U.S. DEPARTMENT OF ENERGY | Office of Science

Accelerator R&D News

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U.S. Department of Energy

Superconducting RF Materials Workshop--Jlab
July 16, 2012

Topics

- Background information
- Ongoing "comparative review" process
- Accelerator R&D stewardship program

Background

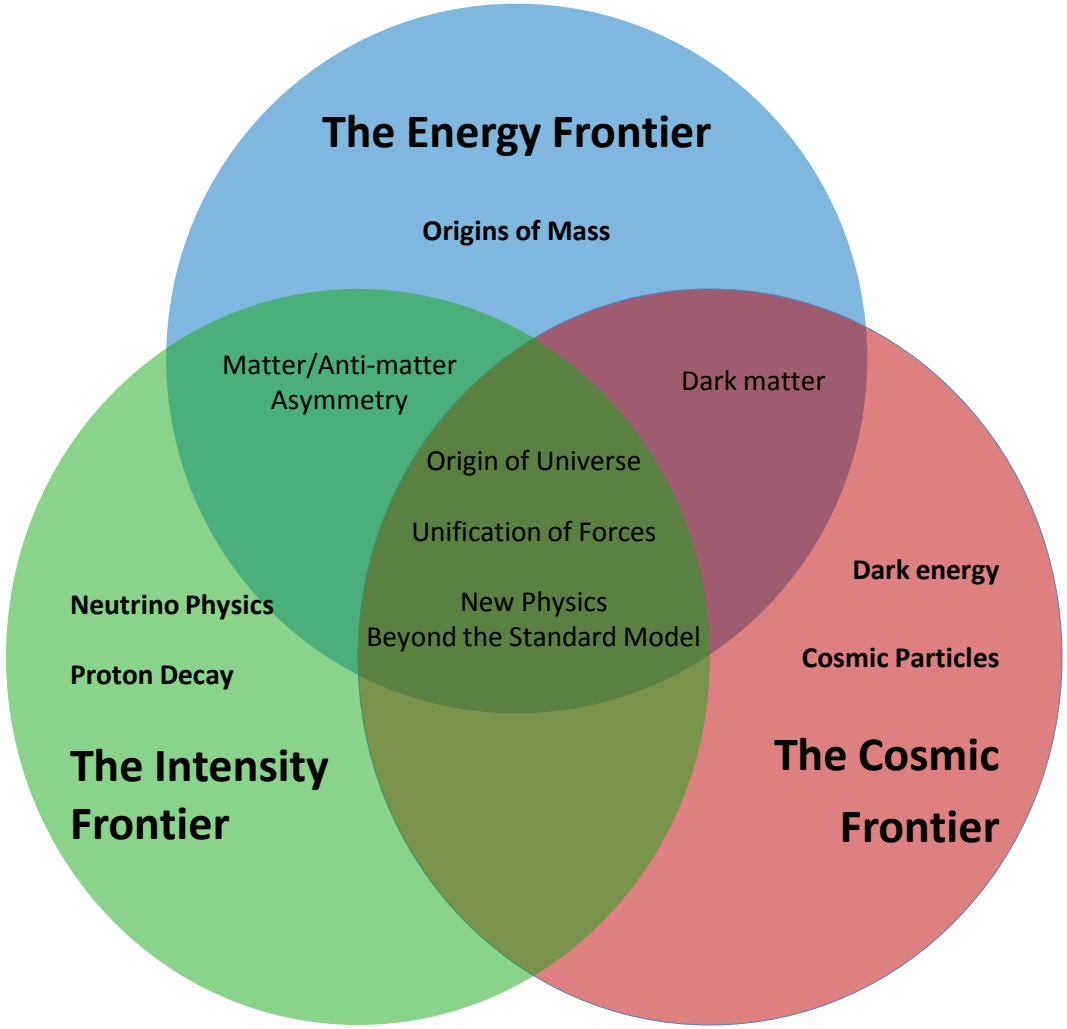
Relevant Changes in FY2013

- ILC 5-year R&D program successfully completed in FY2012
  - no project on the near-term horizon, so R&D support ends
  - plan for continued involvement with international planning process
    - at very low level
  - working with Labs to minimize impact on SRF core program
  - ILC physics case needs to be re-evaluated in light of LHC results
- Developing plans to broaden our accelerator R&D customer base
  - "stewardship"

