

HEPAP Activities

HEPAP Meeting

Bethesda, MD; May 23, 2013

Andrew J. Lankford

HEPAP Chair

University of California, Irvine

HEPAP Activities

P5 Report

HEPAP Meeting

Bethesda, MD; May 22-23, 2013

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University of California, Irvine

P5 Report

Discussion:

- **Further impressions**
- **Thoughts about HEPAP follow-up**

HEPAP Activities

Subcommittee for Assessment of Workforce Development

HEPAP Meeting

Bethesda, MD; May 22-23, 2013

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University of California, Irvine

Workforce Development

Please refer to Richie Patterson's report earlier today.

The following slides are from my HEPAP Activities presentation at the March meeting and are included here for background reference.

Background

Charge to Chairs of all Federal Advisory Committees for DOE Office of Science

- **From Dr. Patricia Dehmer, Acting Director, Office of Science**

“The Office of Science research programs have a long history of training graduate students and postdocs in disciplines important to our mission needs as part of sponsored research activities at universities and DOE national laboratories. In addition, the Office of Workforce Development for Teachers and Scientists supports undergraduate internships, graduate thesis research, and visiting faculty programs at the DOE national laboratories.

“We are asking the assistance of each of the Office of Science Federal Advisory Committees to help us identify disciplines in which significantly greater emphasis in workforce training at the graduate student or postdoc levels is necessary to address gaps in current and future Office of Science mission needs. ...

Key elements of the charge

- **Identify disciplines in which significantly greater emphasis in workforce training is necessary**
 - **To address gaps in current and future Office of Science mission needs**
 - **At the graduate student or postdoc levels**
- **Please consider:**
 - **Disciplines not well represented in academic curricula**
 - **Disciplines in high demand resulting in difficulties in recruitment and retention at U.S. universities and DOE national laboratories**
 - **Disciplines identified above for which DOE labs may play a role in needed workforce development**
 - **Specific recommendations for programs that can address discipline-specific workforce development needs.**
- **Letter report**
 - **Describing findings and recommendations**
 - **Due no later than June 30, 2014**
 - **Implies discussion at May HEPAP meeting**

Subcommittee process

Subcommittee composition:

- **Small committee (4-6) members**
 - **in order to practically work on short two-month time scale**
- **Composed of members with previous involvement in workforce training in at least one discipline of concern**
- **Drawn primarily from HEPAP; open to any interested HEPAP member**
- **Supplemented by non-HEPAP members as needed**

The subcommittee should:

- **Consult HEPAP and the HEP community for input on possible disciplines in need of workforce development.**
- **Consult members of the community with experience and expertise in workforce training for disciplines of interest.**
- **Consult subcommittees of other SC FACAs regarding disciplines of common concern or interest.**
- **Make use of existing resources from past studies.**

Letter report

- **Discussion by HEPAP at May meeting**
- **Submission of final draft to HEPAP in advance of meeting**

Subcommittee membership

The following individuals have graciously agreed to participate:

- **Ritchie Patterson** (Cornell) - Chair
- **Ilan Ben-Zvi** (BNL, HEPAP)
- **Tao Han** (Pittsburgh, HEPAP)
- **Patty McBride** (Fermilab, HEPAP)
- **Ian Shipsey** (Oxford/Purdue, DPF, incoming HEPAP *ex officio*)

HEPAP Activities

Subcommittee on Accelerator R&D

HEPAP Meeting

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University of California, Irvine

Accelerator R&D

Overview

Accelerator R&D is crucial to the future of particle physics, both mid-term and long-term.

Particle physics demands a healthy, multi-faceted program of R&D.

- **Focused on** (time dimension):
 - **Accelerator projects in the foreseeable future**
 - *e.g. HL-LHC, Japanese-hosted ILC*
 - **Enabling technologies for new accelerators in the more distant future**
 - *e.g. very high energy hadron and e+e- colliders*
 - **Striking a balance between “directed” & “basic” accelerator R&D**
- **Focused on** (technology dimension):
 - **Numerous technical subjects:** novel concepts for acceleration; superconducting RF; accelerator, beam and computational physics; particle sources; beam instrumentation and control; normal gradient/high gradient structures & RF sources; superconducting magnets (also see Snowmass)
- **Accelerator test and user facilities** (*e.g. ATF at BNL, FACET at SLAC*)
- **Basic accelerator science**

Accelerator R&D is a major commitment of the HEP program.

