

# **NNSA Perspective on Fusion**



**For Fusion Power Associates  
Livermore, CA  
December 4, 2008**

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Chief Scientist**



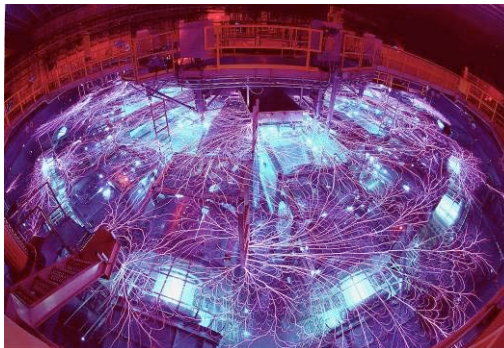
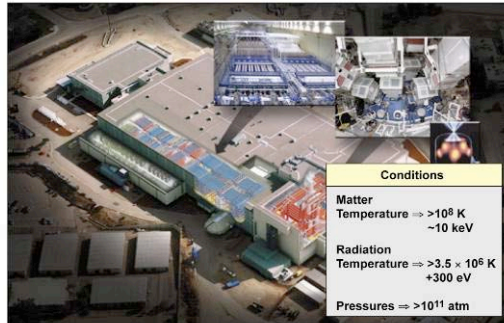
# Inertial Confinement After 50 Years



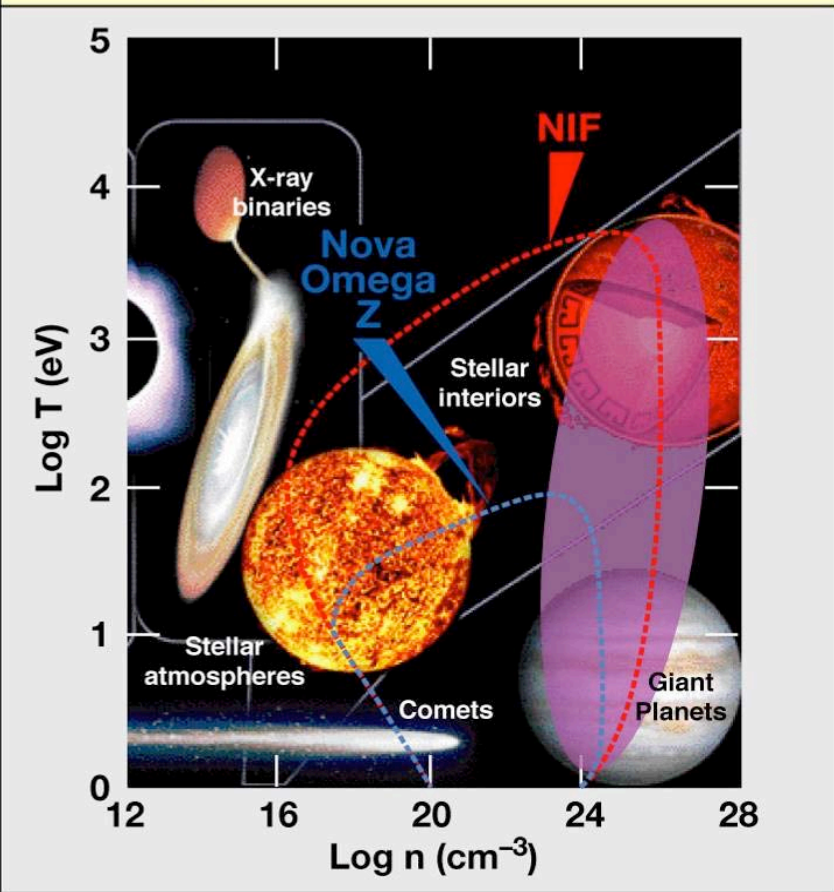
- **NIF near complete – largest and most complex facility ever for DOE**
- **Ignition experiments are 1 year away**
- **The most complex and visible endeavor for DOE since the Manhattan Project**
- **Will this change the game?**



