

Exceptional service in the national interest



DIRECTED ENERGY LASER APPLICATIONS

Confronting national security challenges with pulsed laser, nonlinear optical, and high-voltage technology solutions

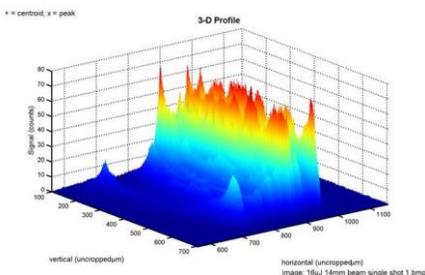
Overview

Sandia's Laser Applications department has specialized in the research and development of ultra-short pulse lasers (USPLs) for over 15 years. USPLs are a Directed Energy technology, delivering precise, concentrated, high-intensity electrical field energy to a target. The ability to generate femtosecond pulse durations and produce non-thermal effects, such as inducing terahertz radiation, are some of the key differentiators and advantages USPLs have over traditional continuous wave and longer pulse lasers. Our experience spans fundamental science and modeling and simulation in nonlinear optical and laser phenomena, high-voltage technology, innovation in sources and techniques, and application development and testing.

Laser System Capabilities

Varied systems to propagate lasers and test effects on targets of interest

- Wavelengths: 0.4 μm to 24.8 μm
- Pulse Lengths: 12 fs to 250 ns
- Repetition Rates: 10 Hz to 80 MHz
- Pulse Energies: 1.46 nJ to 1 J



Diverse Facilities & Environments

- Multiple laboratories at various classification levels
- Roof-top kilometer scale range for low-power outdoor propagation experiments
- Desert and maritime testing environments
- Mobile trailer laboratory for field applications
- Real-time video recording, data decoding, processing and display

Applications

The Directed Energy Laser Applications Department provides unique capabilities on the frontier of short and ultrashort pulse lasers and nonlinear optics to diverse applications such as

- Laser-induced electrical switching
- Remote sensing
- High energy density pulsed plasma diagnostics
- Industrial process diagnostics
- Compact tunable sources
- Short-pulse laser imaging and diagnostics
- Optical communications
- Propagation and filamentation
- Stabilized laser sources, from Hz-level CW to zero-phase slippage ultrafast frequency combs

Contact Us

David R. Gardner, PhD
Manager, Directed Energy Laser Applications
(505) 845-7875 / drgardn@sandia.gov

