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Michigan Institute for Plasma Science and Engineering



Wednesday
December 2, 2026
1:30 pm
Room TBD

Dr. Dave Ampleford

Sandia National Laboratories

The ZX Initiative - Expanding the Physics Capabilities of the Z Pulsed Power Facility

Pulsed power provides an energy-rich tool for studying plasma physics and accessing High Energy Density conditions. Today, the Z Facility at Sandia National Laboratories – the most powerful pulsed power driver ever constructed – is used to study material responses at extreme pressures, to produce very intense radiation environments and to drive fusion fuels to thermonuclear conditions. We are embarking on an effort to further increase the impact of Z through several targeted upgrades, including doubling the energy delivered to experiments, referred to collectively as the ZX Initiative (Z eXtended Capability Initiative). Through these upgrades we intend to demonstrate robust alpha heating in our fusion experiments, potentially achieving Mega-Joule-class yields. In our radiation experiments we anticipate creating the most intense pure x-ray sources available. Finally, we expect to be able to study the equations of state for mm-scale samples at record pressures. In this talk we will review the science currently being studied on Z and discuss the physics aims of the ZX Initiative. We will then describe the specific pulsed power and subsystem upgrades that enable ZX performance, and discuss work already occurring today to make that happen.

About the Speaker: Dave Ampleford is currently leading the ZX Project Planning and Integration efforts at Sandia National Laboratory (SNL). Prior to that he was leading SNL's Inertial Confinement Fusion science research. He is an experimental plasma physicist who has researched pulsed power driven radiation sources and Inertial Confinement Fusion on the Z Pulsed Power Facility. He obtained his PhD from Imperial College London, where his dissertation was using the Magpie pulsed power driver for laboratory astrophysics research.

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