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Title: Laboratory Overview

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Intended for: Senator Bingaman's Staff and Community Leaders



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Laboratory Overview

Duncan W. McBranch

Members from Senator Bingaman's staff and various community leaders will be provided a general laboratory update on science and energy programs.

Laboratory Overview

Duncan W. McBranch
Deputy Principal Associate Director for
Science, Technology and Engineering

June 2, 2011



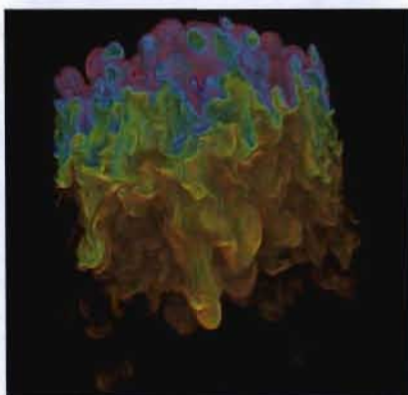
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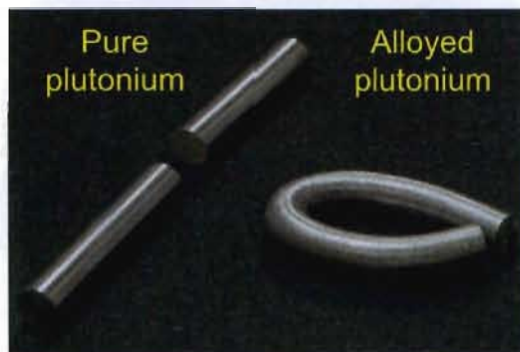


