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Dr. Dennis Kovar
Associate Director for High Energy Physics
Office of Science
Department of Energy

Dr. Tony Chan
Assistant Director for Mathematical and Physical Sciences
National Science Foundation

Dear Dennis and Tony:

I am writing to summarize the meeting of the High Energy Physics Advisory Panel (HEPAP) held in Washington on May 29-30, 2008. The focus of the meeting was the strategic plan for the next decade prepared by the Particle Physics Project Prioritization Panel (P5).

Prior to considering the P5 plan, we heard DOE and NSF status reports from Dennis Kovar and Joe Dehmer respectively. Dennis reported that even with the FY08 budget reductions there is a productive HEP program that includes the operating Fermilab experiments, the successful completion of the PEP-II program, and final preparations for LHC startup. On the other hand, the negative impact of the omnibus funding bill is serious, with staff reductions at Fermilab and SLAC, work stoppage on the NOvA experiment, and minimal support for ILC and superconducting RF R&D. At the time of the meeting, the outlook on supplemental funding for the Office of Science was uncertain. The President's FY09 budget proposal had a significant increase for high energy physics, but it seemed likely that there would be a continuing resolution for the first half of that fiscal year. This would extend the pain of the current budget.

Joe Dehmer reported that the expected 8% increase in NSF Physics Division funding in FY08 turned into a 1% increase as a result of the continuing resolution. Even so, work continues on the energy frontier experiments, preparation for DUSEL, and a number of projects in particle astrophysics and cosmology. Joe stressed that the P5 report is urgent given the developments of the past 18 months. He said that the NSF and DOE will respond coherently to advice from P5 and HEPAP.

The report of the P5 subpanel was presented by its Chair, Charlie Baltay. P5 was charged with developing a ten-year plan for U.S. particle physics under each of four DOE funding scenarios. Charlie stressed that the scientific priorities enunciated in previous reports, both the National Academy's EPP2010 report and reports of prior P5 subpanels, have not changed. Rather it is the context for pursuing the scientific opportunities that has been altered. The major collider

facilities in the U.S. have recently completed operation or will do so in the next few years. The high energy frontier, which has been at Fermilab for decades, is about to move to CERN in Geneva, Switzerland, with the commissioning of the Large Hadron Collider (LHC). In addition, there are serious fiscal challenges as a result of the FY08 omnibus bill and the cost of the International Linear Collider which will delay a possible construction start. The P5 panel developed its strategic plan in light of these realities.

Recent discoveries of phenomena beyond the Standard Model of particle physics – neutrino mass, dark energy, dark matter – make this the most exciting time in particle physics in many decades. There is broad expectation of major discoveries in the coming ten years that will help answer the central questions of the field. P5 categorized the techniques and tools used in particle physics into three broad areas – the energy, intensity, and cosmic frontiers, employing high-energy colliders, high intensity beams of lower energy, and particles from space respectively. The panel recommended a balanced program at the three frontiers that would broadly address all of the major questions in the field.

At the energy frontier, where new particles and phenomena can be directly produced and studied, the plan calls for full exploitation of the LHC including its upgrades. Since there is broad consensus that detailed understanding of the new phenomena will require a lepton collider, it is essential to continue R&D for the ILC and technologies needed to access even higher energies. Detector R&D should also be pursued to prepare for the challenging experiments that will be carried out.

The heart of the proposed program at the intensity frontier is a very high intensity neutrino beam produced by a new proton accelerator at Fermilab and aimed at a large detector in the proposed Deep Underground Science and Engineering Laboratory (DUSEL) in South Dakota. This will allow detailed studies of neutrino properties that can inform us about the unification of the forces and the matter-antimatter asymmetry in nature. This detector would also be sensitive to proton decay and neutrinos from supernova explosions. Other major projects foreseen for DUSEL are experiments to detect dark matter and neutrinoless double beta decay. The intensity frontier program would also include studies of rare decays of muons, B mesons, and possibly K mesons.

The program at the cosmic frontier would focus on understanding dark energy and dark matter which together constitute 95% of the universe. Recommended are ground-based and space-based dark energy projects, underground experiments to look for the interaction of dark matter from space, as well as R&D funding for some particle-astrophysics experiments.

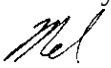
P5 also stressed the importance of adequate support for advanced accelerator and detector R&D to develop techniques that will be important in the future to both particle physics and the broader scientific enterprise. In addition, P5 concurred with another recent HEPAP subpanel on the importance of strengthening the university groups, both experimental and theoretical.

Charlie Baltay presented in detail what could be accomplished with inflation-adjusted funding based on the FY07 budget. He showed the significant reduction in productivity and world leadership that would result if the budget were instead pegged to the FY08 omnibus funding level, as well as the large increase in scientific output if funding were to double over the decade, as proposed for the physical sciences in the America Competes Act.

Charlie then responded to HEPAP's questions, those that had been sent to him in advance as well as those asked at the meeting. There was a wide-ranging discussion of the role of the ILC in the 10-year plan, the reach of the various neutrino experiments, the impact on the plan if DUSEL is not approved or is significantly delayed, the details of the budget assumptions, the rationale behind the choice of experiments to be retained in the lower budget scenarios, and the interplay between the U.S. neutrino program and those abroad. Following this thorough discussion, HEPAP unanimously approved the P5 report.

The next HEPAP meeting will be held on November 13-14. The panel hopes by then the funding situation will have improved.

Sincerely yours,



Melvyn J. Shochet
Chair, HEPAP