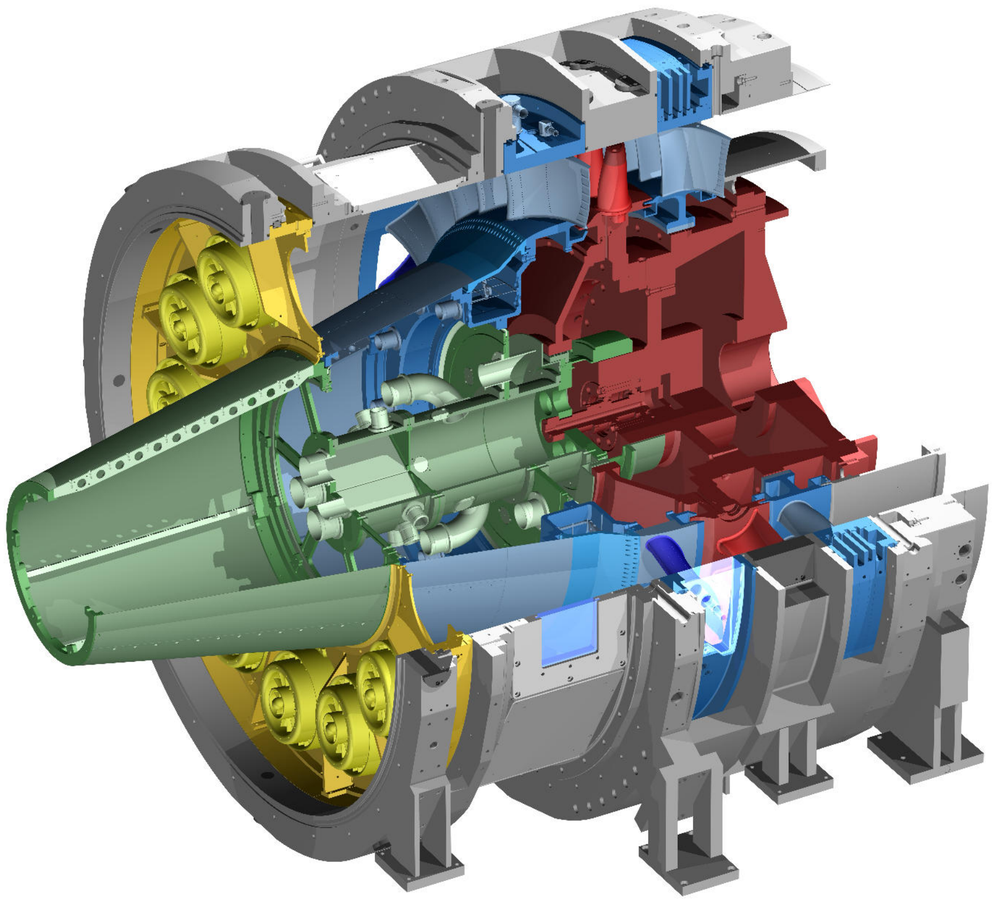
AG Turbo 2020 3.2.1 A

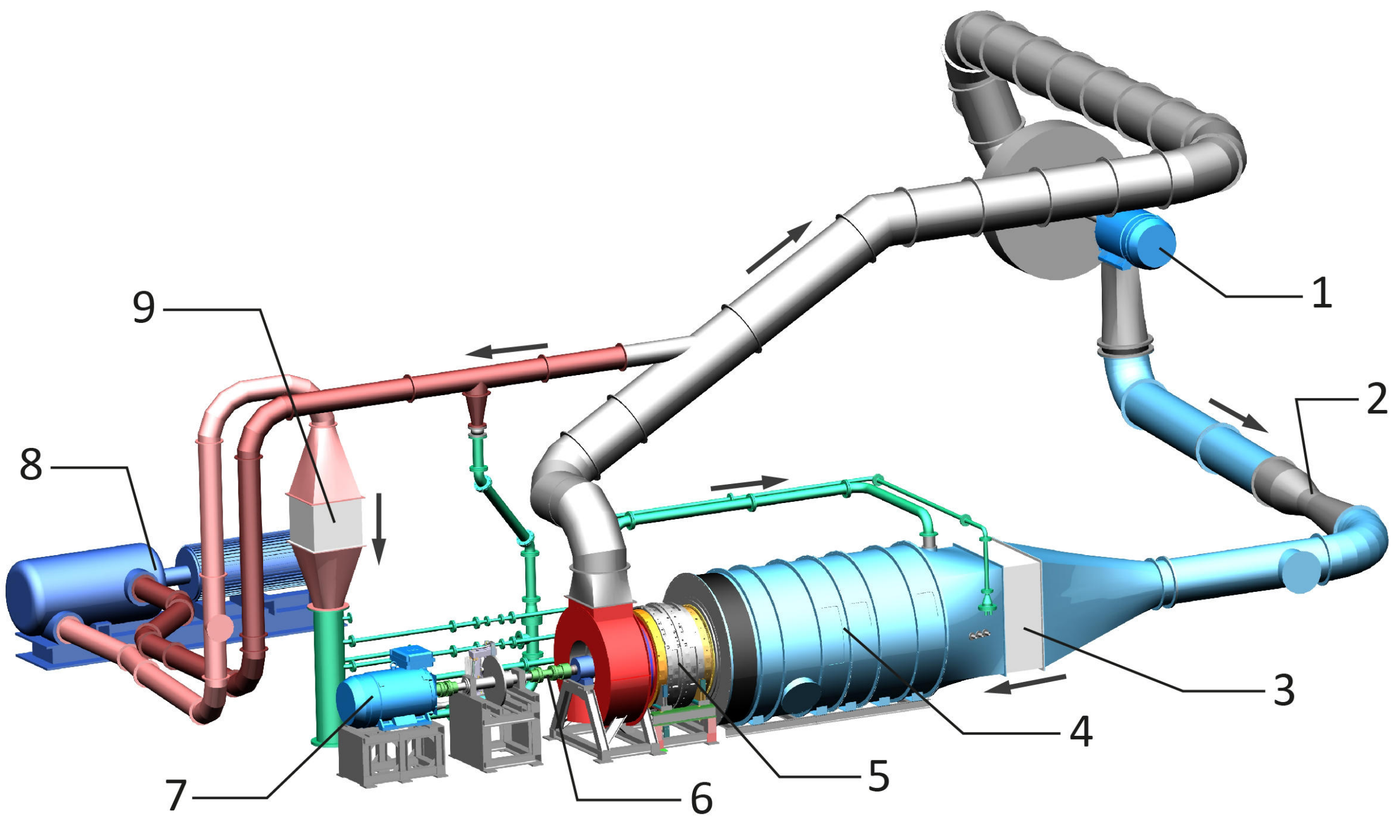
Combustor Turbine Aerodynamic Interaction

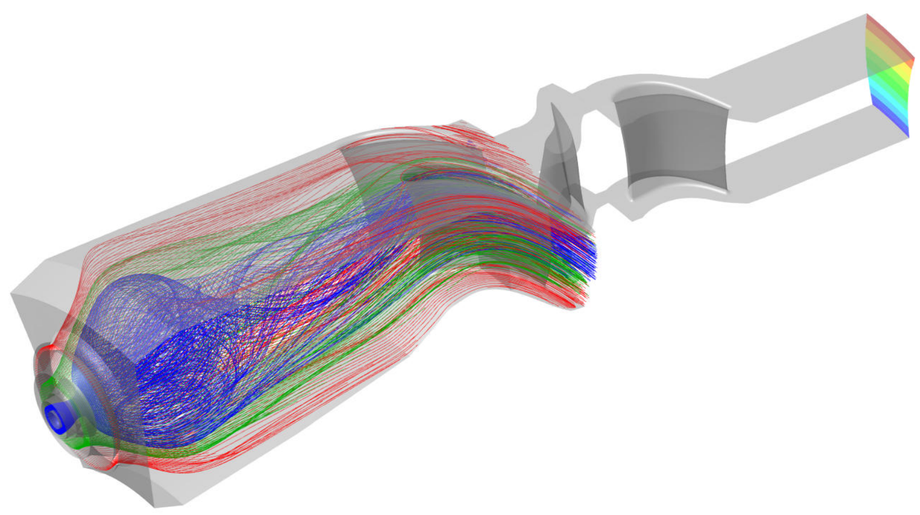
TECHNISCHE UNIVERSITÄT DARMSTADT

Research Objective

Using lean combustion, a further reduction in pollutant emissions, especially NO_x,can be achieved. However, increased residual swirl compared to conventional RQL-combustors change the incidence situation for the nozzle guide vane and create a low-pressure recirculation zone, influencing turbine design. The research project AG Turbo 2020 3.2.1A focuses on the investigation of the impact of variable turbine inlet flow conditions (axial inflow, turbulent inflow, swirled inflow) on the HP-turbine aerodynamics. A comparison to numerical simulations complements the experimental investigations.



