# DPF Newsletter – June 2005

The DPF newsletter is published roughly twice a year. Contributions are always welcome. Please send them to the Editor.

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## In this Issue…



## Message from the Chair

Following a tradition, our annual DPF meeting for 2005 was part of the APS April meeting in Tampa. The meeting was well attended and included two plenary talks, 18 invited sessions, and 36 contributed sessions either fully or jointly sponsored by the DPF. We also jointly (with CSWP) sponsored a networking session for women in physics. As you will see below, we were able to continue our tradition of providing travel grants for students. Many thanks to Joe Lykken for organizing the meeting.

The DPF has been quite active in 2005 World Year of Physics, both through our Education and Outreach Subcommittee and by the many talks given by the membership at symposia and public lectures. This is a great way to increase public awareness of high energy physics.

One of the themes I have been pursuing during my year as chair is a closer connection our counterpart organizations in the European Physical Society and the Japanese Physical Society. As our field continues to become increasingly global, such connections should work to all our benefit. Hiro Aihara was kind enough to join the DPF Executive Committee meeting in Tampa and spoke briefly about the activities of the High Energy part of JPS. As you will see below, our DPF2006 meeting in Hawaii will be jointly sponsored by the DPF and the JPS. I was interested to learn that the High Energy Particle Physics Division of the EPS is actively engaged in many of the same issues as the DPF. Among others, they have endorsed position papers on the role of university groups at large lab, the status of women in physics, and a proposal for Scientific Notes—an attempt to increase the visibility of individual members of large collaborations. Jose Bernabeu, HEPP Board chair, graciously invited me to speak at their next Board meeting in July.

The Government Liaison Subcommittee is in transition as we re-define the scope to make it more productive. The next newsletter will have a more complete report on the new directions.

## DPF Election News

The 2005 DPF Executive Committee members have now been elected and been in place since January 1, 2005. We congratulate those newly elected members and thank all those that agreed to stand for election. This was the first year that web balloting was used, which made the

The present members of the 2005 DPF Executive Committee and the final years of their terms are

Chair: Bill Carithers (2005).
Chair-Elect: Joe Lykken (2005).
Vice-Chair: Natalie Roe (2005).
Past Chair: Sally Dawson (2005).
Secretary-Treasurer: Mike Tuts (2006).
Division Councilor: John Jaros (2007).

**Executive Committee Members:** Marcela Carena (2005) and John Womersley (2005), Daniela Bortoletto (2006) and Hitoshi Murayama (2006), Andrew Cohen (2007) and Sarah Eno (2007).

We would like to take this opportunity to thank the DPF Executive Committee members whose terms expired in 2004: Jon Bagger (Past Chair), and Howard Haber and Elizabeth Simmons (Executive Committee members). The DPF is fortunate to have such dedicated

people who give so freely of their time.

## 2004 DPF Fellows

Congratulations to all those who were chosen Fellows of APS from the DPF in 2004.

*Paul A. Avery* - For leadership in developing grid computing resources for high-energy physics and other sciences
*Andrew Robert Baden* - For exceptional work in hadron collider physics, including instrumentation and ideas that contributed to the top quark discovery
*Zvi Bern* - For outstanding contributions to quantum field theory, especially for developing powerful calculational techniques in guage theories
*Robert Howard Bernstein* - For the design and construction of a novel neutrino beam that made possible unprecedented precision measurements
*Ikaros I. Bigi* - For correctly predicting large CP violation in B meson decays
*Daniela Bortoletto* - For important contributions to top and bottom quark physics, and leadership in the development and fabrication of precision silicon detectors
*Peter Semler Cooper* - For outstanding leadership in experiments studying charm and strange particle physics
*Graciela Beatriz Gelmini* - For outstanding contributions to the theory of cosmological dark matter, neutrino mass, and the astrophysics of the highest energy cosmic rays
*Bruce Gibbard* - For leadership in planning and implementing large-scale computing facilities for high-energy and nuclear physics
*Abolhassan Jawahery* - For important contributions to the measurement of bottom quark properties and the CKM matrix elements, including the CP violating phase
*Marvin Lloyd Marshak* - For significant contributions to underground physics, including studies of neutrino mass, nucleon decay and very high energy cosmic rays
*Frederick Iver Olness* - For significant contributions to understanding nucleon structure and heavy quark production in perturbative quantum chromodynamics
*Stephen S. Pinsky* - For pathbreaking research on glueballs, light-cone field theory and supersymmetric discrete light cone quantization
*Vivek Anand Sharma* - For leading contributions to the discovery of $B_s$ meson, the $\Lambda_b$ baryon and the observation of CP violation in the B° system
*Kellog Sheffield Stelle* - For outstanding contributions to quantum supergravity and theories of supersymmetric extended objects
*Robert Stephen Tschirhart* - For leadership in the Fermilab kaon physics program, especially on the study of rare kaon decays
*Frank Wilczek* - For the discovery of asymptotic freedom in the theory of strong interactions

