

# Master-Thesis/Bachelor-Thesis/ADP/Hiwi

## Development of a Novel Laminar Flow Reactor for Optical Measurements of Biomass Flames in NH<sub>3</sub>-enriched Atmospheres

### Motivation & Background

As the push for sustainable energy solutions intensifies, the combustion of biomass solid fuels in ammonia (NH<sub>3</sub>)-enriched atmospheres presents a promising path forward. This approach not only leverages renewable biomass resources but also explores the potential of ammonia as a carbon-free hydrogen carrier and fuel. To deepen our understanding of the combustion dynamics and emission characteristics under these conditions, we propose the development of a novel laminar flow reactor specifically designed for optical measurements of biomass solid fuel flames in an NH<sub>3</sub>-enriched atmosphere. The key features of the reactor will include:

- The reactor will be designed to maintain a stable laminar flow, ensuring consistent and reproducible combustion conditions.
- The reactor will feature multiple optical windows to allow for comprehensive diagnostic techniques.
- The reactor will be equipped with precise control systems for introducing and regulating ammonia concentrations in the combustion chamber

### Tasks

- Review the literature, especially NH<sub>3</sub> combustion and biomass energy
- Design and construct a laminar flow reactor
- Assemble the reactor and perform experiments
- Analyze data and results
- Intermediate and final presentations, write the final thesis

### Focus areas

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

### Date

27.06.2024

### Start from

Flexible, get in touch!

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