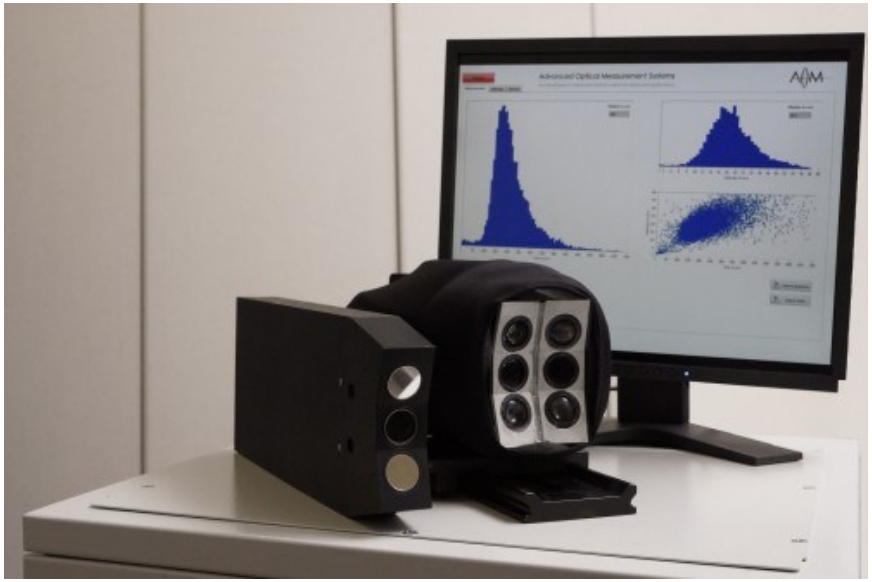
GRADUATE SCHOOL
computational engineering

TECHNISCHE UNIVERSITÄT DARMSTADT

Subject: Simulation of the Time-Shift process for non-spherical particles

Research Focus: Multirate and multiscale methods (R1)



Description:
In the past, the SpraySpy detector as a variant of a Time-Shift measurement probe has been developed in cooperation with the company AOM Systems GmbH to the point that it is able to successfully characterise sprays of transparent and opaque fluids. In the meantime the ever-increasing industrial demand for a ParticleSpy probe has become apparent.
In support of a simultaneous experimental and constructive effort, this numerical project shall develop a predictive model for the dynamic Time-Shift measurement process based on existing numerical tools. Ultimately, the predictions of the exact model shall serve as a basis for a parametric model to improve the accuracy of the Time-Shift probe when measuring non-spherical particles in realtime.
This process will include the particle dynamics in the surrounding fluid, the laser light scattering process itself and the signal processing in the receiver optics. This work will be a cooperation between the institute of fluid mechanics and aerodynamics (SLA) and the institute for the theory of electromagnetic fields (TEMF).
Accepted scholarship holders will work in the dynamic Startup environment of AOM Systems GmbH.

Requirements:
Prospective candidates must have an excellent M.Sc. Degree in electrical or mechanical engineering, physics, computer science or mathematics. Key requirements include experience with compiler based languages and numerical analysis (e.g. FEA). Applicants must be flexible and able to model different phenomena from widely different disciplines, including Electromagnetics, Fluid Mechanics, and Signal Processing. Readiness of mind and the search for a challenging topic are advantageous traits when accepting this topic.

Supervisors:
Prof. Dr.-Ing. C. Tropea (Fluid Mechanics and Aerodynamics)
Prof. Dr.-Ing. H. De Gersem (Theory of Electromagnetic Fields)