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Michigan Institute for Plasma Science and Engineering

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Sandia National Laboratories

A Multi-Dimensional View of the U.S. Inertial Confinement Fusion Program

The U.S. Inertial Confinement Fusion (ICF) program is pursuing three major approaches with a goal of achieving multi-mega-Joule fusion yields in the laboratory: laser indirect drive, laser direct drive, and magnetic direct drive, each with unique physics and engineering challenges. There are, however, many commonalities in the plasma conditions and dynamics that occur near peak compression, the need for new diagnostic capability, and the need to control laser plasma instabilities. Greater cross-fertilization of expertise and ideas across the national program combined with advancements in experimental methods and new technologies is leading to new insights into the physical processes of each approach. This talk reviews the status and future outlook of U.S. efforts in ICF through a comparison of the common challenges and key differences of the three major approaches and highlights of recent accomplishments and future plans.

About the Speaker: Dr. Gregory Rochau is the manager of the Radiation and Fusion Experiments department and the head of the Secondary Assessment Technologies program at Sandia National Laboratories. Prior to this role, he managed x-ray imaging and spectroscopy diagnostic development and operations on Z, the world's most powerful Pulsed Power facility. Dr. Rochau specializes in applied spectroscopy for the diagnosis of high energy density plasma conditions in z-pinch and inertial confinement fusion experiments; work through which he has authored or co-authored more than 80 papers. He has been the principal investigator for dozens of experiments on both the Z facility at Sandia and the Omega facility at the Laboratory for Laser Energetics.