

# Plasma Physics Seminar

Physics & Astronomy Building (PAB) Room 3-330

Via Zoom: <https://ucla.zoom.us/j/92785449357?pwd=SVBTSko3bTdEUW03dzQwNks1Q2IKZz09>

Friday, December 8, 2023 at 12:30PM

Lunch will be served at 12:00PM

## High-Energy-Density Physics Research at General Atomics: Inertial Confinement Fusion and Laboratory Astrophysics

**Mario Manuel (General Atomics)**



**Abstract:** General Atomics (GA) has supported the Inertial Confinement Fusion (ICF) and High-Energy-Density (HED) Physics programs for over 30 years. As the primary supplier of target components and metrology services for the national ICF program, GA has developed the most comprehensive measurement systems for characterizing ICF targets used in ignition experiments conducted at the National Ignition Facility (NIF). This first half of this talk will cover recent advancements in target fabrication and metrology that continue to aid the ICF program as well as new research areas in high-repetition rate technology development. In addition to developing novel target fabrication and characterization techniques, GA collaborates with multiple academic institutions as part of the Center for Matter in Extreme Conditions (CMEC), led by the University of California San Diego, to study problems in basic HED science. Through the CMEC collaboration, we have developed a platform on the Omega Laser Facility to study the early formation stages of quasi-parallel collisionless-shocks in the laboratory. In astrophysical systems, such as supernova remnants, these shocks are likely responsible for the generation of the highest energy cosmic rays in our universe. Laboratory experiments such as these, provide the means to study the microphysics and kinetic instabilities responsible for shock formation in a controlled way that is not resolvable in observational data. The second half of this talk will discuss these astrophysical and laboratory systems in more detail and our most recent results that show the non-resonant instability dominates field generation in high-Alfvénic mach number systems, such as those found in nonrelativistic supernova remnants.