99.999999% of the energy from a weapon is generated in the high energy density state



### Astrophysics Sources and Facilities



***NNSA has championed the World's three largest HED facilities***



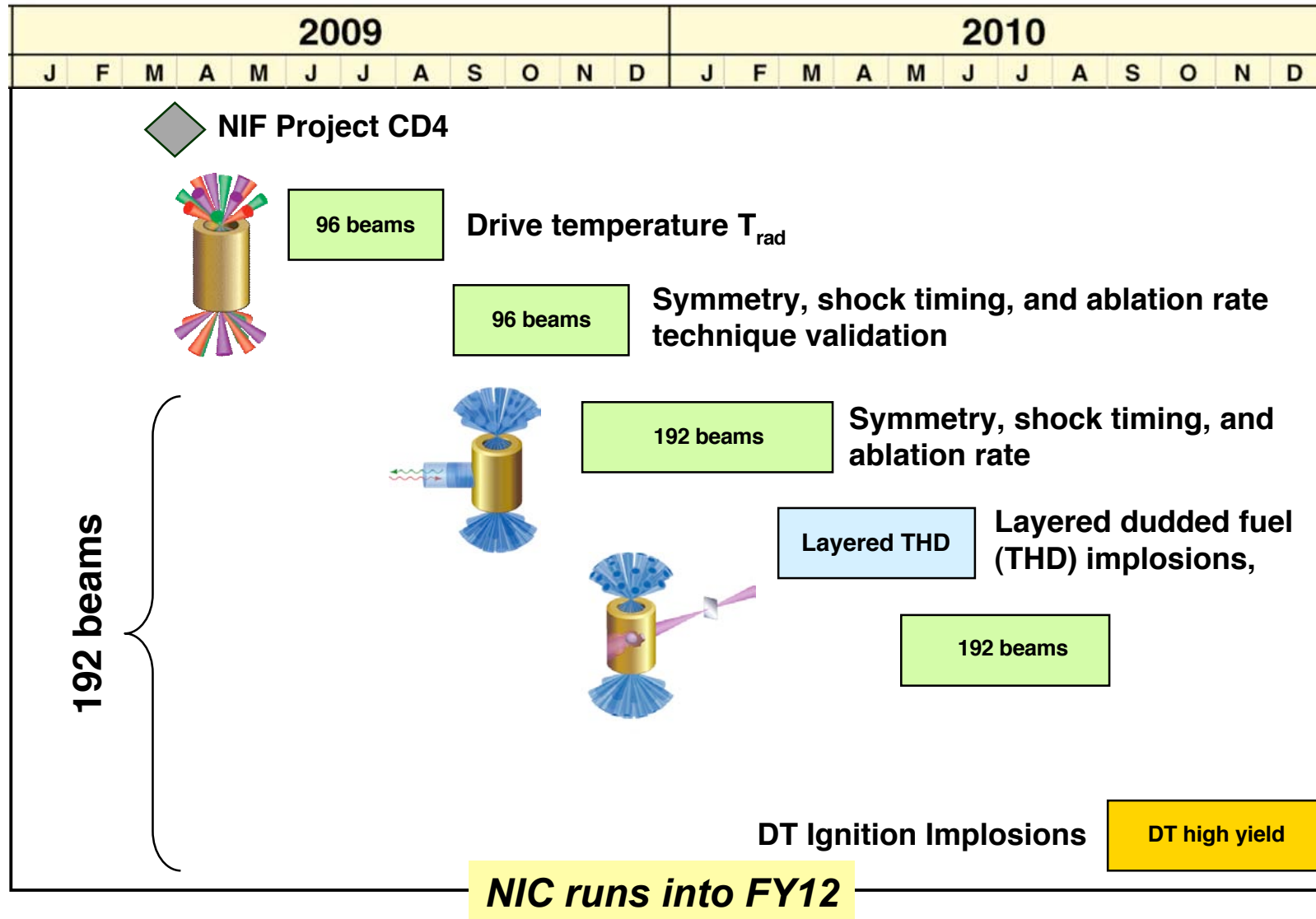
# For Nuclear Warheads



- **Fusion – “Boost” makes our warheads work**
- **Understanding Boost? – not yet, major initiative**
- **This now limits warhead design and assessment options without testing**
- **Plan for Predictive Capability Framework depends on ignition by 2012**

