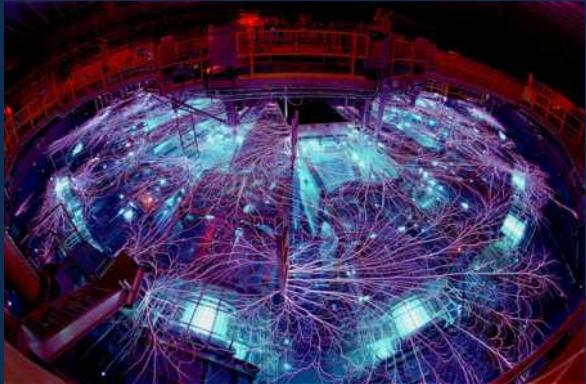


Exceptional service in the national interest



Z Facility Overview

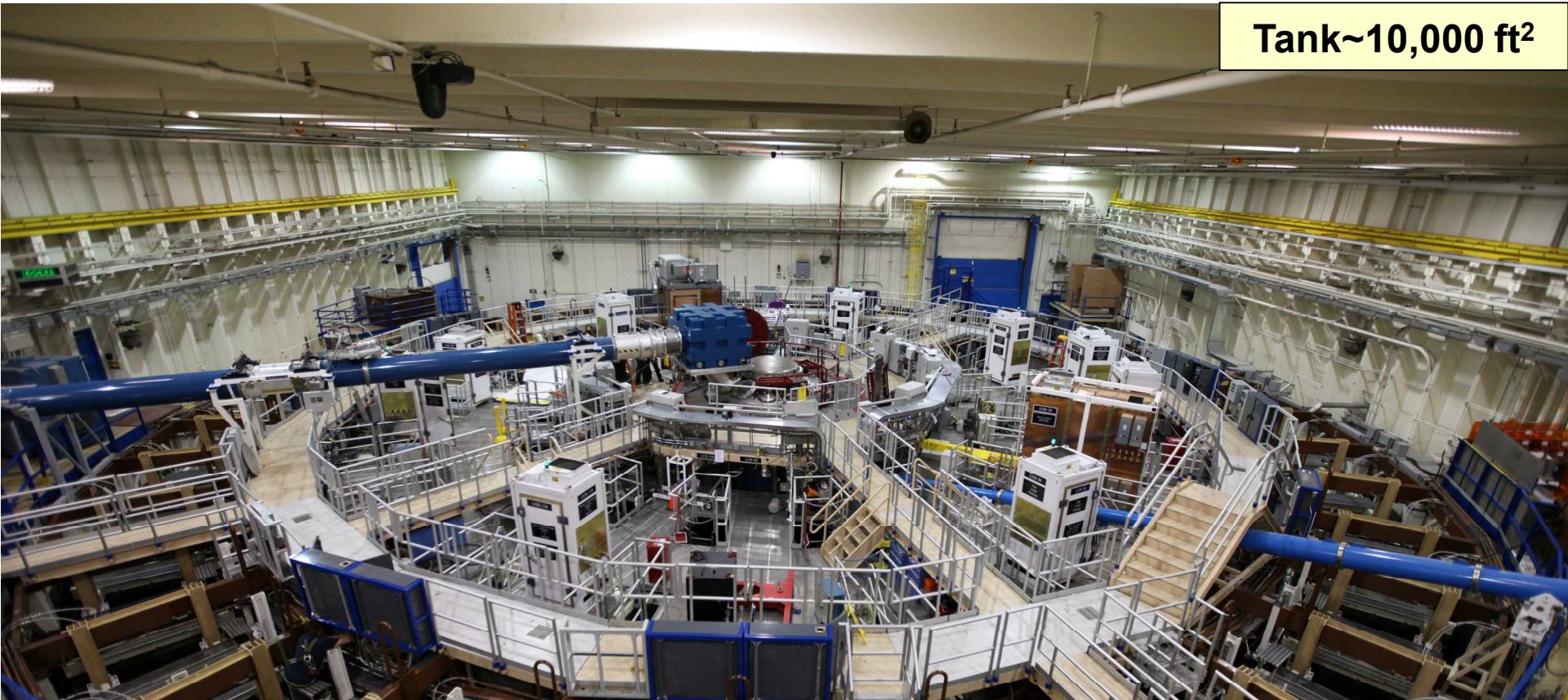
Keith Matzen

8/16/2012



Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

The Z facility generates large magnetic fields for dynamic materials and magnetic implosion experiments



