

April 9, 2021

BSc Project – experimental

Advanced Plasma Actuators for Flow Control

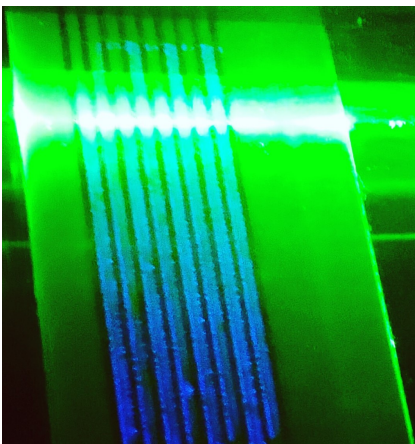
Motivation

Stricter environmental-, acoustic- and anti-pollution regulations push towards more efficient and quiet airborne technology (aircraft wings, wind turbines, propeller blades, air inlet nacelles, etc.). Novel design approaches have been developed to guarantee optimal flow evolution featuring reduced drag and reduced acoustic emissions. The need to extend the operational envelope of these designs led to the adoption of active flow-control techniques, where the flow-controlling parameters can be optimally adjusted to a broader variety of flow conditions. Among these devices, plasma actuators (PA) are gaining increasing attention from the research community and industry. Advanced designs are currently developed within the experimental research group at the ISTM and require multiple electrodes narrowly spaced amongst each other and supplied with AC high-voltages to maintain a plasma discharge (see picture). These requirements pose many technological challenges that demand further development in the materials, the manufacturing techniques and the operation. This project aims at contributing to these developments.

Content

Following a thorough state-of-the art survey, the experimental activities will be defined. Advanced manufacturing routines, as electrodes screen- and ink-jet printing, and novel materials for the electrodes isolation will be developed and tested. Another important aspect is the correct installation of the PAs to operational readiness. Thorough testing of the electrical and mechanical performance of the novel PAs will be performed by deploying the state-of-art lab equipment. The flow-field induced by the actuator will also be measured and evaluated. The aim is to contribute to the advancements of this flow-control technology.

The scientific diffusion of the performed activities is a final goal of this project. For this reason, the project language is English and knowledge of scientific English is a prerequisite.



Starting date:

Ending date:

Student name:

Signature:

Contact persons:

Dr. Jacopo Serpieri,
✉ jacopo.serpieri@kit.edu

Mrs. Saskia Pasch
✉ saskia.pasch@kit.edu
Institute of Fluid Mechanics

Kaiserstraße 10,
Building 10.23, 6th floor,