## 2006 DPF Meeting

*Contributed by Steve Olsen*

In October 2001, the APS Division of Nuclear Physics and the Japan Physical Society's counterpart organization held their annual meeting jointly in Maui. This was so successful, they are doing this again in September 2005. Following this lead, the Division of Particles and Fields will hold a meeting at the Sheraton Waikiki in Honolulu, October 30- November 3, 2006, with combined participation of all Pacific Region particle physics communities including Australia, Canada, China, Japan, Korea, Mexico, Russia and Taiwan.

The site has meeting facilities that can accommodate plenary sessions with as many as 800 attendees and many smaller rooms for parallel sessions. The Sheraton has offered blocks of guest rooms at discounted prices. In addition there are many hotels with different price ranges within easy walking distance of the Sheraton. There are hundreds of inexpensive restaurants in Waikiki with many different and interesting cuisines. We are in the very early stages of constructing a website for the meeting: www.dpf2006.org.

The meeting occurs at a time of transition for Pacific Region particle physics. The spectacularly successful Super-Kamiokande program will be gearing up for neutrinos beams from the JPARC high intensity proton facility, where there will also be new opportunities for rare kaon and muon decay experiments when it starts operation in 2008. The successful B factories at KEK & SLAC will be nearing their $1000fb^{-1}$ goals, and plans for a Super-B factory at one of these labs will be well advanced. In Beijing, the major upgrades to the BEPC $e^+e^-$ collider and the BES detector will be nearing completion and an exciting program of high sensitivity experiments in the J/ $\Psi/\tau$/charm region will be about to start. In Korea, the KIMS dark matter search at the Yangyang Underground laboratory will be in full operation, and preparations for a next-generation double-beta decay will be well advanced. In addition we can expect that one or more of reactor neutrino $\theta_{13}$ experiments, that are currently proposed in the area, will have received approval and will be underway.

Overshadowing this exciting and diverse program will be the imminent turn-on of the LHC, where many researchers from the Pacific Region are playing important roles and making important contributions. Nevertheless, we will be faced with the fact that, after a period of high visibility, the particle physics world's center-of-attention will soon shift from the Pacific Region to the opposite side of the Earth at CERN.

In the long-term future, balance could be nicely restored by an International Linear Collider in Japan or in the U.S. If this is to happen, researchers from all parts of the world have to establish the close working relationships that will be essential for the success of such a huge international undertaking. Our goal for this meeting is to bring researchers, especially young researchers, together in a pleasant environment to discuss their work and explore opportunities for future collaboration.

## Tampa April APS Meeting Travel Grants

The DPF, together with the generous support of a $7,000 grant from the NSF, was able to award travel grants of $300 to 35 students that attended the Tampa APS Meeting.

Although modest, these awards did, in some cases, make the difference between being able to attend the meeting or not. It is important that graduate students have the opportunity to attend the APS meetings and interact with the wider physics community. It proved to be a very successful program. The students supported were Adelman, Attal, Attisha, Budd, Butt, Canepa, Cavero-Pelaez, Christidi, Degenhardt, Gibson, Golossanov, Group, Grundler, Han, Jackson, Khotilovich, Kraus, Kulasiri, Kumar, Middleton, Mustafayev, Nayeem, Paz, Samuel, Sedov, Sengupta, Soderberg, Song, Stonehill, Uzunyan, Veszpremi, Walker, Winklmeier, Xuan, Yan.