HEP Paradigm

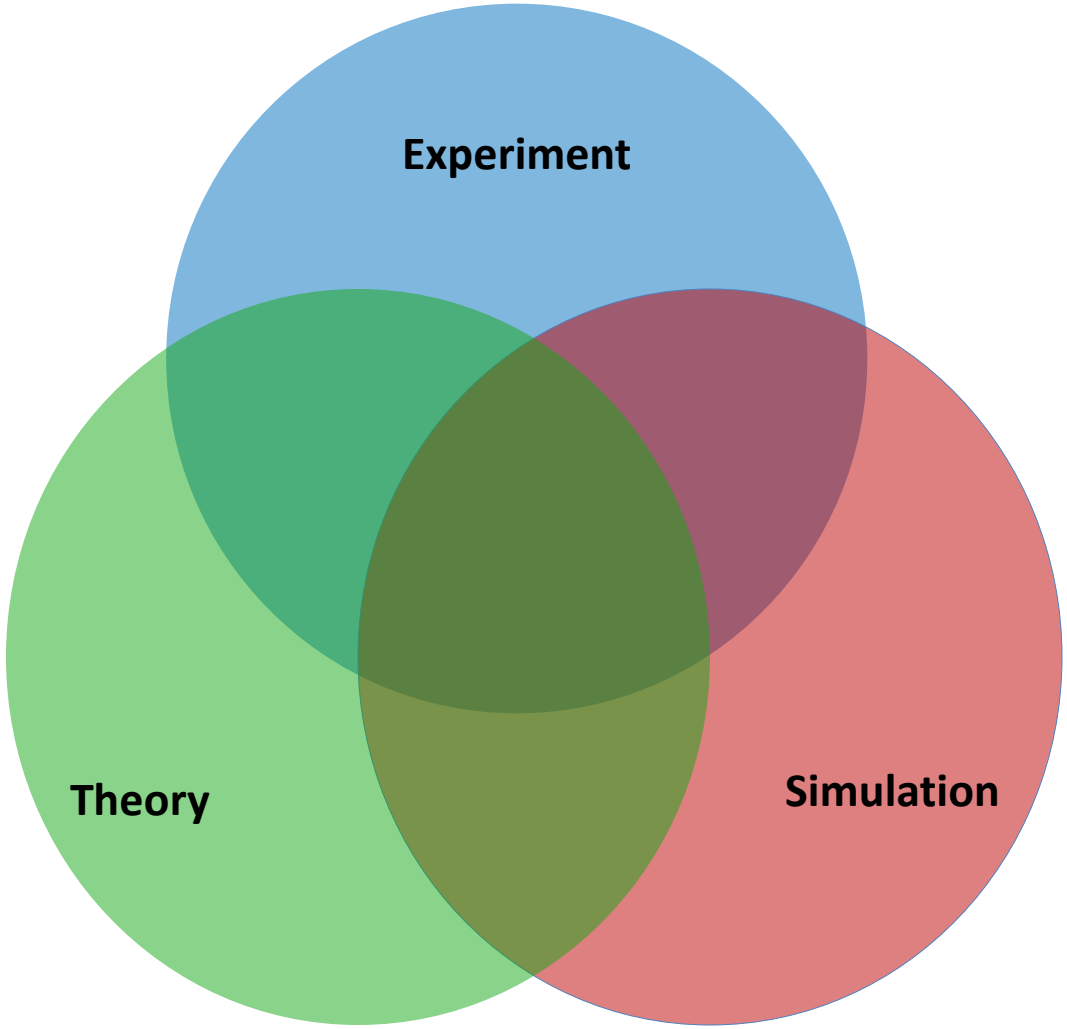
- Three scientific frontiers
  - energy frontier
    - use powerful accelerators to create new particles, reveal their interactions, and investigate fundamental forces
  - intensity frontier
    - use intense particle beams and highly sensitive detectors to pursue alternate pathways for investigating fundamental forces and particle interactions via the study of rare processes
  - cosmic frontier
    - use non-accelerator –based experiments and telescopes to make measurements of naturally occurring phenomena that offer new insights on dark matter and dark energy to understand the fundamental properties of matter and energy