Science at Los Alamos National Laboratory

Stockpile Stewardship

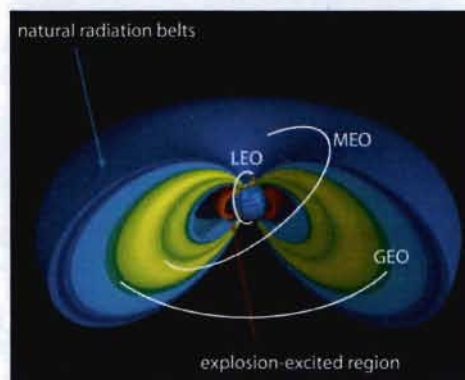


Hydrodynamics: Turbulence

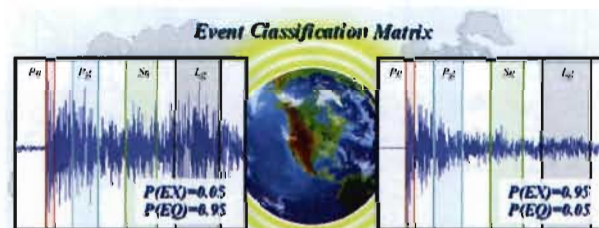


Plutonium Science: Metallurgy

Global Security

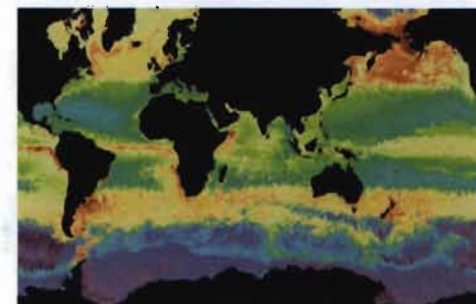


Threats from Space: Dynamic Radiation Environment Assimilation Model



Seismic Detection of Nuclear Explosions

Energy Security



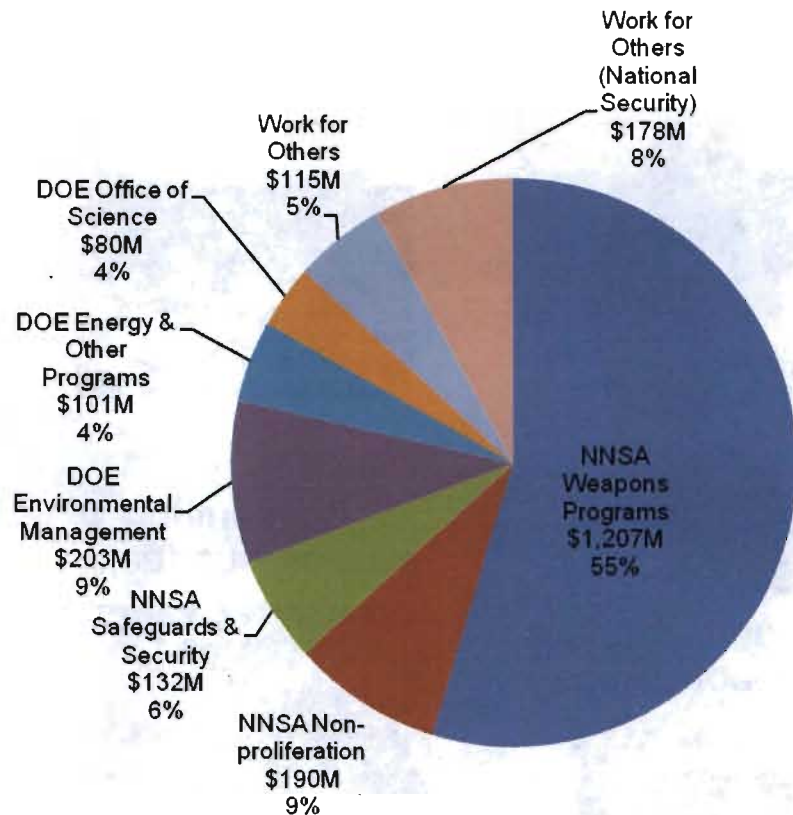
Climate/Energy Impacts: Simulation and prediction



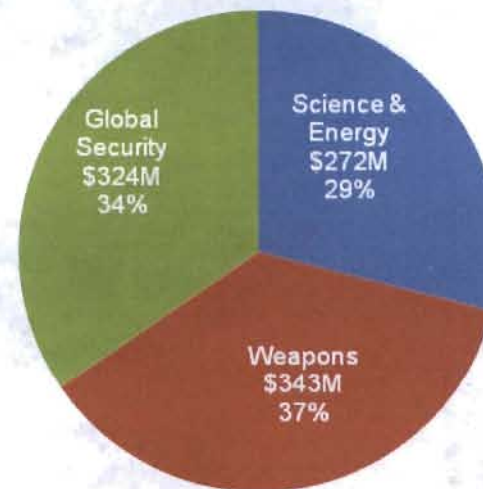
Materials: Energy generation and transmission

FY10 Laboratory Budget

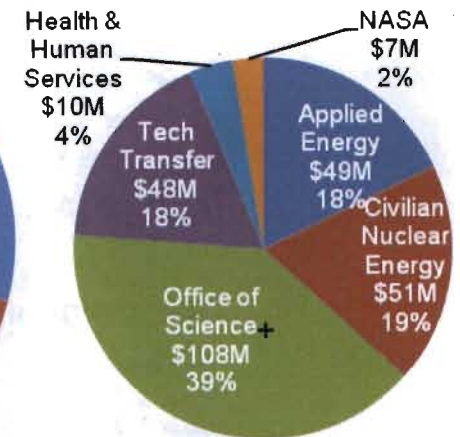
The Lab's FY10 annual budget was approximately \$2.2 Billion*



Science & Energy Funding: \$273M**



Laboratory's R&D Funding: \$939M**



+ Includes Genome, Tropical Western Pacific, and Stimulus

Diverse ST&E capabilities are needed to perform the Laboratory's national security missions



Weapons Science & Engineering



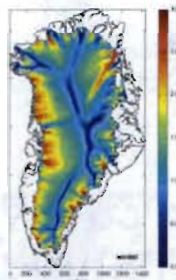
Accelerators & Electrodynamics



Biosciences



Computational Physics & Applied Mathematics

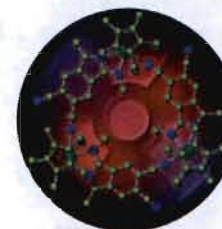


Information & Knowledge Science



Materials

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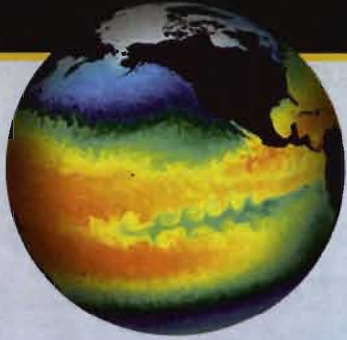
Chemical Science