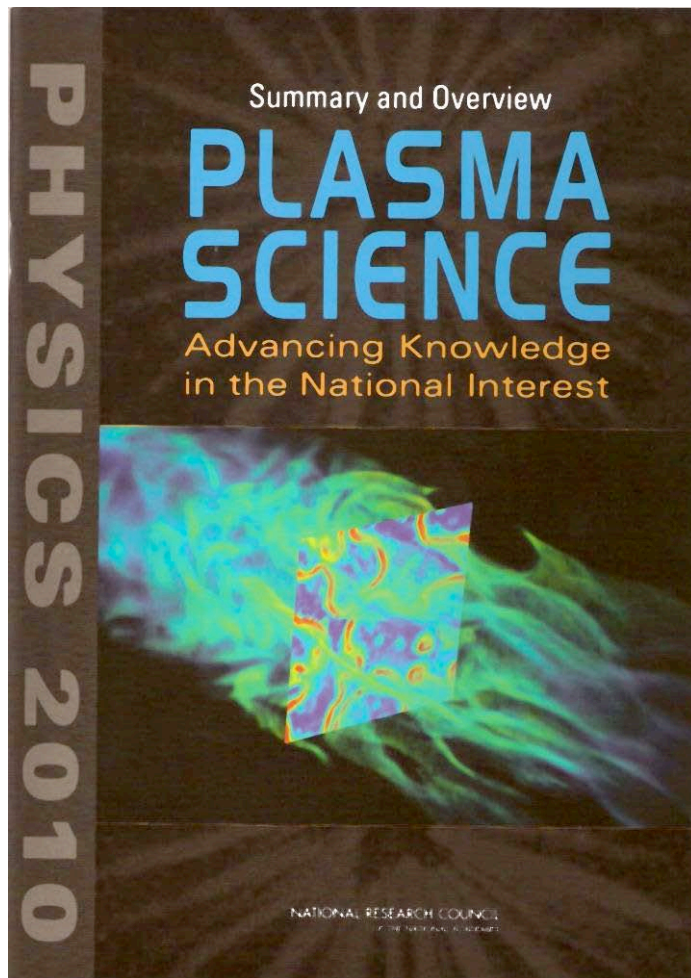


# We are on an aggressive schedule





# Response to the Decadal Study



**Principal Conclusion:** The expanding scope of plasma research is creating an abundance of new scientific opportunities and challenges. These opportunities promise to further expand the role of plasma science in enhancing economic security and prosperity, energy and environmental security, national security, and scientific knowledge.

