Overview of imaging diagnostics for the characterization of sprays and droplet fields

Abstract: This talk provides an overview of the evolution of imaging diagnostics techniques applied to sprays and droplet fields. Sprays and particle fields have been extensively studied over the years, delivering in-depth understanding of the droplet formation processes and its evolution. Most of this knowledge was acquired by the development and application of numerous diagnostics, often made possible by the combined power of innovations in equipment and methods. Beginning with an exploration of early imaging techniques, this review traces the development of methodologies such as shadowgraphy, schlieren imaging, and holography. These foundational techniques paved the way for contemporary advanced imaging methods aiming at characterizing particle fields in high-speed flows, where the droplet field features smaller particle sizes and higher velocities. Continuing with the advancements brought up by new diagnostic technologies, we will also explore the impact that the evolution of hardware and data processing capabilities have brought to the field.

Julien Manin

Bio: Dr. Manin obtained his M.Sc. degree in Mechanical Engineering and in Automotive and Transportation Systems in France in 2006. He completed his Ph.D. in Physics and Mechanical Engineering in 2011 at the Polytechnic university of Valencia, Spain. Dr. Manin has been working at Sandia National Laboratories since 2011, starting as a postdoctoral researcher. He now is a principal member of the technical staff in the Applied Combustion department, at the Combustion Research Facility. Over the course of his scientific career, he has had various roles in industry and academia, such as advanced diagnostics lead at Artium Technologies, as well as an assistant professor at the University of Hiroshima, Japan, and at the Polytechnic university of Valencia, Spain. Dr. Manin has gained broad experience in fluid mechanics, thermodynamics, laser and optical diagnostics. He has been involved in many national and international research projects and has published over a hundred papers in scientific journals or international conferences.