ME Seminar

New developments on laser and optical diagnostics for combustion studies

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ABSTRACT

New developments for optical measurements in flames will be described. The lecture will demonstrate how these new approaches provide new insights on:

1. Triggering of thermoacoustic oscillations

2. Measuring simultaneously local flow velocity and air-fuel ratio (without any 'seeding')

3. Measuring soot generation and temporal evolution in flames of hydrogen blends

At the end of the lecture, some fluid mechanics applications will be outlined, which will include boiling for nuclear technology, electrolysis for hydrogen production, droplet erosion of wind turbine blades and designing bubbly chocolate.

ABOUT THE SPEAKER

Mechanical Engineering degree from National Technical University of Athens, Greece, followed by PhD at Imperial College London. He was awarded an EPSRC Advanced Research Fellowship for experimental research on combustion of liquid and solid fuels before joining the academic staff at Mechanical Engineering Department of Imperial College, where he was promoted to Professor in 2009. In 2000, he spent a year at Ricardo Consulting Engineers working on computational models for liquid atomization through a Royal Academy of Engineering industrial secondment award.

His research covers combustion, heat and mass transfer, liquid atomisation and sprays and the development and application of novel optical and laser diagnostics. The latter led to patents for instruments on powder sizing, planar droplet sizing, nanoparticle sizing and novel imaging devices. His research contributed to gas- and liquid- fuelled land-based gas turbines, coal burners, aeroengines, gasoline and Diesel engines and liquid propellant rocket engines. He also researched spray drying and Cleaning-In-Place processes for the chemical and food industry and 'nanofluids' as improved coolants for fusion and fission reactors.

He is a Fellow of the Institute of Physics and Associate Fellow and member of the technical committee of Propellants and Combustion of the American Institute of Aeronautics and Astronautics. He chaired the Combustion Physics Group of the Institute of Physics and is an Editor of Experimental Thermal and Fluid Science and serves at the advisory and editorial boards of Experiments in Fluids and Int. J. of Spray and Combustion Dynamics.

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