

**LLNL-developed  
solid-state lasers  
and advanced  
technology  
have direct  
applications  
for Stockpile  
Stewardship**

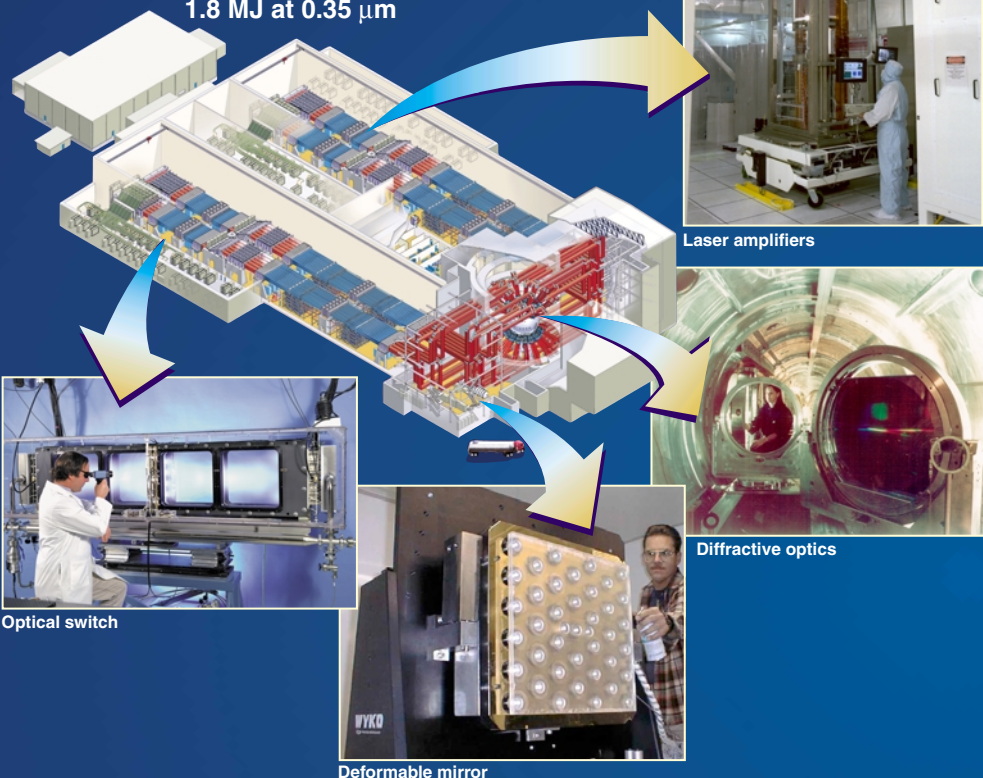




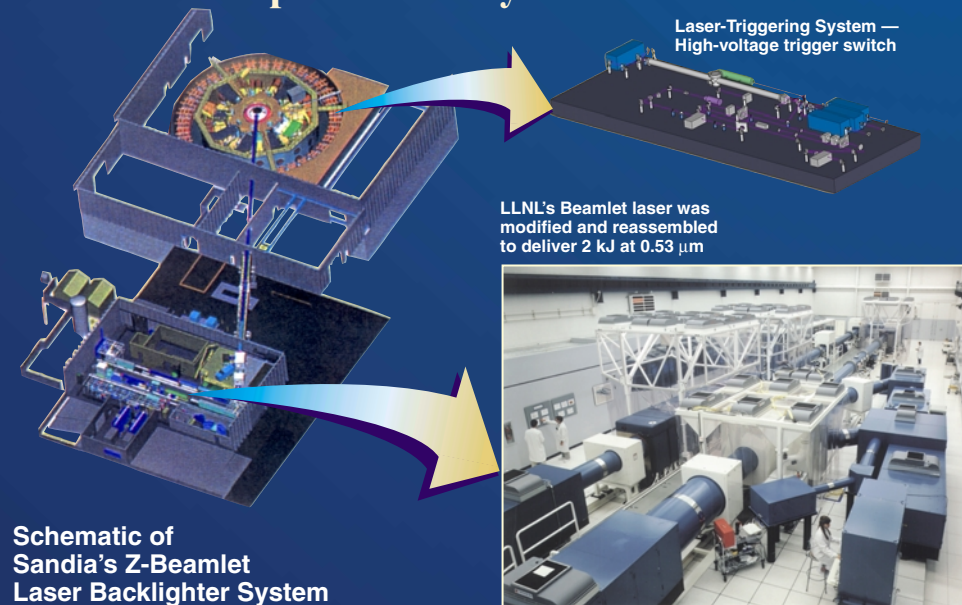
# Laser Science and Technology Program has provided enhanced capabilities for Stockpile Stewardship

We developed the laser components and optimized the design of the National Ignition Facility