- **Significant fraction of HEP budget** (15-20%)
- **New thrust for NSF in basic accelerator science**
- **Also, HEP stewardship responsibility**

Subcommittee membership

- **Co-chairs:** **Marty Breidenbach & Don Hartill**
- **Members from:**
 - **HEPAP**

Ilan Ben-Zvi	Robert Tschirhart
Georg Hoffstaetter	Bruce Carlsten
 - **Particle physics accelerator and experiment communities**

William Barletta	Young-Kee Kim
Roger Dixon	James Rosenzweig
Steve Gourlay	Michael Syphers
	Rik Yoshida
 - **International accelerator community**

Oliver Bruning (CERN)	Lia Meringa (TRIUMF)
Tadashi Koseki (KEK/J-PARC)	
- **Observers from Nuclear Physics & Basic Energy Sciences**

Zhirong Huang (BES)	Geoffrey Krafft (NP)
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Elements of Charge - 1

Charge is in final stage of preparation (P5 Scenario C led to change)

Context:

- **Critical enabling technology, for HEP and beyond**
- **Portfolio:** accelerator science, accelerator technology and materials, provision of test facilities, simulation work, and training of accelerator physicists
- **Universities and national labs**
- **Categories:**
 - **short-term research**, required for optimization of operating facilities or approved new facilities
 - **medium-term research**, to bring new concepts to practice so that 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 additional important goal.

Elements of Charge - 2

Summary of 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.

Elements of Charge - 3

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.

Balance:

- healthy and appropriately balanced program for medium- and long-term R&D, including test facilities, in light of the budget envelope considered by P5.
- 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.

Comments on potential synergies or conflicts between the two programs welcome

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

HEPAP Activities

National Scientific Program Advisory Subpanel

HEPAP Meeting

Bethesda, MD; March 13-14, 2013

Andrew J. Lankford

HEPAP Chair

University of California, Irvine

National Scientific Program Advisory subPanel

Goal: A more effective and transparent mechanism for HEPAP to advise on the execution of particle physics projects

**Concept was outlined at HEPAP March meeting.
The concept is still in development.**

Connections with HEPAP-P5 report:

- **Possible role in advising on “Small Projects Portfolio”, “Short Baseline Portfolio”**
- **Possible role in review of projects previously recommended by P5 that experience significant changes in cost or schedule, in particular for continuing compatibility with the P5 strategic plan**

The remaining slides with this heading are from my presentation on HEPAP Activities and are included here for background reference.

Concept - 1

A National Scientific Program Advisory subPanel is a concept in development.

- **Mentioned as a possibility at December 2013 HEPAP meeting**
- **The concept as described today is partial, and is DOE-centric,**
 - ***i.e.* focuses on goals/needs/methods of HEP**
 - **Response to previous HEPAP/CoV concerns about having a more transparent/regular review process**
 - **for new projects and for projects that have undergone significant cost/scope changes since they were last reviewed by P5.**
- **We will work to make the subpanel useful for NSF, as well,**
 - **recognizing that “one size does not fit all”**

Goal: A more effective and transparent mechanism for HEPAP to advise on the execution of particle physics projects

- **P5 process does strategic planning, *i.e.* sets overall goals and priorities.**
- **DOE CD process and NSF review process take over technical review when a project concept is ready to become a project (to be *projectized*).**
- **Often there are scientific & technical issues to be evaluated between.**
 - **Especially for projects in the early phases**
 - ***e.g.*, for small experiments to be added to the portfolio**

Concept - 2

NSPAsP will perform scientific & technical review

- **Role analogous to that performed by PAC for experiments at FNAL**
- **With additional criterion of alignment with objectives of P5 strategic plan and considering P5 selection criteria.**
- **Scope of scientific review:**
 - **Usual merit review criteria, including e.g.:**
 - **significance of scientific objectives**
 - **capability to achieve scientific objectives**
 - **Quality of the team**
 - **Technical approach**
 - **Budget review sufficient to set CD0 range.**
 - **Assessment of potential for impact on the particle physics program**
- **Advice on project viability & appropriateness to the portfolio**

