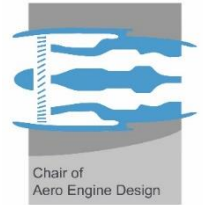


# Student Project / Thesis

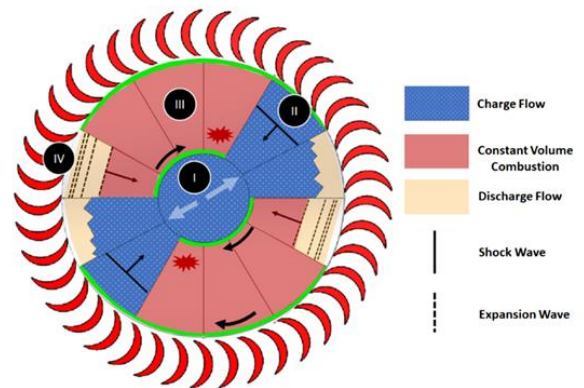


## Title of the research:

## Numerical Investigation of a Radial Wave Engine – Combustor simulation

### Description:

The new concept of ultra-compact combustor (UCC) utilizing circumferential combustion has been recently developed. The UCC concept reduces combustor length by taking advantage of engine diameter to perform the combustion process in the circumferential direction with sufficient resident time for fuel/air mixture. With its short length, the UCC allows for a reduction in combustor lengths by up to 33%, reducing the overall length of the engine. Reduction in the combustor length is translated to less material or simply weight, increasing the engine power density. The UCC is considered an innovative approach to radically change the geometry of existing combustors that can reduce propulsion unit weight. Combining the benefit from both PGC and UCC, a new disk-oriented gas turbine engine (Radial Wave Engine) for power generation, combining PGC and UCC as a compact efficient engine has been developed by Akbari et al.<sup>1</sup>. Since the combustion process can operate on hydrogen, the new engine configuration has the potential to be carbon-free, lightweight, and compact. The current study is the continuation of the latter research to provide a detailed understanding of the combustion phenomena inside the engine through high fidelity 2D and possibly 3D CFD simulations.



RWE working concept <sup>1</sup>

(<sup>1</sup>Akbari et al. 2023, doi:10.1115/1.4049452)

**Start:** As soon as possible.

### Expected qualifications:

- Fundamental knowledge on gas dynamic and combustion
- Basic CFD knowledge and CFD software e.g., ANSYS CFX
- Ability to work as a team and independently

### What we offer:

- Working in an international team
- Joint supervision by CalPoly and BTU members
- Possibility of a short research stay at California Polytechnic University
- Possibility of extending the research as a master thesis
- Co-authoring research papers, e.g., in ASME TurboExpo or journals

If interested, please send an email to [asli@b-tu.de](mailto:asli@b-tu.de), including CV and transcript.