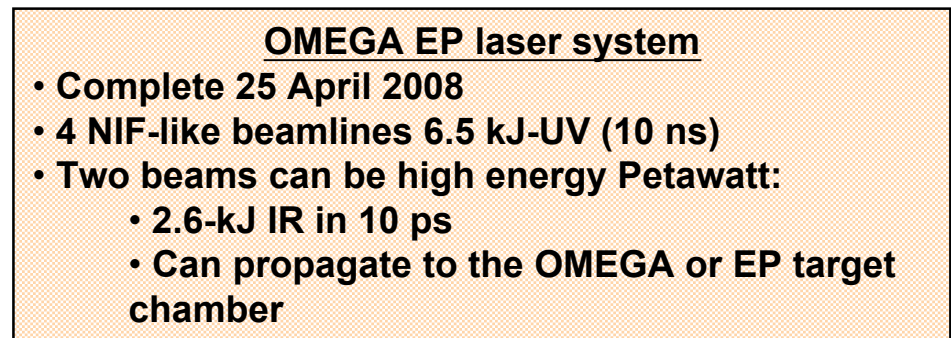
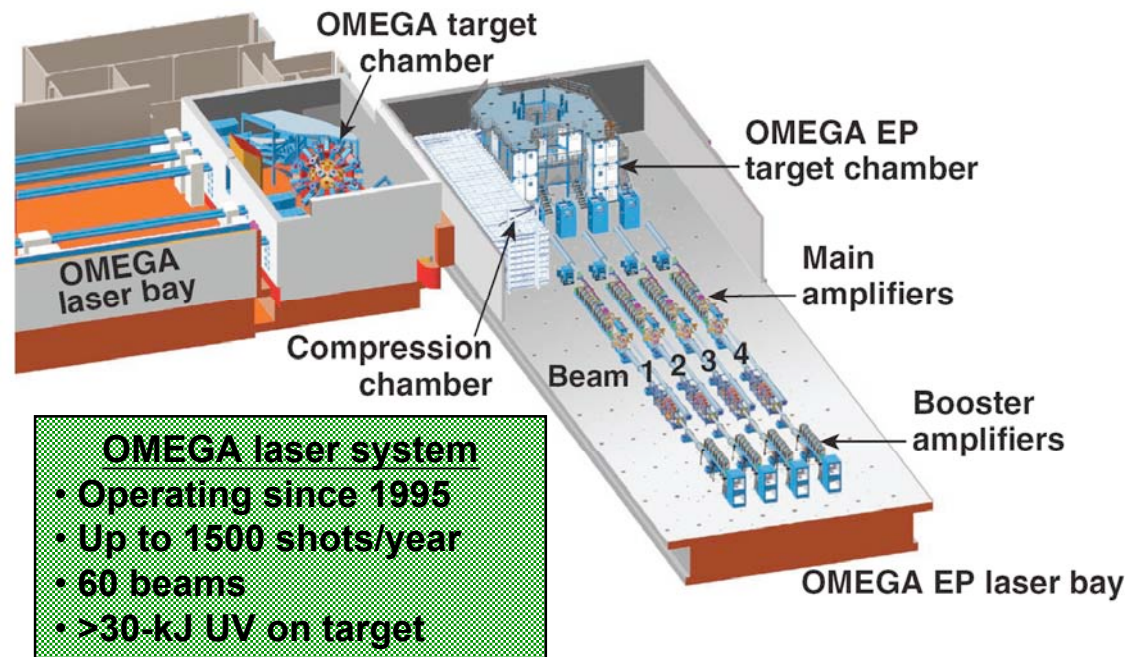
- **OFES would be an excellent steward of Plasma Science**
  - Exciting opportunities with ITER, growth of plasma applications, etc.
- **NNSA has and will continue to lead many growth areas in High Energy Density Physics**
  - A peer for OFES in stewarding HEDLP
- **Ignition and beyond will energize the HED community**
- **Many of our applications sit at the interface between plasma science with materials, nuclear physics, etc.**
- **Our investments in smaller facilities and university programs will help grow the community and the field**