Concept - 3

NSPAsP is planned as a subpanel of HEPAP

- **Convened as needed**
- **Provides initial review of experiments proposed to join the US particle physics portfolio**
- **Membership adjusted to provide appropriate range of expertise**

NSPAsP & FNAL PAC

- **NSPAsP will review in a manner analogous to FNAL PAC**
- **NSPAsP is a more general mechanism applying to all aspects of the program, and is FACA-compliant.**
- **Where applicable NSPAsP will work in concert with, not duplicating FNAL PAC.**

Possible mode of operation

- **Agencies collect proposals on a regular basis through solicitation/FOA**
 - **Perform initial screening for appropriateness to call and of cost**
- **Proponents would provide any prior outside reviews, to see if ready for NSPAsP**
 - **e.g. FNAL PAC review, LHCC review, lab director's review**
 - **If no outside review, one would be performed prior to NSPAsP**
- **NSPAsP provides scientific evaluation, incl. compatibility with P5 strategic plan and position within global context, and evaluation of technical readiness**
- **In cases of multiple projects, NSPAsP provides prioritization**

Next steps

Refine concept, including:

- **NSPAsP role with respect to each agency, DOE & NSF**
 - **In consideration of different nature of each**
- **Interplay & interactions of NSPAsP & FNAL PAC**
- **Role in interagency projects or initiatives**
- **Possible role in review of projects previously recommended by P5 that experience significant changes in cost or schedule, in particular for continuing compatibility with the P5 strategic plan**

Formal charge sometime after P5 report

Feedback today on concept as input to the charge.

HEPAP Activities

Future subcommittee laboratory & university roles

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University of California, Irvine

Future subcommittee on laboratory & university roles

**Concept was outlined at HEPAP March meeting.
The concept is still in development.**

Connections with HEPAP-P5 report:

- **Related to discussion and recommendations concerning the research program. Potentially provide information or advise to agencies.**

The remaining slides with this heading are from my presentation on HEPAP Activities and are included here for background reference.

Approaching the subject of laboratory & university roles

- **HEPAP discussed the formation of a subpanel or subcommittee to consider the respective roles of laboratory & university groups in the execution of the HEP program.**
 - Arising from topics such as university infrastructure, senior scientists, Theory Panel Report, differences in costs
- **CoV recommended an examination of the balance between the laboratory & university research programs.**
- **An approach:**
 - **Start discussion in the context of agency (DOE & NSF) missions**
 - What are the missions of the agencies?
 - How do labs, and how do universities contribute to agency missions?
 - What are “missions” of labs and of uni’s in this context?
 - What can agencies do to enable labs and uni’s to fulfill their “missions”?
 - **Focus on: How to best accomplish science goals in this context?**
 - **What are respective roles of the various types of institutions in accomplishing the program’s science goals, and in satisfying the missions of the program?**
 - **How can roles and working relationships be defined (or redefined) so as to optimize science accomplishment and to satisfy missions?**

Laboratory & university roles - 2

- **Bear in mind:**
 - **DOE & NSF missions differ**
- **Consider:**
 - **How does DOE mission differ for Fermilab & multi-purpose labs?**
 - **How do mission or goals differ for large and small universities?**
- **How do respective roles vary in experimental areas as experiments progress stage by stage from detector R&D through construction to physics analysis?**
- **How do respective roles vary in different areas of theory?**
- **How can roles be designed such that there are no 2nd class citizens?**
- **What degree of “academic freedom” should there be: in theory? in experiment? at universities? at labs?**
 - **What degree of mobility should there be within the field? to neighboring fields? (forays?)**

Update

In presence of P5 and other HEPAP activities, only modest further progress has been made on formulating the concept and charge.

- **I believe that this subpanel, once well conceived, can have a very positive impact on research in our field.**

This subpanel will be addressing difficult and controversial issues.

- **It must conduct its activity in a thoughtful and collegial manner.**
- **Recall its purpose is to optimize the scientific capabilities of our field.**
 - **Not to serve (or please) any single sub-community**
- **Needs a balanced composition**
 - **Institution type** (Lab/Univ; Single/multi-purpose; big/small)
 - **Subfield** (Theory/experiment; frontier)
 - **Sponsoring agency** (DOE & NSF)
- **Expect to receive a formal charge**

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Future Topics

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