

Special Plasma Physics Seminar

UCLA College | Physical Sciences
Physics & Astronomy

Physics & Astronomy Building (PAB) Room 4-330

Friday May 15th at 12:30 PM

<https://ucla.zoom.us/j/93881358690?pwd=pH25uXYTbxV2EHrOjDPBBwddleYL3A.1>

Unique Solutions to Heating and Driving Current in Plasmas

Stephanie Diem (University of Wisconsin-Madison)

Magnetic confinement fusion requires the formation, heating, and sustainment of high-temperature plasmas under conditions where conventional plasma initiation and current drive techniques become increasingly challenging. In compact confinement systems, these challenges motivate new approaches at the intersection of fundamental plasma physics and practical fusion technology development.

This seminar will discuss experimental and modeling studies of non-solenoidal plasma initiation, wave-particle interactions, and plasma control in several magnetic confinement devices, with an emphasis on how fundamental plasma physics informs confinement-relevant fusion technologies. Results from toroidal and linear plasma experiments will be presented, including measurements identifying collisional damping of the hot plasma wave prior to mode conversion in the scrape-off layer as a mechanism limiting electron Bernstein wave coupling efficiency in overdense plasmas. The seminar will also highlight recent results using direct-current local helicity injection that demonstrate strong plasma current amplification and stable plasma formation without reliance on a central solenoid. The roles of injector geometry, impurity transport, and 3D current structures in determining plasma performance and stability will be discussed. Finally, ongoing efforts integrating helicity-driven plasma initiation with microwave heating, plasma-material interaction studies, and stability control in toroidal systems will be presented.



Host: Chris Niemann