The University of Texas at San Antonio

UTSA Physics and Astronomy

Inertial and Magnetic Confinement Fusion at General Atomics

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Dr. Carlos Monton

Dr. Carlos Monton obtained his Ph.D. in physics at the Instituto Balseiro in Argentina. He made two postdoctoral stays in Europe, at the Institute of Materials Sciences in Barcelona, and in the US, at the Physics Department of the University of California San Diego. In 2015, he was appointed as an assistant professor of physics at UTSA. In 2019, he joined General Atomics, where he works as Director of the Center of Excellence Advanced Materials Engineering (COE-AM). Dr. Monton is an expert in thin film deposition techniques, magnetism, and nanotechnology. Currently, the Center he directs is conducting research and development on plasma-facing materials and the development of metal film pumps for direct internal recycling of tritium in magnetic confinement fusion reactors. It also provides high-precision targets for high-density experiments for inertial confinement fusion.

Abstract: Founded in 1955, General Atomics (GA) is a defense and diversified technology company. Today, GA and its affiliated companies operate on five continents. GA's research and development portfolio includes magnetic and inertial confinement fusion as well as nuclear fission. The mission of our magnetic and inertial fusion programs is to rapidly advance the science and technology needed for the successful development of fusion as a safe, clean, and virtually limitless energy source for the future. GA has been an international leader in magnetic fusion research since its inception and is the principal private sector participant in thermonuclear fusion research through its internationally recognized DIII-D National Fusion Facility, operated by GA for the U.S. Department of Energy. GA is also the main private contributor of advanced targets and components to the three largest US Inertial confinement fusion (ICF) facilities. Among these, the largest operational ICF experiment is the National Ignition Facility (NIF) in the US. In 2022, the NIF achieved fusion with a gain of 1.5, delivering 2.05 megajoules (MJ) of energy to the target, which produced 3.15 MJ. This was the first time that an ICF device produced more energy than was delivered to the target. In this presentation, I will describe this experiment and how GA supports fusion through its magnetic and inertial confinement divisions. I will describe the technical and material science challenges that exist in both approaches and how, in the Center of Excellence Advanced Materials Engineering, we are working to overcome them.

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