Physics and Technology



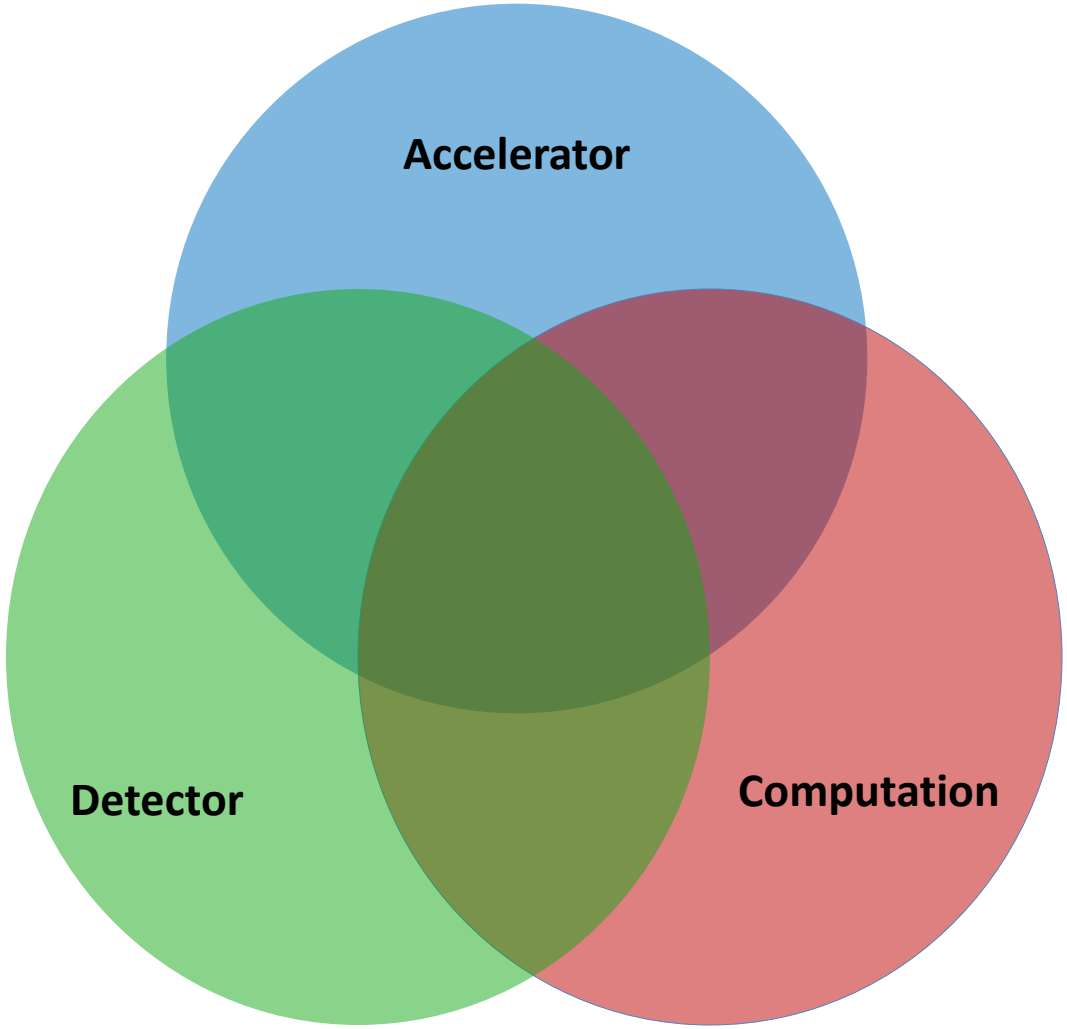
Physics Frontiers

Physics and Technology



Physics Techniques

Physics and Technology



Enabling Technologies

Accelerator Science & Technology

- Accelerator R&D develops basic science and technologies needed to design, build, and operate state-of-the-art accelerators
  - these accelerators are essential for making new discoveries in HEP
    - and in serving a broader community
      - discovery science
      - industry
      - medicine
      - defense and security
      - energy and environment