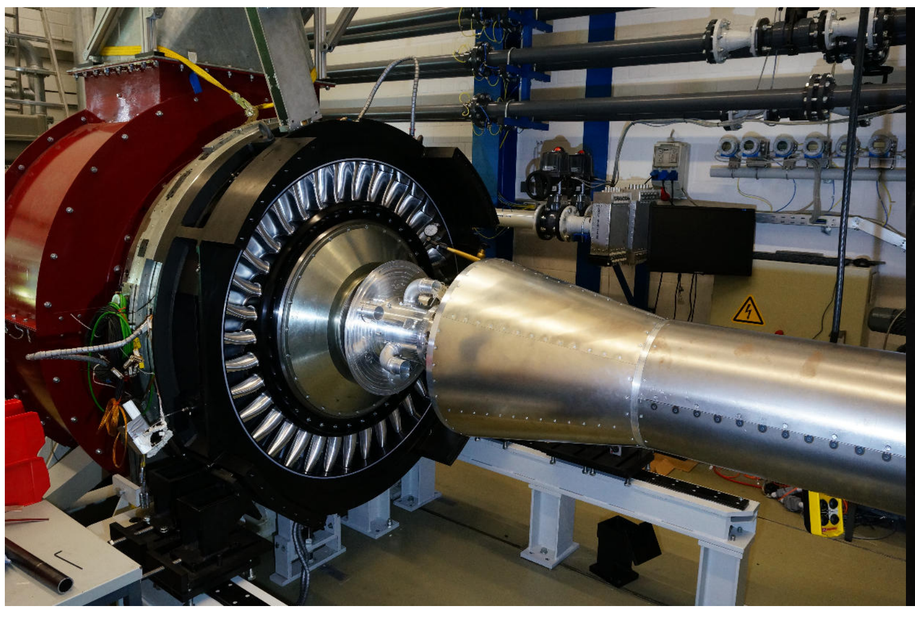


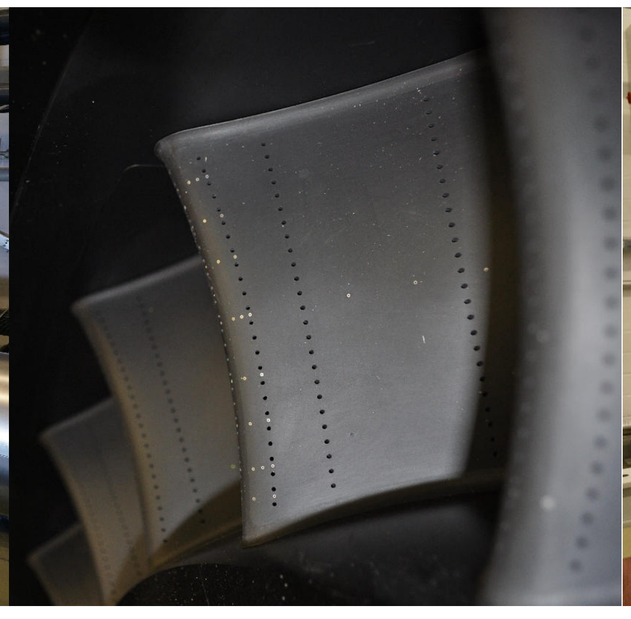


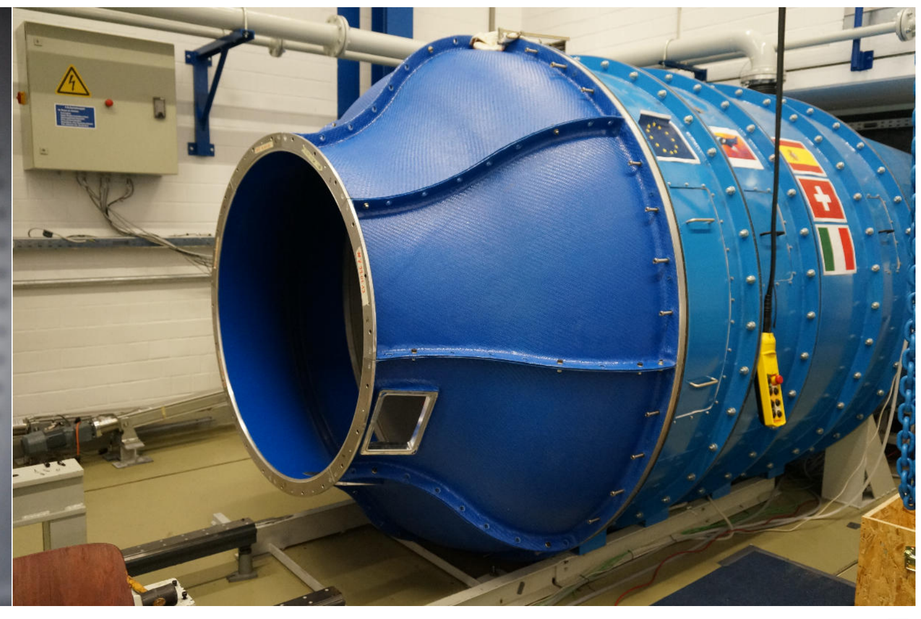
Aerodynamic Measurements

To study the effects of varios inflow conditions on turbine aerodynamics, a large set of aerodynamic measurements is performed. Turbine efficiency is determined using a torquemeter. Probe Measurements are performed to determine flow structures and loss mechanisms. Moreover, there are instrumented stator vanes for profile pressure and stagnation line measurements.

Unsteady effects are examined using hot-wire anemometry and particle image velocimetry.







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