Les sprays

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Sprays in Engineering and the Environment

- Sprays in Engineering (fuel injection, painting/coating, cleaning/cutting)
- Medical Sprays (drug delivery)
- Agricultural Sprays
- Fire Extinguishers
- Sprays in Nature (rain, fog)
The main direction of work

- Experimental studies of sprays (C.Crua)
- Development of theoretical and numerical models of cold sprays (S Martynov, E Sazhina, S Sazhin)
- Development of the models of droplet heating and evaporation (S Sazhin + research student)
- Building bridges with SMEs (S Sazhin, S Martynov)
Experimental studies of sprays

7-hole injector at injection pressure 600 bar; ambient air pressure 20 bar; air temperature 570 K, nozzle diameter 0.135 mm; the length of the domain 100 mm
Spray Penetration
Droplet grouping
(EPSRC project, collaboration with Ben-Gurion University, Israel)
Development of the models of droplet heating and evaporation

- Development of the numerical code taking into account the temperature gradient inside droplets
- Approximate analysis of thermal radiation absorption in droplets
Building bridges with SMEs

- All developed models can be easily generalised to *any* type of sprays.
- Numerical simulation of various types of sprays using conventional models.
- Taylor-made developments for specific needs of a company
- Possible future joint projects partly funded by EPSRC, EU, Royal Society etc.
Dissemination of the Results
International conference presentations


National conference presentations

INTERREG PROJECT “LES SPRAYS”
S. Sazhin, M. Heikal, C. Crua, S. Martynov, E. Sazhina, M. Gorokhovski, and A. Chtab
Poster at the INTERREG Showcase Event, 1 March, 2006, Ashford.

MODELLING OF CAVITATION FLOW IN A DIESEL INJECTION NOZZLE
S. Martynov, D. Mason, Heikal and S. Sazhin

OSCILLATING JETS AND SPRAYS IN MODERN TECHNOLOGIES,
S. Martynov, S. Sazhin, and M. Heikal
Poster submitted to the BISME conference, KTP, September 10 – 12, 2006, University of Brighton.
Publications in International Refereed Journals


Related Developments

- Development of the dynamic decomposition method for numerical solution of the system of stiff ODEs (in collaboration with V Bykov, I Goldfarb, V Goldshtein) [Computers and Fluids (in press)].

- Development of the new numerical algorithm for the solution of the Boltzmann equation and its application to modelling of diesel fuel droplet evaporation (in collaboration with I Shishkova, A Kryukov and V Levashev) [J Computational Physics (in press)]
European Regional Development Fund
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Thank you for your attention

Any comments or suggestions would be highly appreciated
Les sprays

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