$\Rightarrow$ Stewardship

Comparative Review

Purpose

- Previous to FY2012, all HEP proposals responding to the general Office of Science call were individually peer-reviewed by independent experts
  - change in process recommended by several DOE advisory committees, most recently the 2010 HEP Committee of Visitors:
    - recommendation: use comparative review panels on a regular basis
- DOE/HEP started comparative grant reviews for existing research grants scheduled for renewal in FY2012 (+ new submissions)
  - existing grants not renewing in FY2012 ("continuations") were not affected…yet

First announced at the HEPAP Mtg. in June 2011

- Goal: improve quality of research program by identifying best proposals

HEP Activities Supported

- What we support
  - research efforts (mainly scientists) on R&D, experiment design, fabrication, data-taking, analysis activities
    - theory, simulations, phenomenology, computational studies, accelerator S&T, detector S&T
- Faculty support
  - assume 2 months summer support "buys" their full research time throughout the entire year
    - summer support should be adjusted based on % time on this effort
  - ***maximum of 2 months support from all federal sources***
- Research scientists
  - support *may* be provided, but due to long term expectations, need to consider what they bring to the program that couldn't be provided otherwise

× <u>What's not supported</u>
  - not considering any significant "project" support: technical personnel, M&S, consumables
  - non-HEP related efforts

FY13 Comparative Review: Round Two

- FY 2013 Research Opportunities in High Energy Physics
  - DE-FOA-0000733 – posted to FedConnect June 8, 2012; application package now available on grants.gov
  - HEP will also provide link to FOA and FAQ:
    http://science.energy.gov/hep/funding-opportunities/

- Letter of Intent is strongly encouraged: July 16, 2012
  - an overview of the research plan limited to two pages. Indicate how the proposed research fits into one or more HEP subprograms; list the major research thrusts and the Senior Investigator(s) expected to be involved

- Proposal deadline: 23:59PM ET Monday September 10, 2012
  - length of research description: ≤9 pages per senior investigator
  - for purposes of page limit, a senior investigator is an active tenured or tenure-track faculty member at the sponsoring institution. Non-tenure-track faculty (e.g., research faculty) or senior research staffs with term appointments are not included *unless* they are the sole senior investigator on the proposal

Accelerator R&D Stewardship Program

History

- Accelerators for America's Future (AfAF) workshop held in 2009
  - working groups for Defense & Security, Discovery Science, Energy & Environment, Industry, and Medicine
    - each group developed list of needs
      - and list of issues/impediments
- Came to attention of Senate last year
  - requested strategic plan for accelerator stewardship
    - status of response to that request summarized today
- Immediate actions
  - detailee assigned task of preparing strategic plan
    - already in place prior to Senate request
  - community Task Force set up under N. Holtkamp (SLAC)
  - began consultations with ASCR, BES, NP

Stewardship Program Request

- Excerpt from recent Senate Appropriations Committee language encourages more proactive approach to stewardship task
  - along with a deadline for doing so!
    - subsequently delayed until September 1, 2012

