Argonne NATIONAL LABORATORY

... for a brighter future

Argonne Accelerator Institute Quarterly Meeting

Rod Gerig

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U.S. Department of Energy

UChicago Argonne LLC

Office of Science
U.S. DEPARTMENT OF ENERGY

A U.S. Department of Energy laboratory managed by UChicago Argonne, LLC

AAI Quarterly Meeting

Agenda

- General Updates – Rod Gerig
- Accelerator Developments in Physics Division – Robert Janssens
- Proposal for SRF Test Facility – Mike Kelly
- Accelerator Developments in the HEP Division – Wei Gai
- Accelerator Developments in the DOD Office – Sandra Biedron
- Argonne Accelerator Historical Collection – Tom Fields

AAI Quarterly Meeting

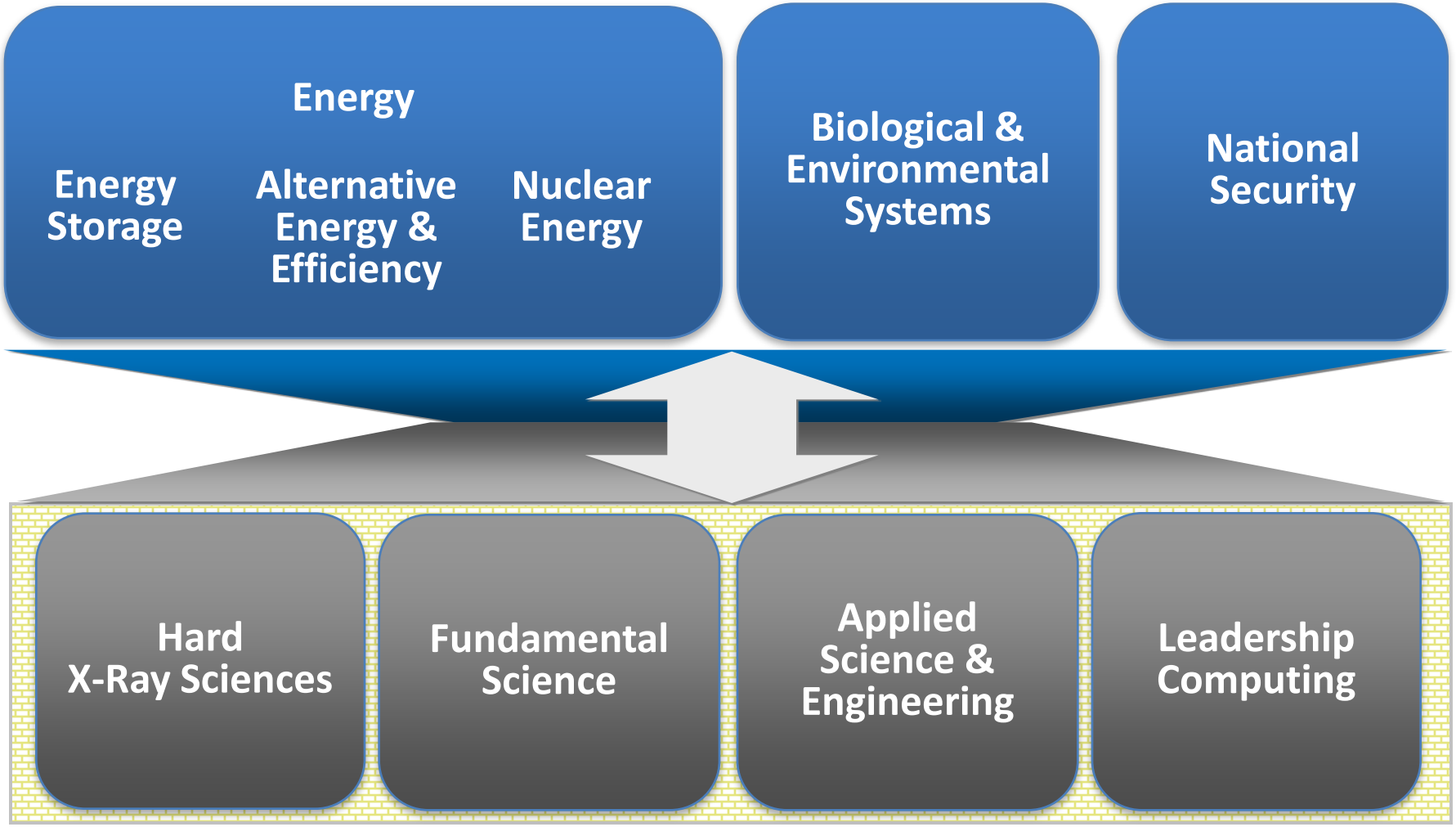
- Last meeting (November 24, 2008) was used to get input on Strategic Plan…. More on that later.
- Since then (December 11, 2008), FRIB siting decision to MSU
- Funding has improved substantially across the Office of Science
- ARRA money has been made available on a variety of fronts, potentially impacting Accelerator R&D at Argonne
- Second year of Lee Teng Intern Program – Argonne has six students, Fermilab has five. They are presently at the USPAS