Earth & Space Sciences



Los Alamos Energy Security focus areas

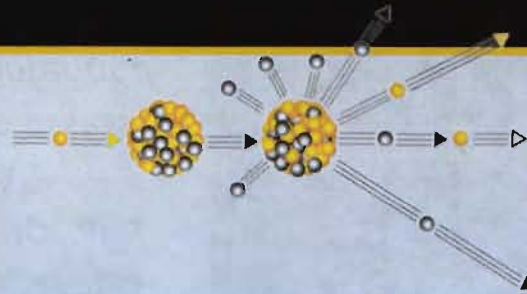


Impacts of Energy Demand Growth

- Coupled predictive models for climate, infrastructure impact analysis
- Prediction of abrupt change at multiple scales (regional to global)
- Global security and policy implications

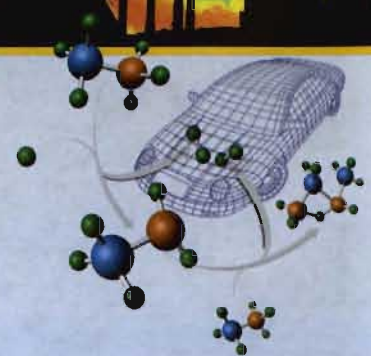


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Sustainable Nuclear Energy

- Efficient extraction of energy content from fuel
- Nonproliferation & safeguards
- Effective waste management



Concepts and Materials for Clean Energy

- Energy storage, generation, and transmission
- Biofuels and fuel cells
- Clean fossil energy



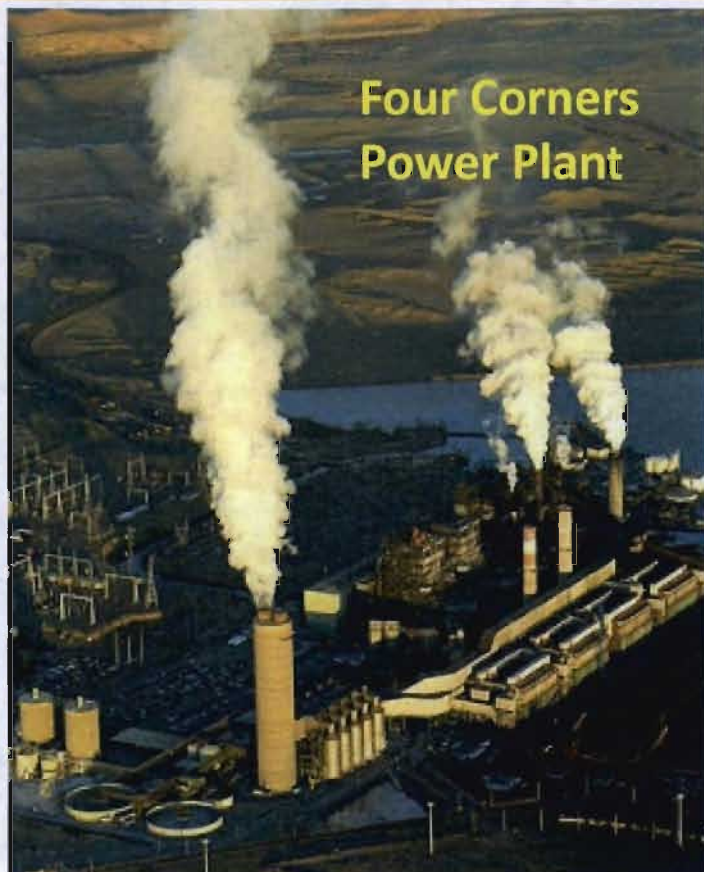
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Slide 2



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Four-corners pilot: CO₂ attribution & scaling



We are combining column CO₂, NO₂ and CO observations using FTS, GOSAT, SCIAMACHY and MOPITT data to assess the ability of remote sensing to infer and attribute CO₂ emissions from a power plant.