# The OMEGA/OMEGA EP laser system is currently NNSA's largest Users' Facility

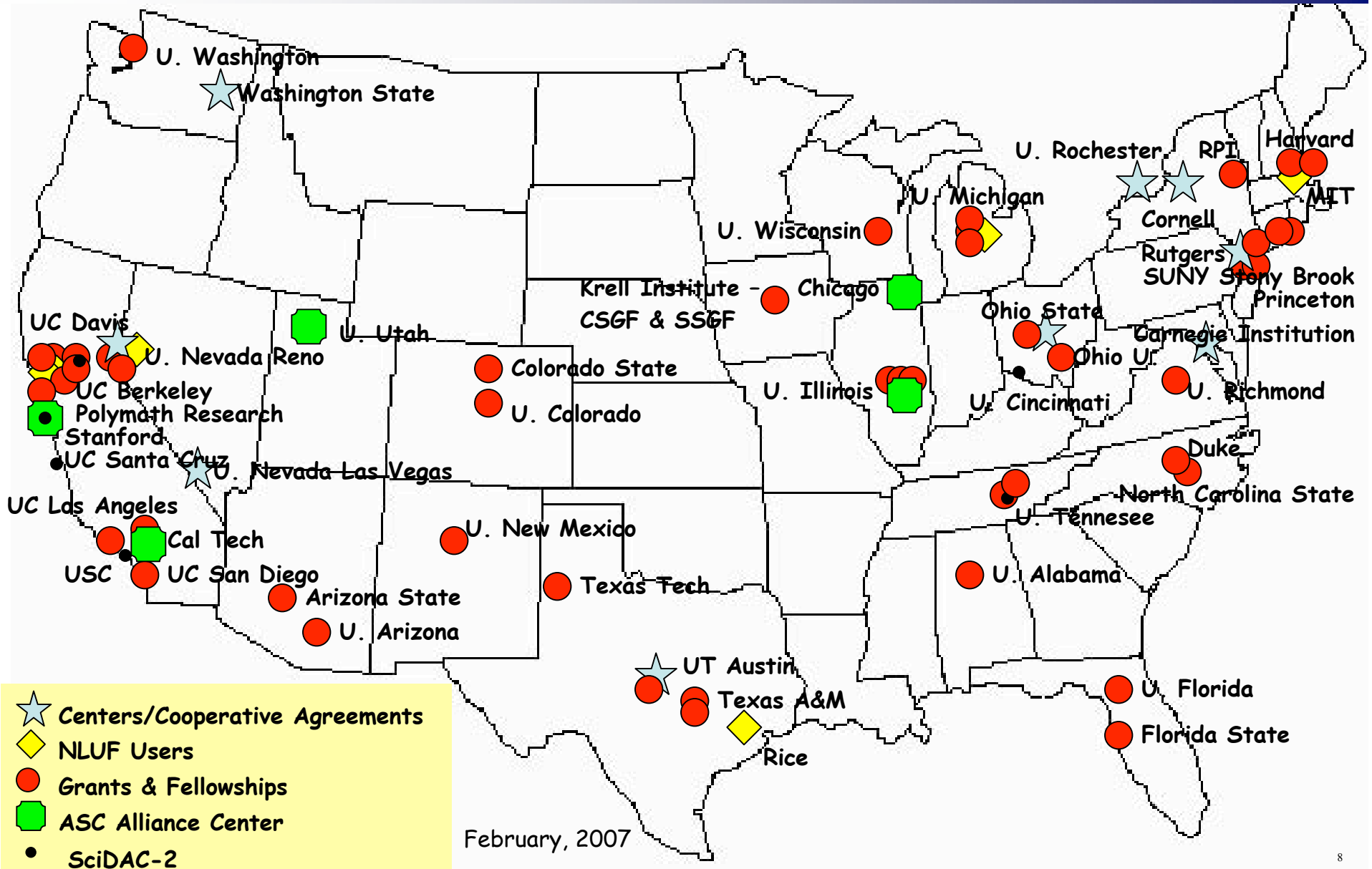


- **OMEGA/OMEGA EP is located at the University of Rochester's Laboratory for Laser Energetics**
- **~70% of time for NNSA mission-related research**
  - ICF
  - HED Physics
- **~25% of time for peer-reviewed basic science**
  - Laboratory Basic Science
  - National Laser Users' Facility Program





# NNSA Support for Academic Research







# NIF and LMJ



- **Same technology – shared development**
- **Similar designs and capability**
- **Near total alignment of mission drivers**
- **Both will have “open” use components**
- **NIF will lead**



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