

September 7, 2005

Dr. Ray Orbach  
Director, Office of Science  
U. S. Department of Energy  
Washington, D.C. 20585

Dr. Michael Turner  
Assistant Director, National Science Foundation  
Directorate for Mathematical and Physical Sciences  
4201 Wilson Boulevard  
Arlington, VA 22230

Dear Ray and Michael,

I am writing to communicate a summary of the meeting in Washington of the High Energy Physics Advisory Panel (HEPAP) on July 11 - 12, 2005 and its aftermath. The last couple of months have been particularly eventful for particle physics.

At the meeting, HEPAP heard from Joe Lykken, co-chair with Jim Siegrist of the Subpanel on LHC-LC Synergy, about the draft report to the EPP2010 Committee. The report, *Discovering the Quantum Universe: The Role of Particle Colliders*, is a layered document, consisting of an introduction, a presentation of the science in terms of three themes, and an elaboration of those themes through detailed scenarios. The last layer is in essence a white paper on the science opportunities at the Large Hadron Collider (LHC) and the International Linear Collider (ILC). Attached are both the final report and a cover letter from me answering six specific questions on the physics case from EPP2010. The report and the cover letter were very positively received by EPP2010 at their meeting at Cornell in early August.

Later in August, the International Linear Collider Workshop took place in Snowmass. Attended by over 600 physicists from around the world, this meeting saw significant forward progress. In particular, the Global Design Effort (GDE) team, led by Barry Barish, met in person for the first time and is moving to a baseline design for the ILC at the end of this calendar year.

The progress in construction of the LHC and U.S. participation in the commissioning and operation of the experiments was another major theme of the HEPAP meeting. At the end of the fiscal year, the U.S. part of the construction project for the LHC accelerator and detectors will be 98% complete. Tom Ferbel informed HEPAP about the transition from construction to research, with Jim Whitmore focusing on LHC computing and the Tier 2 computing centers being put in place as part of the grid for analyzing the forthcoming LHC data. At the end of August, the installation of the last of the barrel toroidal magnets for ATLAS, the rotation of the CMS solenoid, and the nearly 100 dipole magnets installed in the tunnel were compelling reminders of the approaching reality of the LHC as the centerpiece of world particle physics.

Does the U.S. have the physicist resources to participate in the LHC research program while continuing to carry out its commitments to the planned domestic program for the next five years? This was the question posed to the Physicist Resource Study, led by Raymond Brock and Jim Whitmore. After preliminary reports at previous meetings, HEPAP heard a final report. It followed a very intensive effort that achieved a 100% response from 194 groups to a questionnaire to the PIs on their planned allocation of effort. With careful cross checking, this was compared with the results of a separate questionnaire to the various LHC and domestic experiments on their "needs." These match well in 2004. They diverge in the out-years, with an almost linear increase in planned ATLAS and CMS effort of the PIs not reflected in a decrease of the "needs" of the domestic experiments, particularly CDF and D0. Indeed, a number of the senior PIs are already transitioning their effort to the LHC. It was acknowledged by the agencies, by Fermilab, and by the collaborations that this was a serious problem, but that they were all committed to working together to manage the transition so as to try to optimize the physics.

In addition to the LHC-LC Synergy Subpanel, there are six other subpanels of HEPAP that are in operation. Their status is as follows:

to HEPAP and AAAC. Chaired by Rocky Kolb, it is analyzing a large number of white papers that flowed from the community on possible near- to medium-term experiments that will advance understanding of the properties and nature of dark energy. The Task Force will be meeting shortly and aims at a report by the end of the year.

- The report of the Subpanel chaired by Bob Cahn on the science of the RSVP experiments found that the science of MECO and KOPIO and the design of the experiments themselves were of very high quality. The report was part of the material forwarded by NSF management to the National Science Board, which voted at their August meeting to terminate the RSVP project “due to large projected increases in both construction and operating costs.”
- The Particle Physics Project Prioritization Panel (P5), chaired by Abe Seiden, has its first meeting later this week to begin considering its recommendations on the direction of resources for the on-going program, specifically, operation of the Tevatron Collider at Fermilab and the B-Factory at SLAC, versus construction of future experiments. Meetings at Fermilab and SLAC are scheduled, and a preliminary report is expected in October.
- A new subpanel on Advanced Accelerator R&D has been established. Jay Marx agreed to be the chair during the HEPAP meeting in July, and the rest of the Subpanel is now in place and beginning deliberations.

As outgoing chair of HEPAP, I take the conclusion of this letter as an opportunity to thank the DOE and the NSF for the opportunity to help advise them on the national program in particle physics for the last six years. I leave with a different science. The subject under HEPAP's purview is much broader, especially as it includes the growing overlap with astrophysics and cosmology, and it is better named as particle physics, reflecting the science done rather than one of the very important techniques of pursuing that science.

I also leave with a different HEPAP. HEPAP advises both the DOE and NSF, and, thanks to their willingness to seek the community's advice and help, a far bigger range of issues under consideration by HEPAP subpanels, from specific experiments (RSVP), to sub-fields (TFCR, DETF, NuSAG), to priorities across the field (P5), and, not least, to expository efforts like *Quantum Universe* and *Discovering the Quantum Universe: The Role of Particle Colliders*.

Sincerely,

A handwritten signature in cursive script, appearing to read "Fred Gilman".

Frederick J. Gilman  
HEPAP Chair

cc: Dr. Glen Crawford  
Dr. Jim Decker  
Dr. Joe Dehmer  
Dr. Marvin Goldberg  
Dr. John O'Fallon  
Ms. Marsha Marsden  
Dr. Peter Rosen  
Dr. Robin Staffin  
Dr. Bruce Strauss  
Dr. James Whitmore  
Dr. P. K. Williams  
HEPAP Members  
HEPAP University Representatives