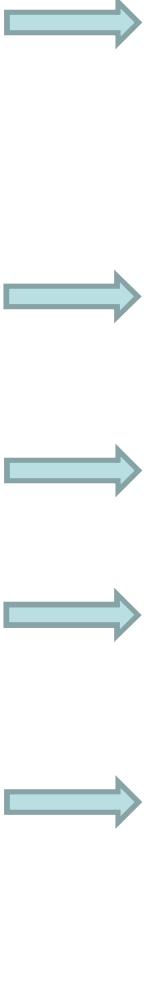
22 MJ stored energy
3 MJ delivered to the load
26 MA peak current; 80 TW peak power
5 – 50 Megagauss (1-100 Megabar)
100-600 ns pulse length

Recent Accomplishments

and

Impact

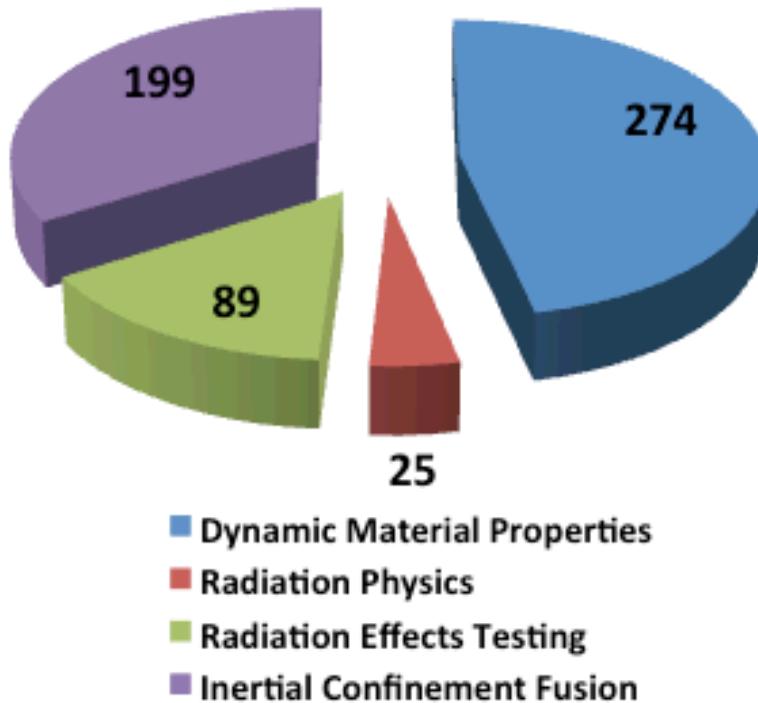
- Material Properties
 - Performed plutonium experiments and obtained excellent data
 - Obtained data on several materials at very high pressures
- Radiation Effects
 - Developed and applied Z x-ray source for radiation effects testing
- Fusion
 - Exciting results from novel laboratory fusion concepts
- Radiation Physics
 - Performed Z experiments with newly developed x-ray source and unique radiographic capabilities
- Z operations
 - Prepared and executed special nuclear materials experiments
 - Performing 40 to 50 shots per quarter, including experiments with SNM



- Data provides surprising insights into the behavior of plutonium at pressures found in nuclear weapons
- Key data for stockpile modernization options and hydrodynamic experiments
- Qualified a new key component for insertion into the stockpile; SGEMP, Impulse, Thermo-structural response
- Pulsed power may enable cost effective path to robust ignition and high gain. Boost applications are being explored
- Z experimental data helped resolve the long standing “energy balance” issue; High-Z opacities
- Z is the only HEDP/ICF facility qualified to perform experiments on plutonium
- Z is a cost effective way of addressing critical stockpile stewardship science challenges

Z continues to be heavily oversubscribed

Stockpile Stewardship Shot Days Requested for CY13



587 shot days have been requested for stockpile stewardship and related national security applications for Calendar Year 2013

Issues and Concerns

- **Strong connection to stockpile issues is a strength**
 - **Focus on milestones**
 - (+) Coordinated national effort on critical issues
 - (+) Mission; HED council: Z, NIF, Omega
 - (-) Impact on scientific understanding and innovation
 - **Necessity of large facilities**
 - (+) Provide conditions relevant to NW performance
 - (-) Impacts balance of exploration and creativity using smaller facilities
 - (-) Limited throughput and number of experiments
- **Operational oversight and regulatory environment**
- **Balance between S&T and weapon delivery**
- **Preparing to address the science challenges of long term stewardship**
 - Developing the next generation of NW scientists (unclassified work, fundamental science program)
 - Building ties to academic community
 - Investing in foundational work needed for future experimental capabilities