192-beam, single-shot laser facility, delivering 1.8 MJ at 0.35  $\mu\text{m}$



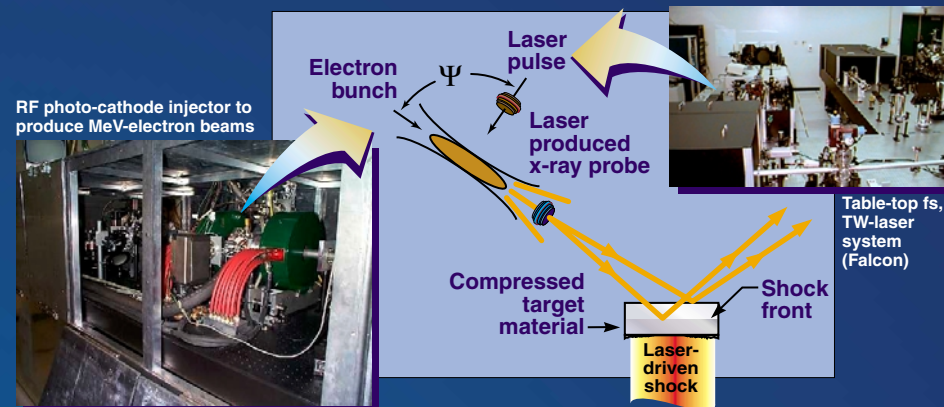
We have modified and installed the Beamlet laser system for use as a Backlighter Laser System in Sandia's Z-pinch Facility



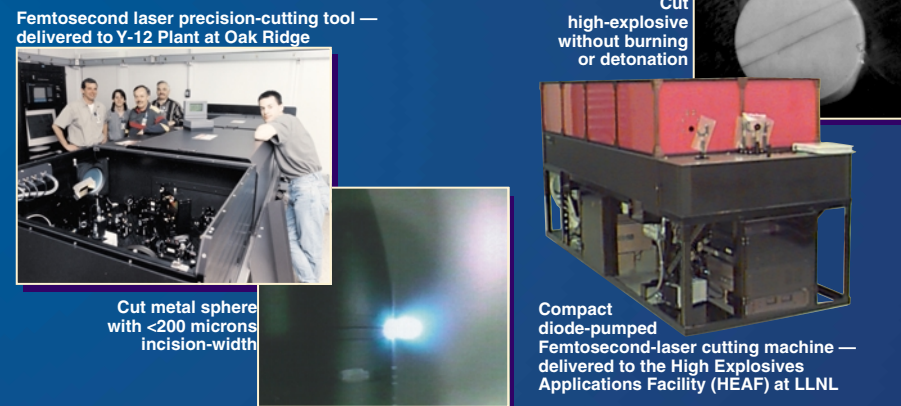
LLNL's Beamlet laser was modified and reassembled to deliver 2 kJ at 0.53  $\mu\text{m}$

Schematic of Sandia's Z-Beamlet Laser Backlighter System

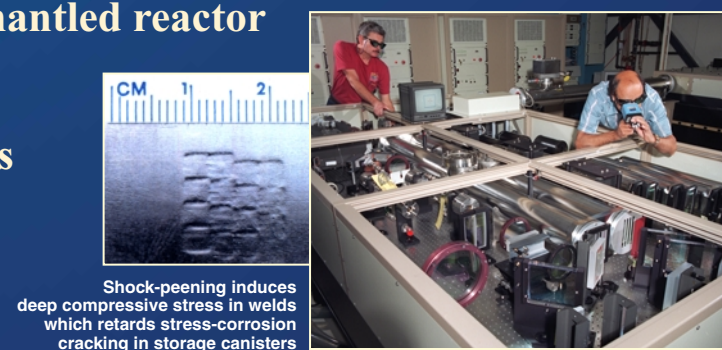
We are also developing an ultrafast x-ray source (based on Thomson scattering of femtosecond-laser pulses from relativistic-electron bunches) to study the ultrafast response of materials



For Stockpile Life Extension Process (SLEP), we developed advanced short-pulse laser systems for DOE to disassemble weapons components minimizing waste and damage



For Nuclear Material Stewardship, we are developing Laser-Shock Peening technology to improve the service lifetime of metal canisters designed for final disposal of high-level-radioactive waste, dismantled reactor and retired weapon components



Shock-peening induces deep compressive stress in welds which retards stress-corrosion cracking in storage canisters



University of California



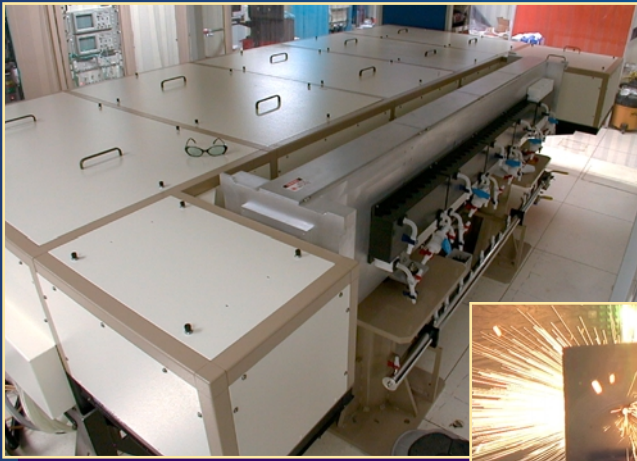
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Visit our Laser Programs Website at <http://lasers.llnl.gov>

# Our High-Average-Power Solid-State Laser Technology has applications to both DoD and DOE needs

Laser technology developed for the Air Force's Starfire Optical Ranger is being applied to laser damage testing of NIF optics

We are also developing a Heat-Capacity Laser for lethality tests in U.S. Army's High-Energy Laser Strategic Test Facility



Heat-Capacity Laser



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