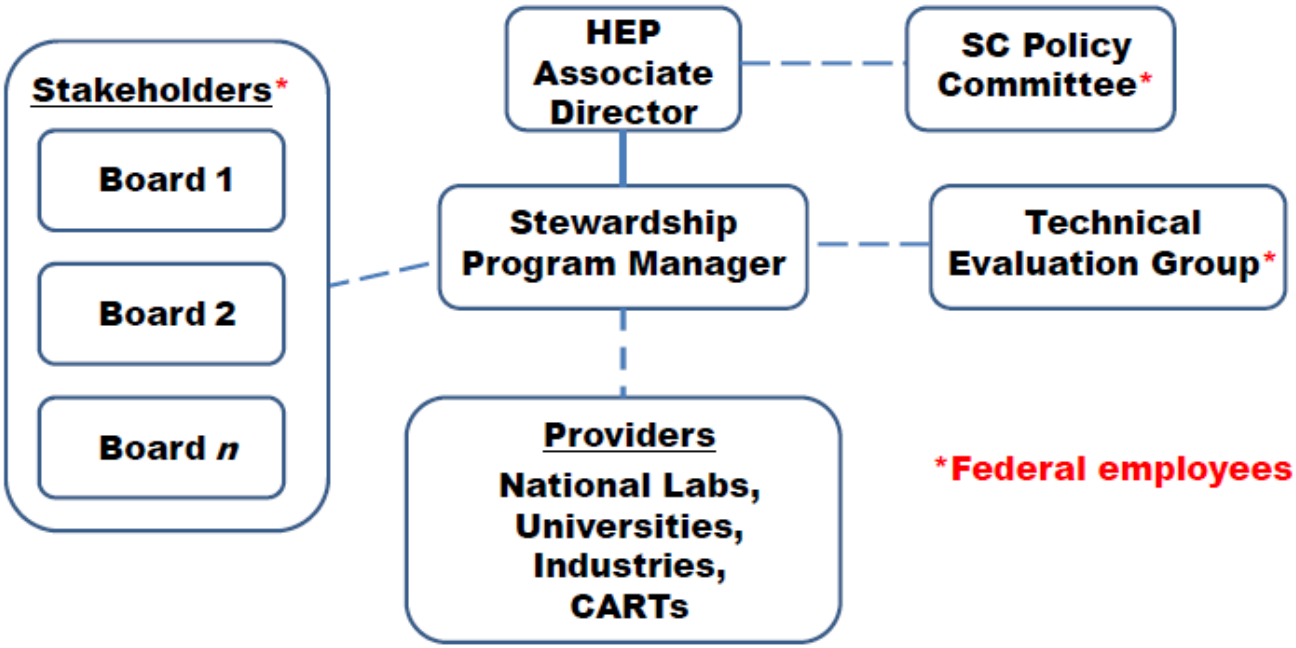
"The Committee understands that powerful new accelerator technologies created for basic science and developed by industry will produce particle accelerators with the potential to address key economic and societal issues confronting our Nation. However, the Committee is concerned with the divide that exists in translating breakthroughs in accelerator science and technology into applications that benefit the marketplace and American competitiveness. The Committee directs the Department to submit a 10-year strategic plan by June 1, 2012 for accelerator technology research and development to advance accelerator applications in energy and the environment, medicine, industry, national security, and discovery science. The strategic plan should be based on the results of the Department's 2010 workshop study, Accelerators for America's Future, that identified the opportunities and research challenges for next-generation accelerators and how to improve coordination between basic and applied accelerator research. The strategic plan should also identify the potential need for demonstration and development facilities to help bridge the gap between development and deployment."

Mission

- The mission of the HEP long-term accelerator R&D stewardship program is to support fundamental accelerator science and technology development of relevance to many fields, and to disseminate accelerator knowledge and training to the broad community of accelerator users and providers
- Accomplished through:
  - improving access to national laboratory accelerator facilities and resources for industrial and for other U.S. government agency users and developers of accelerators and related technology
  - working with accelerator user communities and industrial accelerator providers to develop innovative solutions to critical problems, to the mutual benefit of our customers and the DOE discovery science community
  - serving as a catalyst to broaden and strengthen the community of accelerator users and providers

Organization

- Diagram shows stewardship program organization
  - overall responsibility rests with HEP AD
    - in consultation with SC policy committee
  - stewardship program manager works with
    - technical evaluation group (other SC accelerator program mgrs.)
    - stakeholder boards (programmatic)
    - providers



Initial Plans

- First step: open Lab infrastructure to US industry
- Two new areas selected (each with a stakeholder board)
  - particle therapy beam delivery improvements
    - present gantry systems are large, heavy, and costly
      - especially for ^{12}C beam
    - goal: design smaller gantry and fabricate prototype magnet
      - also demonstrate fast energy and/or transverse position control
  - laser development program to enhance accelerator capabilities
    - desired features are high peak power, high average power, high electrical efficiency
    - need dedicated R&D program to make progress (long-term effort)
      - proposal-driven, with national lab, university, and industry participants
      - synergies with other programs, but complementary
- New initiatives to be launched via open solicitations (FY14)
  - preceded by workshops to define requirements

