Karlsruhe Institute of Technology

Institute of Fluid Mechanics
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http://www.istm.kit.edu

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Bachelor's or Master's Thesis – experimental

Design of a Background Oriented Schlieren Setup to Quantify Electroaerodynamic Density Fields

Task description

As part of the EU project "IPROP - Ionic PROPulsion in Atmosphere", current research effort at ISTM revolves around the evaluation and quantification of electroaerodynamic thrust devices, based on the principle of corona discharge. ISTM aims to generate quantitative and experimentally obtained density fields of thrust producing corona discharges in the future. These serve as validation points of numerical studies by project partners.
To this end, a schlieren setup is currently being put into operation, which is to be extended and modified to allow for background oriented schlieren imaging in order to allow for robust and quantitative evaluation of density fields.
Additional details about the project: https://www.istm.kit.edu/projekte_2015.php

Work plan

- Literature research: electroaerodynamic thrust, schlieren imaging, background oriented schlieren method
- Design and construction of an extension to an existing schlieren setup, enabling background oriented schlieren capture
- Design, execution and evaluation of experiments
- Analysis of density fields in a fluid mechanics context

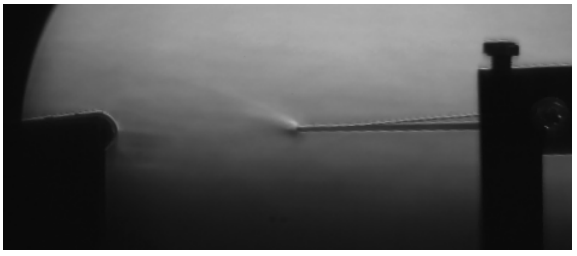

Figure 1: Preliminary schlieren imaging of a corona discharge

Requirements
Good understanding of fluid mechanics

Beneficial Skills
Experience in experimental fluid mechanics
Experience in data analysis using Python/Matlab

Start: immediately

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