

FELLOWSHIP

Uncertainty analysis of shock-droplet interactions



An opening of a Research Fellowship with the opportunity to obtain a doctoral degree is offered. Close cooperation of the Institute of Aerodynamics at the Technische Universität München and the Flow Physics and Combustion group at Stanford University in a joint research project offers a fellowship through the International Graduate School of Science and Engineering at the Technische Universität München for three (3) years. The earliest begin of the project is April 1st 2008.



Thematic description of the project

Uncertainties in fluid flow numerical simulations is still an unanswered question when modelling is applied. Hypersonic flows can be simulated with appropriate accuracy from a fluid flow point-of-view, but the thermodynamic and chemical relationships inherit quantifiable uncertainties. The influence of these uncertainties on the quality and the error estimates of complex fluid flow simulations is one of the focal points of current research in this field.

In this particular project, as a complex fluid interaction example also important for hypersonic flows, the interaction of shocks with two-phase flows shall be investigated. The complexity implied by the occurrence of shock-interface interactions prevents a reliable prediction by experiments. A reliable prediction by simulation is currently obstructed by uncertainties in interaction modeling and uncertainties of initial and boundary data. The motivation of the project can be summarized as: (i) to assess known uncertainty quantification methods for a physically complex interaction problem in fluid mechanics, (ii) improve such methods or develop new methods which are better suited and allow for more efficient application to complex interactions in fluid mechanics, (iii) for the first time achieve a quantitative estimate for the different modeling and physical uncertainties determining shock-interface interactions in two-phase flows.

Fellowship details:

The fellowship at the International Graduate School of Science and Engineering at the Technische Universität München is endowed with 1,500€ per month for the duration of three (3) years. The candidate will not be employed by the university and will cover his/her insurance expenses out of the fellowship. Additional allowance for travel and equipment is available.

As close cooperation with our partner from Stanford University are an integral part of the project, proficiency in English is required. The candidate is also required to spend regular long-term stays at Stanford University.

The candidate holds a Masters of Science or Diplomingenieur degree in Mechanical or Aerospace Engineering with an excellent academic record. Prerequisite courses in fluid mechanics are a matter of course. Experience in the field of compressible/hypersonic flow simulations are of advantage. The candidate is expected to complete his/her Ph.D. in the course of the project. The International Graduate School of Science and Engineering will award a certificate which is connected to a research training program where the fellowship holder is required i.e. to take courses and to collect 50 credits during the course of the fellowship.

Women and applicants with disabilities are explicitly encouraged to apply.
Further detail on the goal, structure and requirements of the IGSSE can be found at <http://www.igsse.de> .

Dates:

- earliest starting date: April 1st, 2008
- latest starting date: September 1st, 2008
- open: until filled

Contact:

Please send the application material (CV and letter of motivation, academic record and diploma, letter of recommendation and, if applicable, a list of publications) or contact for further information:

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