RÉPUBLIQUE FRANÇAISE
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Université d'ORLÉANS

Labex CAPRYSSES
Cinétique chimique et Aérothermodynamique pour Propulsions et Systèmes Énergétiques PROPRES et SÛRS

15 Avril
13h30
Salle réunion Carnot

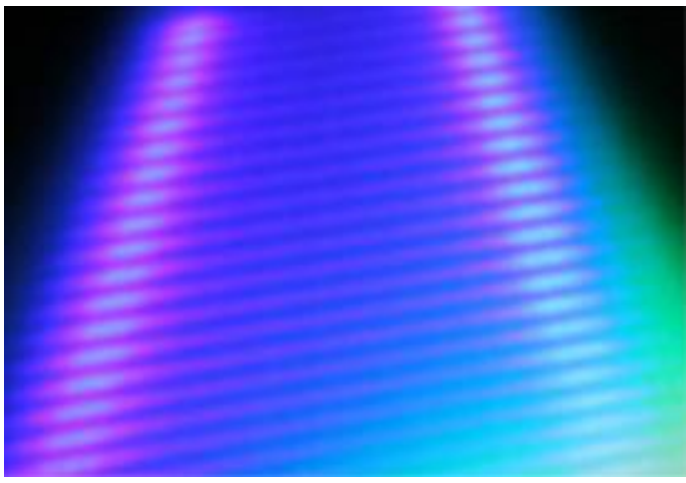
SÉMINAIRE

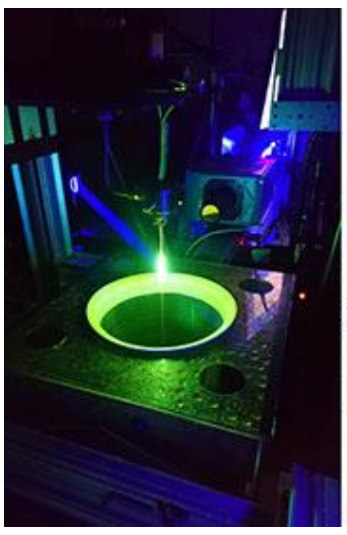
Edouard BERROCAL
Lund University

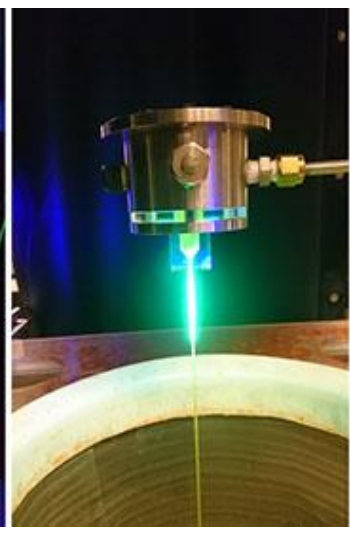
ORGANISÉ(E) par **le labex CAPRYSSES**

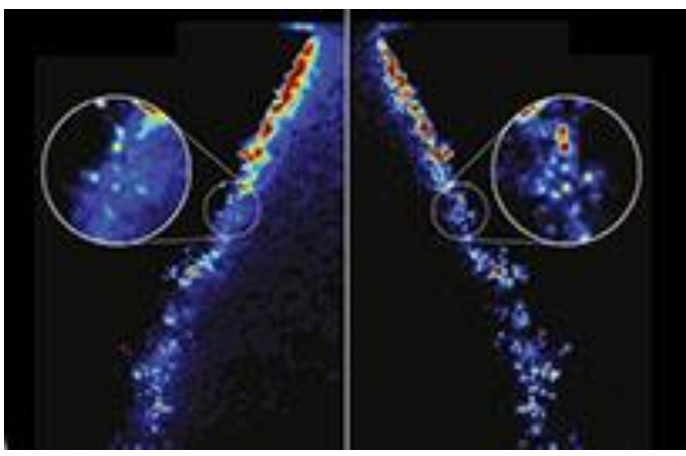
PRISME
Laboratoire Pluridisciplinaire de Recherche Ingénierie des Systèmes, Mécanique, Énergétique

SLIPI-polarization ratio imaging: A new technique for sizing droplets in optically dense sprays









Previous research has shown that the polarization ratio technique allows sizing droplets generated from dilute spray systems. The polarization ratio technique is based on the acquisition of the perpendicular and parallel polarized components of Lorenz-Mie scattered light, which ratio is proportional to the surface mean diameter, D21. One of the main advantage of this technique, compared to some other laser imaging techniques (e.g. LIF/Mie droplet sizing), is that no fluorescent dye is required. This makes the technique suitable for the characterization of sprays under evaporating conditions. However, its application to optically dense sprays has posed significant challenges and restrictions due to the presence and detection of multiple light scattering.

A novel approach, presented in this talk, consists in combining the polarization ratio approach with Structured Laser Illumination Planar Imaging - SLIPI - a technique that allows suppressing efficiently the unwanted multiple light scattering intensity. Thanks to this suppression of unwanted light, the method offers a promising solution for accurate and comprehensive 2D characterization of challenging atomizing sprays. Note that the SLIPI-polarization ratio technique is calibrated using Phase Doppler Anemometry and applied, here, to a hollow-cone water spray running from 20 and 100 bar injection pressure.

Associate Professor at the Department of Physics, Division of Combustion Physics, Lund University – Sweden

LIEU

Université d'Orléans
Polytech
8 rue Léonard de Vinci
45100 Orléans
Site de Vinci

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