



Physics Colloquium



Thursday, March 9th at 3:30 pm in SC 234

Dr. George Laity

Sandia National Laboratories

Understanding Vacuum Power Flow at the Sandia Z Accelerator for Improving High Energy Density Physics Experiments

The Sandia Z Facility is the world's largest pulsed power accelerator, and can routinely deliver 25-27MA current pulses to a variety of high energy density experiments useful for investigating bright x-ray radiation physics, material science, inertial confinement fusion, and laboratory astrophysics. For target configurations which require high-inductance (>3.0 nH) hardware, the accelerator can suffer from reduced current coupling in the form of charged particle losses in magnetically insulated transmission lines (MITLs). These losses: (1) can be difficult to model with conventional simulation techniques; (2) can be caused by a number of coupled physical processes including space charge limited electron and ion flows, plasma formation in desorbed neutral layers, and negative ion transport; and (3) can potentially become even more severe for higher current, next-generation pulsed power accelerator concepts under consideration. This presentation will describe our understanding of vacuum power flow in large pulsed power accelerators, examples of key diagnostics under development, and impacts of improving current delivery for ongoing high energy density physics experiments.

Refreshments at 3:00 pm in SC 103