AAI Quarterly Meeting

- Strategic Planning
  - The institute has been working with lab management to incorporate and maintain the visibility of accelerator R&D as the strategic plan has been developed
  - Much of what we will relate has been put into the context of this plan

Argonne Core Capabilities Supporting Key Objectives

Research and Development Key Objectives



Foundation of Core Capabilities

Laboratory Core Capabilities

Lab Core Capabilities	Supporting Strategy
Hard X-ray Sciences Deliver research and instrumentation that enable world leading materials science, structural biology, environmental and energy sciences and engineering at ultra-small and fast time scales using the wide range of hard x-ray energies from the Advanced Photon Source. Develop a fully coherent x-ray source through both accelerator upgrade and new photon science accelerators while maintaining the highest level of coordinated and optimized beamline support and imaging technology for both local and visiting users.	• APS Renewal • Accelerator Based Hard X-ray Source Development • Imaging Systems • In-situ Experiments
Leadership Computing Guide the evolution of leadership computing from petascale to exascale while leading the development of scalable codes and computing environments for these machines.	• Blue Gene/Q • Computer Science • Applied Math & Logic • Computational Science
Fundamental Science Conduct world leading fundamental science to support lab key objectives and enable the great scientific discoveries of the future. Pursue and retain the top scientists available and provide world leading facilities to achieve this endeavor.	• Materials Discovery & Nano Device Design • Catalysis & Combustion • Biomolecular Characterization • Nuclear & High Energy Physics
Applied Science & Engineering Develop world leading applied science and technology into deployable systems that support scientific discovery and achievement of laboratory key objectives. Pursue and retain the top researchers in applied science and engineering and provide world leading facilities to achieve this endeavor.	• Nuclear, Chemical & Systems Engineering • Detector & Device Development • Accelerator S&T

Core Capability: Substantial combination of people, facilities and equipment with unique or world-leading component supporting major research and development efforts

APS Developments

- APS has submitted to BES a proposal to proceed with the APS Renewal (Upgrade), CD0 is hoped for this fiscal year
  - This is a ~$350M project which emphasizes improvements to beamlines and the accelerator enhancements to realize these.
    - *Longer straight sections*
    - *Higher current capability*
    - *Short pulse capability (an SRF project)*
    - *New insertion device designs*

AAI Quarterly Meeting - APS

- Accelerator Based Hard X-ray Source Development
  - DOE views this as “beyond the upgrade (renewal)”, namely from their perspective the next hard X-ray facility could be at Argonne, or elsewhere. Thus we need to be in the position to show that Argonne has the accelerator expertise to build what will be demanded by the science when that time comes. We are pursuing
    - *XFELO*
    - *ERL (a number of us just returned from ERL09)*
    - *Ultimate storage ring*
  - In general we are not in the running for SASE FEL (leaving that to SLAC), although we would like to be involved in appropriate R&D, and if it is an obvious add-on to our proposal, we would include it.

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- Within the Office of Science, ILC R&D funding has been fixed at $35M, FY09-FY12.
- Mike Harrison continues to direct the America's Regional Team
- Argonne continues to receiving funding ($1.43M in FY09) for four activities
  - Support GDE Management
  - ILC Controls
  - Accelerator Physics of positron production
  - Processing SRF Cavities

AAI – Quarterly Meeting… around the labs

- NSLSII now well into construction, received considerable ARRA funds, (not impacting TEC) but front loading funding profile
- BELLA and FACET, the two plasma wakefield R&D facilities at LBL and SLAC respectively are moving into CD1 phase, both benefiting from ARRA funding.
- SRF Infrastructure program at Fermilab is moving forward, and expects to benefit from ARRA funding. This is considered independent of ILC (e.g., also supports Project-X) activities but there are many interconnects.
  - Argonne processing facility is considered part of the Fermilab infrastructure
  - Could be additional Argonne hires from Fermilab
- SLAC successfully turned on LCLS; forming an Accelerator Directorate

AAI – Quarterly Meeting

Two upcoming workshops:

- Workshop on Application of High Intensity Proton Accelerators
  - October 19-21, 2009
  - Argonne expected to play significant role, Fermilab is particularly interested in NE input
- Accelerator R&D Workshop
  - October 26-28, 2009
  - Organized by OHEP: John Boger (OHEP Lead)
  - Workshop goals are to identify, understand, and report on:
    - *Role of accelerators in society*
    - *Current status with regard to capabilities, costs, and deployment*
    - *Stakeholder requirements (intensity, resolution, timing, and energy)*
    - *Organization of current accelerator R&D efforts*
    - *Path forward to meet society's needs*

AAI – Quarterly Meeting

- Accelerator R&D Workshop, continued:
  - The following individuals have agreed to be workshop co-chairs:
    - *Walter Henning, Argonne*
    - *Charles Shank, Berkeley*
  - Working now to define scope and membership of subpanels
  - Open Plenary Session, Sub-panel participation by invitation
- OHEP historically has been the steward of advanced accelerator R&D for DOE (particle physics and SC programs)
- OHEP and SC believes that this stewardship should be informed and responsive to national needs. Thus, the motivation for this workshop