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Dr. Dennis Kovar
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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, D.C. on May 21-22, 2009.

Dennis Kovar began with an overview of budgets for the DOE Office of High Energy Physics. The field's finances look much brighter this year. American Recovery and Reinvestment Act (ARRA) funds will support important infrastructure projects, accelerator and detector R&D, and early career awards. HEPAP is pleased with the FY09 funding and the President's FY10 budget proposal which will allow significant progress to be made in the field's high priority projects. Interagency cooperation seems to be progressing well, between DOE and NSF on the DUSEL science program and between DOE and NASA to implement a successful JDEM mission. The October 26-28 accelerator R&D workshop will help set priorities aimed at the future of high energy physics and the broader needs of the nation.

Joe Dehmer reported on particle physics within the NSF Physics Division. There are significant increases in the FY10 budgets for the Mathematical and Physical Sciences (MPS) directorate and for Physics. ARRA funds will place extra emphasis on young scientists. Important steps have been taken in the DUSEL program including a pre-construction funding profile agreed upon with MPS and the Directorate, and an NSF-DOE Joint Oversight Group to oversee the physics program. The goal is a preliminary-design project baseline by the end of 2010. There will be a special student program for advanced accelerator R&D. In response to a question, Joe noted that the NSF graduate fellowship program will triple in size.

Natalie Roe reported on the recent Committee of Visitors (COV) review of the NSF Physics Division. The COV found the proposal review process to be excellent, as are the scientific outcome and the broader impact on society. A problem noted by previous COVs remains, developing a program for funding midsized projects. The Elementary Particle Physics program was praised for its creativity in partnering with other offices in the Foundation, and the Particle

and Nuclear Astrophysics program was commended for its stewardship of a very broad and complex field that spans many offices and agencies. A number of HEPAP members expressed concern about the level of support for theory graduate students and postdocs. There was discussion on the relative importance of outreach in proposals. Regarding the Open Science Grid program, HEPAP feels its importance remains and that commercial cloud computing does not adequately address the needs of particle physics.

We heard reports on the design effort for super-B factories in both Italy and Japan. As an introduction, Hassan Jawahery described the physics opportunities at such machines in the LHC era. With two orders of magnitude more data, these machines will allow much greater precision in consistency tests of the CKM picture. In addition, there will be much greater sensitivity to lepton flavor violation in tau decay. These processes probe physics at the TeV scale and beyond.

John Seeman described the progress on the Frascati Super-B Factory. The big change from the PEP-II machine is not in beam current, but in bunch length and beta-star. The crab waist scheme that will be used was successfully tested at DAFNE. A proposal has been made to use the PEP-II magnets, a contribution-in-kind valued at approximately 130 million Euros. Their machine advisory committee recently reviewed the project and now enthusiastically supports writing a technical design report, which could be ready in 18 months.

A report on the KEK Super-B Factory was given by Katsunobu Oide. KEK has been pursuing two options. One is a traditional design with very high beam current. The other has 2-3 times less current but a much smaller beta-star, similar to the Italian design. A number of problems with the traditional design, including the need to operate near a half-integer tune shift and high power costs for operation, have led them toward the nano-beam scheme. A preliminary schedule shows the machine could be operational as early as 2013. The Japanese government has provided \$27M in R&D funds. The installation of this equipment will necessitate the termination of the KEKB data run.

Ed Seidel, the new director of cyberinfrastructure at NSF, described the advanced computing work supported by the Foundation. There are a number of critical issues that are being addressed: how to effectively use the enormous numbers of cores and processors available in modern systems, how to move the large data samples that must be analyzed, and how to improve the reliability of complex code. Their goal is to support large communities doing large scale computing. The Teragrid is being expanded. Open Science Grid and Teragrid are planning how to work together.

Wim Leemans spoke on advanced accelerator R&D. Reaching very high energy collisions in a cost effective way requires a large increase in accelerating gradient. Two new R&D facilities will be built in the U.S.: FACET, a plasma wakefield program at SLAC, and BELLA, a laser wakefield program at LBNL. Laser wakefield acceleration R&D is a world-wide effort. Gradients of 10-100 gigavolts per meter could be reached with such techniques, both of which had impressive successes in the past 5 years. The R&D aims at attaining high power-use efficiency, small beam energy spread, small emittance, and positron acceleration.

Steve Ritz gave a status report on the work of the Particle Astrophysics Scientific Assessment Group (PASAG). He reviewed the charge and the process of information collection that is in

progress. Useful suggestions for improving the communication with the community arose from the discussion that followed.

An overview of the Astronomy and Astrophysics Decadal Survey (Astro2010) was presented by Roger Blandford. We heard its goals, organization, and decision-making process. The survey will include external expert reviews of cost, readiness, and risk assessment for a subset of proposed projects. The Astro2010 panels will use the PASAG report as an input to their final prioritization process. There was a lively discussion with HEPAP about the process and its interaction with the broad scientific community.

The final presentation of the meeting was given by Travis Brooks on INSPIRE, the new high energy physics information system. The current system, which was started three decades ago, has served our community well and has been a model for other fields. The time is ripe for a major revision because of the increasing interdisciplinary nature of HEP, the growing complexity of the literature-related information to be stored, and the major advances that have been made in information system software. CERN, DESY, Fermilab, and SLAC are creating a modern system based on the Invenio digital library technology developed at CERN. Release for users is scheduled before the end of this year.

The next HEPAP meeting will be held on October 22-23 in Washington.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'Mel', with a vertical line extending downwards from the end of the signature.

Melvyn J. Shochet
Chair, HEPAP