FTS + EPA + Satellite

GIGANTIC POINT SOURCE

CO₂ (29 Mtons/year)

NO_x (79 Ktons/year)

IN STACK EMISSIONS (EPA-CEMS)

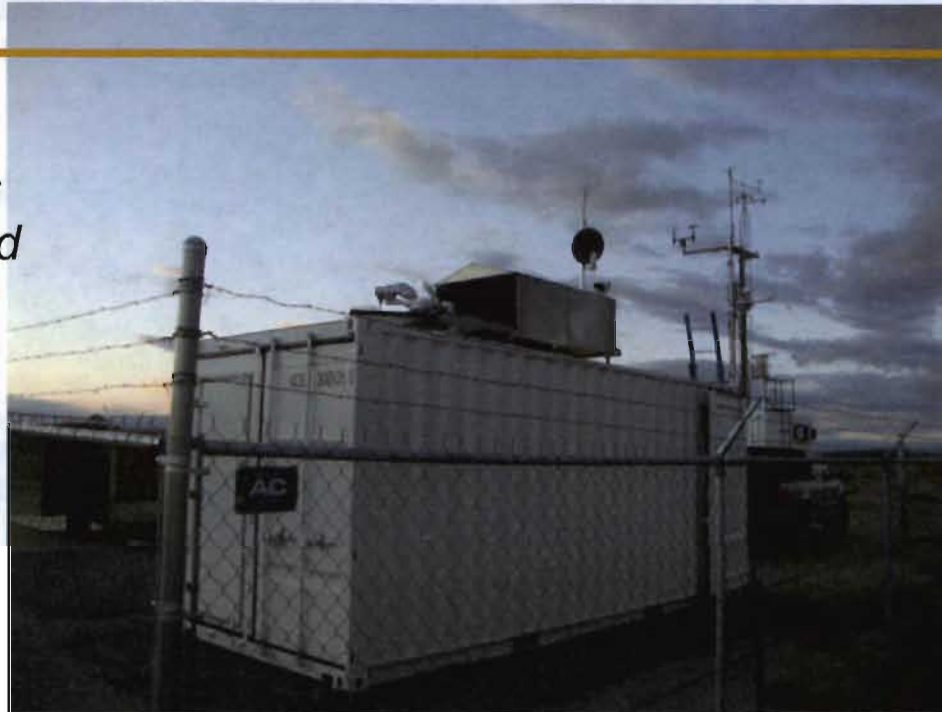
FTS, GOSAT, SCIAMACHY, MOPITT

WRF-Chem-VPRM Model

First Solar FTS to Monitor Power Plant Operational San Juan NM

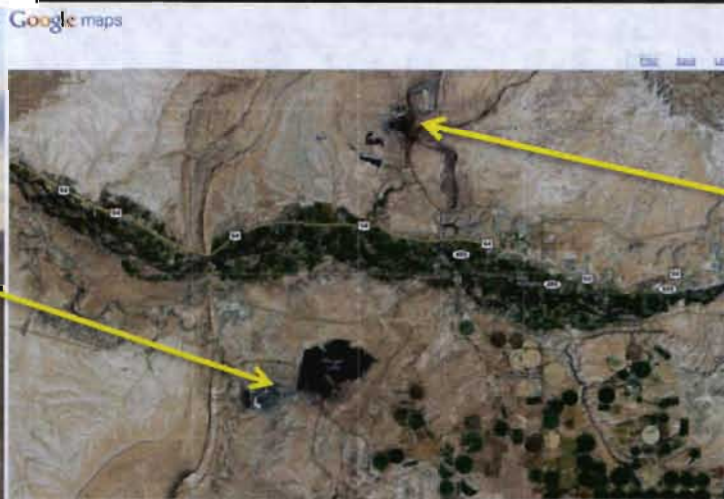
Goal: Separate CO_2 contributions from high NO_x and low NO_x sources using FTS data

Four Corners PP
High NO_x/CO_2



https://tccon-wiki.caltech.edu/Sites/Four_Corners

San Juan PP
Low NO_x/CO_2



where the results...
Security, LLC for the U.S. Department of Energy's NNSA

Los Alamos Science in the 21st Century

The nation's investment in Los Alamos has fostered scientific capabilities for national security missions.

As the Premier National Security Science Laboratory, Los Alamos tackles:

- Multidisciplinary science, technology, and engineering challenges
- Problems demanding unique experimental and computational facilities
- Highly complex national security issues requiring fundamental breakthroughs

