

Aerodynamics and Flow Control Seminar Series



Implicit LES of Plasma-Controlled Turbulent Jets

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ABSTRACT

Plasma-controlled turbulent jets are investigated using Implicit Large-Eddy Simulations at a Reynolds number equal to 460,000 (corresponding to a speed of 33 m/s for a nozzle of diameter 0.2m). Eight Dielectric Barrier Discharge (DBD) plasma actuators located just before the nozzle exit are used as an active control device with the aim to enhance the mixing of the jet. Four control configurations will be presented in this talk as well as a reference case with no control and a tripping case where a random forcing is used to destabilise the nozzle boundary layer. Visualisations of the different cases and time-averaged statistics for the different controlled cases will be used to show strong modifications of the vortex structures downstream of the nozzle exit, with a substantial reduction of the potential core, an increase of the jet radial expansion and an improvement of the mixing properties of the flow.

SPEAKER'S BIO

Sylvain Laizet is a Senior Lecturer in Computational Fluid Mechanics and the senior tutor of the Department of Aeronautics at Imperial College London (ICL). Understanding turbulent flows and how to manipulate them for engineering applications is the motivation behind his research. Currently supported by EPSRC, he is investigating numerically active flow control solutions for drag reduction and mixing enhancement. Expert in incompressible turbulence-resolving simulations, he has been using Tier 0 supercomputers in France, Italy and Germany for very large scale simulations with his open source flow solver Incompact3d. He is the chair of the UK Fluids Network SIG "Multicore and Manycore Algorithms to Tackle Turbulent flows" and is a member of the management committee of the EPSRC UK Turbulence consortium.

VENUE, DATE & TIME

City, University of London
Room: D427
Building: Rhind Building
Date: 10th November, 2017
Time: 12:00-13:30

ORGANIZERS Prof. Alfredo Pinelli, Dr. Mohammad Omidyeganeh

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