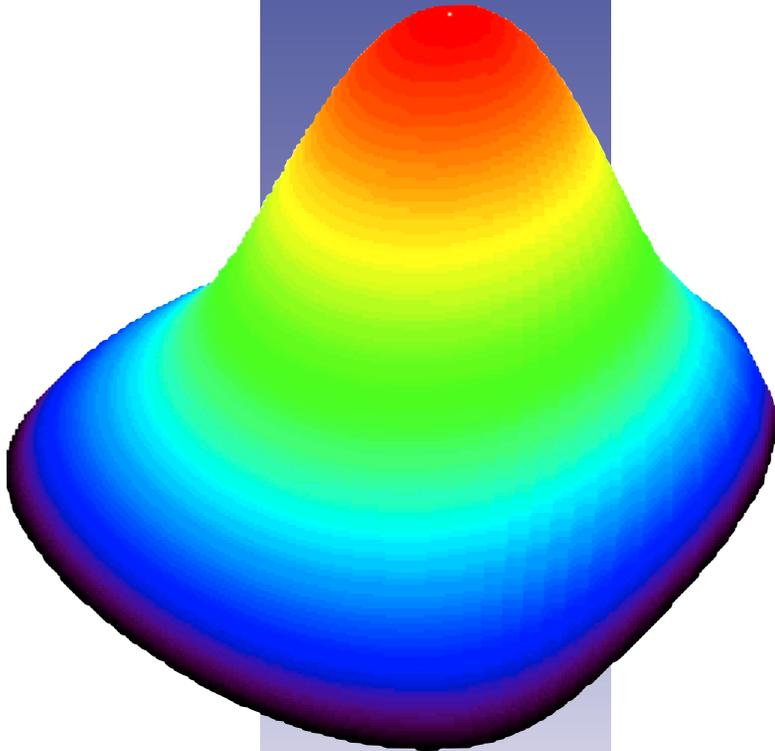


THE NATIONAL FUSION COLLABORATORY

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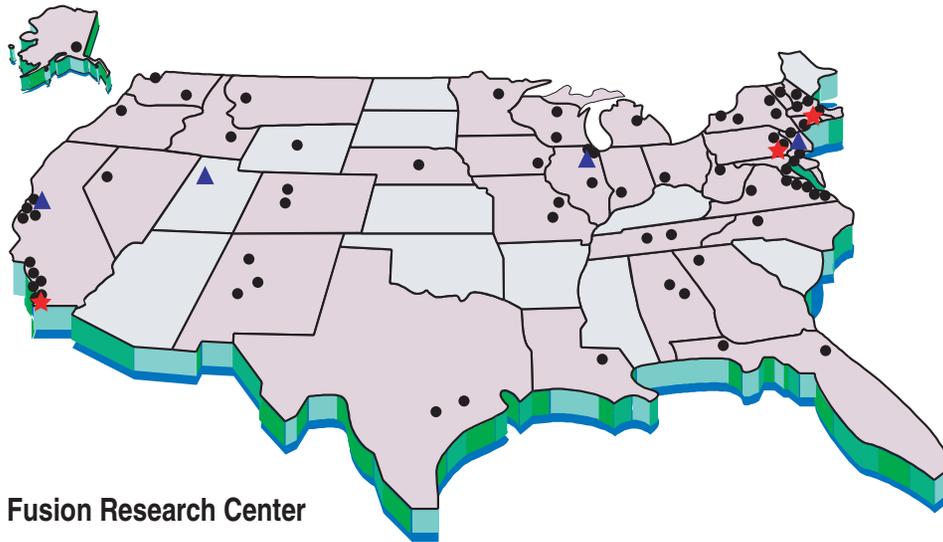


*NIMROD simulated pressure stored
in MDSplus and visualized with IDL*



THE MAGNETIC FUSION COMMUNITY HAS 40 US SITES IN 37 STATES

Over 1000 Magnetic Fusion Scientists in the United States



- Fusion Research Center
- ★ Large Fusion Experiment
- ▲ CSET Partner

- **Three main experimental facilities**
 - CA, NJ, MA worth ~\$1B
 - Pulsed experiments with 15 min cycle
- **Theory & simulation community**
 - Non-linear 3D plasma models
 - Compare theory & experiment
- **Unified data access**
 - MDSplus: network interface to all data
 - RDB: metadata

THE GOAL OF THE FUSION COLLABORATORY IS TO ADVANCE SCIENTIFIC UNDERSTANDING & INNOVATION IN FUSION RESEARCH

- **Enable more efficient use of existing experimental facilities through more powerful between pulse data analysis resulting in a greater number of experiments at less cost**
- **Allowing more transparent access to analysis and simulation codes, data, and visualization tools, resulting in more researchers having access to more resources**
- **Enable more effective integration of experiment, theory, and modeling**
- **Facilitate multi-institution collaborations**
- **Create a standard tool set for remote data access, security, and visualization allowing more researchers to build these services into their tools**

THE COLLABORATORY WILL CREATE & DEPLOY COLLABORATIVE SOFTWARE TOOLS FOR THE FUSION COMMUNITY

- **Create transparent and secure access to local/remote computation, visualization, and data servers**
- **Develop collaborative visualization that allows interactive sharing of graphical images among control room display devices, meeting room displays, and with offices over a wide area network**
- **Enable real-time access to high-powered remote computational services allowing such capabilities as between pulse analysis of experimental data and advanced scientific simulations**

THE COMPUTER SCIENCE RESEARCH NECESSARY TO CREATE THE COLLABORATORY IS CENTERED AROUND THREE AREAS

- **Security: Globus & Akenti**
 - Valuable resources need to be protected: data, codes, & vis tools
 - Collaboratory will require authentication, authorization, and encryption
 - Fair use of shared resources
- **Remote and Distributed Computing: Globus**
 - Share the community's computational resources
 - Job scheduling, monitoring, exception handling, and accounting
- **Scientific Visualization: AG, Tiled Display Walls, OpenGL**
 - Increased data quantities and ease of collaboration requires better visualization technology
 - Collaborative control rooms & meeting rooms, and enhanced vis tools

POTENTIAL CONNECTIONS TO OTHER SciDAC PROJECTS

Group\Action	Authentication	Authorization	Job Monitor	Network Diagnostic	We are a Customer	Large Data Testing	Similar Needs to Fusion	Portal - Job Invocation	Remote Shared Vis.	Remote Work & Comm.
Data Grid - Foster	X	X			X	X				
Fusion - Schissel										
Bandwidth Meas. - Claffy				X						
DOE Science Grid - Johnston					X					
Earth Systems Grid - Foster							X			
Incite - Baraniuk				X						
Science Portals - Gannon								X		
PPDG - Livny	X	X	X				X			
Collab Security - Tuecke	X	X								
Chemical Sciences - Rahm							X			
Secure Group Comm. - Agarwal					X				X	X
Pervasive Compute - Agarwal					X				X	X
Group Collab Middleware - Stevens					X				X	X
Distributed Security - Thompson	X	X			X					
Commodity Grid Kits - Laszewski	X									
Storage Res. Manage - Shoshani						X				
Science Annotate - Meyers					X					