

HEPAP Subcommittee on Accelerator R&D

Don Hartill for the Subcommittee

Overview

- Accelerator R&D is crucial for the future of particle physics both mid-term and long term
- A healthy multi-faceted program of R&D is essential for particle physics:
 - Accelerator projects in the foreseeable future: HL-LHC, Japanese – hosted ILC
 - Enabling technologies for future accelerators: very high energy hadron and e+e- colliders
 - Need to strike a balance between “directed” & “basic” accelerator R&D
 - Focused on novel acceleration concepts, superconducting RF; computational aspects; particle sources; beam instrumentation and control; high gradient RF structures & sources; superconducting magnets

Overview

- Accelerator user and test facilities: ATF at BNL, FACET at SLAC,
- Basic accelerator science
- Accelerator R&D represents between 15 – 20% of the HEP budget
- NSF has started a new program in basic accelerator science
- HEP has some responsibility for accelerator stewardship

Subcommittee Membership

- Co-chairs: Marty Breidenbach & Don Hartill
- Members from HEPAP: Ilan Ben-Zvi, Bruce Carlsten, Georg Hoffstaetter, Robert Tschirhart
- Particle physics accelerator and experiment community: Bill Barletta, Roger Dixon, Steve Gourlay, Young-Kee Kim, James Rosenzweig, Michael Syphers, Rik Yoshida
- International accelerator community: Oliver Bruning (CERN), Tadashi Koseki (KEK/J-PARC), Lia Merminga (TRIUMF)
- Observers from Nuclear Physics & Basic Energy Sciences: Zhirong Huang (BES), Geoffrey Krafft (NP)

Elements of the Charge - 1

- Charge awaits final signatures – hopefully today
- Accelerator science, accelerator technology and materials, provision of test facilities, simulation work, and the training of accelerator physicists are the critical technologies for HEP and beyond
- Universities and National Labs carry out the R&D in the following categories
- Short-term research to optimize operating facilities or approved new facilities
- Medium-term research to develop new concepts to the stage where they can be considered for the design of a new facility
- Long-term exploratory research aimed at developing new concepts for acceleration, new technologies, new materials, and advanced simulation techniques
- The training of accelerator physicists, engineers, and technologists is an important additional goal

Elements of the Charge - 2

- Summary of the charge: examine the research in the current HEP accelerator R&D program and identify the most promising research areas to support the advancement of particle physics
- National Goals: Describe medium- and long-term U.S. accelerator R&D required for a world-leading future program in accelerator-based particle physics consistent with the scientific priorities described in the HEPAP-P5 report for Scenarios A and B
- Current Effort: Examine current scope and evaluate how well these address the HEP mission, as expressed in the HEPAP-P5 report
- Impediments: Describe any impediments that may exist for achieving these goals e. g. resources, management, expertise and infrastructure
- Training: Assess, including partnerships between national laboratories and universities, and opportunities to enhance the training
- National Goals: Describe medium- and long-term U.S. accelerator R&D required for a world-leading future program in accelerator-based particle physics consistent with the scientific priorities described in the HEPAP-P5 report for Scenarios A and B

Elements of the Charge - 3

- Balance:
 - Healthy and appropriately balanced program for medium- and long-term R&D, including test facilities, in light of the budget envelope
 - Further guidance for a plan based on the science and technology case for increased investment in the HEP Accelerator R&D program called for in P5's Scenario C.
 - Particular interest in how partnerships between universities, national laboratories and international collaborators could be most effective in achieving the goals

SC Accelerator R&D Stewardship program is *not* part of this assessment.

Preliminary findings presented to HEPAP by the end of November 2014 with the Final report by March 2015

Planning

- First meeting of Subcommittee by telecon late next week for organization
- Now that the P5 report is available solicit input from the HEP community especially for Scenario C through DPF and DPB to supplement the information already available from Snowmass
- A week-long road trip to visit BNL, Fermilab, and SLAC/LBNL
- Universities near each of the locations will be specifically invited to participate in the discussions and presentations
- With the exception of the road trip will try to carry out the charge as much as possible by a combination of telecons and electronic communication

Summary

- The Subcommittee is very well balanced for the task at hand
- With all the summer conferences, schools, etc it will be a challenge to accomplish our task
- It will be essential to have good community participation in the process
- Marty and I will work hard to make the task as easy as possible
- Finally we want to thank each member of the Subcommittee for agreeing to work on this very important assessment

P5 Budget Scenarios

- Scenario A: Constant level of funding for three years, followed by increases of 2% per year with respect to the FY 2013 budget for HEP
- Scenario B: Constant level of funding for three years, followed by increases of 3% per year with respect to the FY2014 President's budget request for HEP. (+ 500 M\$ compared to A for a decade)
- Scenario C: Unconstrained