Special Plasma Physics Seminar

UCLA College | Physical Sciences Physics & Astronomy

Physics & Astronomy Building (PAB) Room 4-330
Friday May 8th at 12:30 PM
https://ucla.zoom.us/j/99400767996?pwd=Jq62deeVVSNb6mL8AmWrYwOPDV8nhY.1

The Impact of Electrons in Plasma Physics

Pierre Gourdain (Univserity of Rochester)

The role of electrons in plasma physics has often been overlooked, primarily because their flow characteristics are difficult to measure experimentally and even harder to model numerically. The main challenge lies in the separation of spatial and temporal scales between what is structured and therefore tractable—the ion flow—and what drives fluctuations and is therefore difficult to capture—the electron dynamics. However, observations in both plasma physics and astrophysics have shown that electrons can drive dramatic effects, such as confinement degradation in fusion experiments or the handedness of magnetized outflows in active galactic nuclei. This talk will examine these effects and show how they can be incorporated into conservation laws in a tractable and computationally efficient manner. It will also illustrate how this perspective enables the development of new diagnostics. Building on this framework, the talk will focus on how collisionless plasmas can be leveraged for high-throughput data acquisition to support data-driven models. In this context, electrons will emerge as the true probe of the plasma, capable of revealing the inner workings of turbulence.

Host: Chris Niemann