

Laser Plasma Physics: From Particle Acceleration to Laser Fusion

by Prof. Luca Volpe, Polytechnic University of Madrid, Spain

High-power laser technology has developed significantly over recent decades, offering numerous possibilities across various research fields, including particle acceleration, laboratory astrophysics, and laser fusion. The recent demonstration of laser fusion ignition at the National Ignition Facility in Lawrence Livermore National Laboratory has bolstered this development, both scientifically and politically, compelling several countries to increase their investment in high power laser and laser fusion technology.

This presentation will discuss the state of the art in laser particle acceleration and laser fusion research in Europe and beyond, highlighting key challenges related to European projects and infrastructure programs such as the Extreme Light Infrastructure ELI-ERIC and the recent mission-oriented user access program for laser fusion. An example of high-power laser application to study the ion stopping power in warm dense matter will be presented.

The speaker



Luca Volpe is a Professor of Applied Physics at the Polytechnic University of Madrid, Spain. He serves as a Scientific Advisor for the Centro de Láser Pulsados in Salamanca and is the Coordinator of the ELI-ERIC program for Laser Fusion.

Luca is an expert in laser-plasma physics, specializing in extreme intensity, ultra-short laser matter interaction, laser-induced ion acceleration, and transport in warm dense matter, which is relevant for fast ignition schemes in inertial confinement fusion.

From 2014 to 2021, Luca led the laser plasma chair at the University of Salamanca, playing a crucial role in the development of the scientific and user access program for the CLPU PW system in Salamanca. He holds several scientific responsibilities in Europe, including membership in the Eurofusion Spanish scientific panel for Inertial Confinement Fusion and serving as Chair of the Beam Plasma Inertial Confinement Fusion Board at the Plasma Physics Division of the European Physical Society (EPS).

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