



U.S. Department of Energy  
and the  
National Science Foundation



Professor Andrew Lankford  
Chair, HEPAP  
University of California at Irvine  
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Irvine, CA 92697

Dear Professor Lankford:

Much has changed since the last long-range planning document for high energy physics was endorsed by HEPAP (the Particle Physics Project Prioritization Panel (P5) report, submitted in 2008). It is therefore an opportune time to revisit this guidance to the DOE and the NSF. To that end, we ask that you constitute a new P5 panel to develop an updated strategic plan for U.S. high energy physics that can be executed over a 10 year timescale, in the context of a 20-year global vision for the field.

In developing this plan, we would like you to take account of two particularly relevant considerations. First, there is a need to understand the priorities, options, impacts and scientific deliverables for the U.S. program under more stringent budgets than were considered by the previous P5 panel. Second, the recent discovery of what appears to be the long-sought Standard Model Higgs boson and the observation of mixing between all three known neutrino types at unexpectedly large rates have opened up the possibility of new experiments and facilities that can address key scientific questions about the fundamental nature of the universe in new and incisive ways. Other factors that should inform development of the plan include a fuller understanding of the nature of the physics to be explored at the Large Hadron Collider (LHC), and the global coordination required to realize proposed major new scientific facilities.

To better understand this picture, we request an assessment of the current and future scientific opportunities over the next 20 year period. In addition, we request a critical examination of the investments that would be needed to ensure the vitality, scientific productivity, and discovery potential of U.S. high energy physics research during this timeframe. Specifically, we request that HEPAP examine current, planned, and proposed U.S. research capabilities and assess their role and potential for scientific advancement; assess their uniqueness and relative scientific impact in the international context; and estimate the time and resources (the facilities, personnel, research and development and capital investments) needed to achieve their goals. In developing its recommendations, the committee should consider the budgetary constraints indicated below, as well as the technical readiness and feasibility of these efforts. We also request that HEPAP consider the appropriate balance of small, mid-scale, and large experiments and identify, where possible, multiple or complementary pathways to address the important scientific questions. We expect the "Snowmass" reports and the previous HEPAP study of future



facilities will be useful inputs, and that you will make efforts to maximize community input and participation in your process.

Your evaluation should examine the need to maintain a healthy and flexible domestic infrastructure so that the U.S. high-energy physics program can deliver science results regularly throughout the coming decade. Your report should include an explicit discussion of the extent to which it is necessary to construct, maintain and/or upgrade leading domestic HEP facilities in order to maintain a leadership position in this global scientific effort, while at the same time maintaining a healthy balance that preserves essential roles and contributions for national laboratories and universities and enables opportunities for global coordination of large initiatives.

Your report should provide recommendations on the priorities for an optimized high energy physics program over the next ten years (FY 2014-2023), under the following three scenarios:

- a constant level of funding for three years, followed by increases of 2.0% per year with respect to the appropriated FY 2013 budget for HEP; and
- a constant level of funding for three years, followed by increases of 3.0% per year with respect to the FY 2014 President's Budget Request for HEP; and
- unconstrained budget. For this scenario, please list, in priority order, specific activities, beyond those mentioned in the previous budget scenario, that are needed to mount a leadership program addressing the scientific opportunities identified by the research community.

You should consider these scenarios not as literal budget guidance but as an opportunity to identify priorities and make high-level recommendations. The programs you recommend should be (to some significant extent) implementable under reasonable assumptions. At the same time the budget scenarios should not drive the prioritization to the degree that projects are promoted solely for their ability to fit within an assumed profile.

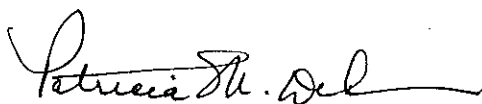
The report should articulate the scientific opportunities which can and cannot be pursued and the approximate overall level of support that is needed in the HEP core research and advanced technology R&D programs to achieve these opportunities in the various scenarios.

The report should also provide a detailed perspective on whether and how the pursuit of possible major international partnerships (such as LHC upgrades, Japanese-hosted ILC, LBNE, etc.) might fit into the program you recommend in each of the scenarios. Given the long timescales for such major initiatives, we expect the funding required to enable the priorities you identify may well extend past the next 10 years, but any new projects recommended should be technically and fiscally plausible to execute in a 20 year time frame.

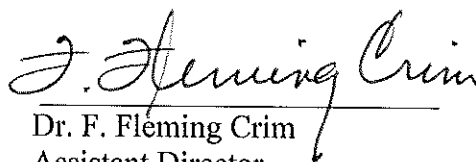
Finally, effective communications about the excitement, impact and vitality of high-energy physics that can be shared with non-scientific audiences will be critical in making the case for the new strategic plan. We would find it useful if your report can update the discussion of the scientific questions that drive the field, in a manner that is accessible to non-specialists (e.g., a science discussion at the level of the *Quantum Universe* report); and also crisply articulate the value of basic research and the broader impacts of high-energy physics on other sciences and on society, including the impacts of training of particle and accelerator physicists.

We would appreciate the committee's preliminary comments by March 1, 2014 and a final report by May 1, 2014. We understand this is a difficult task; however your considerations on these issues will be an essential input to planning at both the DOE and NSF.

Sincerely,



Patricia M. Dehmer  
Acting Director, Office of Science  
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