Summary

Take-Home Message

- HEP continues its historical support of long-term R&D in accelerator science and technology
  - leverages unique expertise and test facilities at different institutions
    - near and mid-term program-specific R&D will continue being carried out by *individual* SC programs
- HEP currently finalizing a strategic plan for accelerator stewardship
  - in consultation with other SC offices
- Goal is to have world-leading program in accelerator R&D not only for SC applications but serving all of the nation's accelerator needs
  - it is a worthy goal, but will not be easy

Backups

Criteria and Scoring

- Reviewers evaluate proposals (including individual contributions by each senior investigator) against five review criteria
  - provide comments + numerical score from 1 (Poor) to 6 (Outstanding) for:
    - Scientific and/or Technical Merit of the Project
    - Appropriateness of the Proposed Method or Approach
    - Competency of Research Team and Adequacy of Available Resources
    - Reasonableness and Appropriateness of the Proposed Budget
    - Relevance to the mission of the Office of High Energy Physics (HEP) program
  - also asked to include general comments and an overall impression
- Next, reviewers give ranking of the proposal overall
- Finally, they provide scores and rankings for the *individual* senior investigator(s)

The scoring system:

Qualifier	Poor	Fair	Good	Very Good	Excellent	Outstanding
Score	1	2	3	4	5	6

The ranking system:

Bottom 1-20%	Bottom 21%-40%	Mid 41%-60%	Top 61%-80%	Top 81%-100%

Comparative Review Criteria (1)

- **1. Scientific and/or Technical Merit of the Project**
  For example, what is the likelihood of achieving valuable results? How might the results of the proposed research impact the direction, progress, and thinking in relevant scientific fields of research? How does the proposed research compare with other research in its field, both in terms of scientific and/or technical merit and originality? *Please comment individually on each senior investigator.*

- **2. Appropriateness of the Proposed Method or Approach**
  For example, how logical and feasible is the research approach of each senior investigator? Does the proposed research employ innovative concepts or methods? Are the conceptual framework, methods, and analyses well justified, adequately developed, and likely to lead to scientifically valid conclusions? Does the applicant recognize significant potential problems and consider alternative strategies?

- **3. Competency of Research Team and Adequacy of Available Resources**
  For example, what are the past performance and potential of each senior investigator? How well qualified is the research team to carry out the proposed research? Are the research environment and facilities adequate for performing the research? Does the proposed work take advantage of unique facilities and capabilities?

Comparative Review Criteria (2)

- **4. Reasonableness and Appropriateness of the Proposed Budget**
  Are the proposed resources and staffing levels adequate to carry out the proposed research? Is the budget reasonable and appropriate for the scope?

- **5. Relevance to the mission of the Office of High Energy Physics (HEP) program**
  How does the proposed research of each senior investigator contribute to the mission, science goals and programmatic priorities of the subprogram in which the application is being evaluated? Is it consistent with HEP's overall mission and priorities? How likely is it to impact the mission or direction of the HEP program?

- **6. General Comments and Overall Impression**
  Include any comments you may wish to make on the overall strengths and weaknesses of the proposal, especially as compared to other research efforts in this area. If there are significant or unique elements of the overall proposal, including institutional setting and resources, synergies with other relevant subprograms, or other broader considerations not noted above please include them here.

FY13 Comparative Review Timeline

- 7/16/2012: Letter of Intent [Today!]
- 9/10/2012: Proposal Deadline (Monday 23:59 PM ET)
- 10/9/2012: Proposals sent to External Reviewers
- 11/7 – 11/16/2012: Subprogram Panels Convene
- 11/21 – 12/7/2012: HEP discusses panel outcome, budgets, programmatic priorities, etc.
- 12/10/2012: Final funding recommendations. PIs will be notified.
  - negotiate final budgets, carryover, No-Fund Extension, etc.
  - paperwork will be needed no later than 1/7/2013 for new grants starting on April 1, 2013.
  - important to coordinate with Sponsored Research Office
    - fall semester ends, holiday season & vacations, etc.