policies become increasingly stringent, reducing pollutant and greenhouse gas emissions has become a paramount objective in combustion research. Hydrogen-powered combustors promise to reduce pollutant emissions, particularly NO_x, while enhancing efficiency and performance under extreme conditions. However, harnessing hydrogen's potential requires overcoming significant technical challenges, particularly in designing combustors that can operate under extreme conditions while minimizing emissions. A better fundamental understanding of hydrogen combustion requires urgently experimental research efforts. This project focuses on developing a lab-scale hydrogen-powered combustor capable of operating under high-temperature, high-pressure, and high-turbulence conditions. Key objectives of this project include:

- Engineering a robust hydrogen-powered combustor designed to withstand and operate efficiently under practically relevant conditions.
- Conducting experiments to understand how hydrogen combustion behaves under high-temperature, high-pressure, and high-turbulence environments. This involves characterizing flame structure and stability.
- Fine-tuning the combustor design to achieve optimal performance, focusing on flame stabilization and emissions reduction.

Tasks

- Review the literature, especially hydrogen combustion and gas turbine combustors
- Design and construct a combustor based on the requirements
- Assemble the combustor and perform experiments
- Analyze data and results
- Intermediate and final presentations, write the final thesis

Focus areas

- | | |
|---------------|-------|
| Experiment | ● ○ ○ |
| Construction | ● ● ● |
| Modeling | ● ○ ○ |
| Data analysis | ● ○ ○ |

Date

17.06.2024

Start from

Flexible, get in touch!

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