CAPABILITY ADVANCES AT THE SANDIA Z MACHINE

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The Z Machine at Sandia National Laboratories is the world's most powerful pulsed power facility. It uses high magnetic fields associated with high electrical currents (up to 28 MA) to produce high temperatures (~10s of millions of degrees), high pressures (~100s of Megabars), and powerful x-rays (> 300 TW) for conducting research in High Energy Density science (HED) and Inertial Confinement Fusion (ICF). The adjacent Z-Beamlet Laser (2-TW, 4 kJ, 527 nm) can also be coupled to the Z Machine. To enable such activities, the Z Machine is continually being improved both from an operational perspective and from a capability perspective. These improvements include greater use of web-based applications for configuration management and information management, maturation of our experiment planning and execution process, development and incorporation of engineered safety systems, pulsed power system upgrades, increased B-field capabilities, increased ZBL laser output, and novel experimental platforms along with developing and fielding novel optical, x-ray and neutron diagnostics. These advances have provided benefit to NNSA laboratory experiments as well as external users connected to our fundamental science program. An overview of present Z Machine capabilities will be given along with planned upgrades and advances in the context of current scientific and programmatic drivers.

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