## Education and Outreach Subcommittee Report Contributed

*by Hitoshi Murayama*

Education and Outreach (E&O) is an important responsibility of researchers funded by tax dollars to give exciting scientific discoveries back to the people who paid for them. The NSF specifically requires E&O activities in the grant proposals. The 2001 HEPAP subpanel report recommended

*"we urge that all current and future large particle physics experiments incorporate project-specific education and outreach programs as part of their mission... the level of activity on education and outreach in the field should be doubled, in order to ensure a viable, effective and sustainable program."*

DPF has an Education and Outreach Committee that aims at facilitating the E&O activities of individuals and acts as a liaison to the DPF Executive Committee. The current numbers are: Marge Bardeen, Michael Barnett, Marcela Carena, Sally Dawson, Judy Jackson, John Jaros, Inga Karliner, Ernest Malamud, Hitoshi Murayama (Chair), Harrison Prosper, Randy Ruchti, Jim Siegrist, Elizabeth Simmons, Greg Snow.

There are many activities people in the particle-physics community are involved in, especially thanks to the World Year of Physics. I cannot describe all of them here, but let me group them in a way that you may find a way to get involved if you have not been yet.

First of all, Elizabeth Simmons wrote a nice article in Physics Today (http://www.aip.org/pt/vol-58/iss-1/p42.shtml) that invites you to E&O activities. It is a good place to start thinking about it.

Many institutions have events to bring people in to interact with physicists, ask questions, and do hands-on activities. One example is “Ask-a-Scientist” at Fermilab, held on the first weekend of each month. Participants meet Fermilab physicists who answer questions and try to explain “everything.” They also get a behind-the-scenes tour of Fermilab.

Interaction with teachers is a powerful way to bring excitement in physics to their students. For example, QuarkNet (http://quarknet.fnal.gov/) is a nation-wide network of (primarily) particle physicists and secondary school teachers. It is in its 7th year with 53

participating institutions, draws in ~500 teachers and reaches out to ~10K students every year. 11 HEP experiments have actively participated. You can find a site close to you to give lectures or demos to high-school teachers to get started.

Many collaborations started to have outreach web pages. See ATLAS page for an example (http://atlasexperiment.org/). Particle Adventure is another organized by PDG/ CPEP (http://particleadventure.org/particleadventure/). If you are multilingual, translating the web pages to other languages will expand the reach greatly. Many people work with the local science museums, helping them organize public lectures and develop exhibits. Laboratories constantly produce brochures to popularize their research and you can get involved in developing material. DPF itself produced the "Quarks Unbound" brochure which was received extremely well. Many K-12 schools welcome the participation of parents and scientists in science classes; just to help kids focus on the task in front of them can be of big help!

If you are coming to the Snowmass ILC meeting this summer, there are many opportunities. One of them is "Quantum Café." You stand next to posters in Aspen and Snowmass, and answer questions from people who pass by; if they are interested in learning more take them to a nearby café and chat!

Finally, I congratulate Greg Snow for his award of APS Fellow by the Forum on Education at the Tampa APS Meeting.

## CISA Study on Access to Major International Facilities

*Contributed by Amy Flatten*

The APS Committee on International Scientific Affairs (CISA) has undertaken a new role to better serve the interests of APS members. In addition to its advisory role, CISA has established subcommittees to study long-term, cross-cutting international issues and trends that affect physics, APS members and APS as a Society. The subcommittees will include representatives from other units or divisions and thus, and will endeavor to increase cooperation throughout the Society on shared international concerns.

CISA recently established a subcommittee, chaired by Henry Glyde of the University of Delaware, that will examine the evolving conditions for access to major international facilities and the projected international interdependence upon them. While major facilities have been critical in particle physics for many years, they are now important in most fields of physics, and the ability to conduct world-class physics research depends increasingly on access to them.

### Goal and Scope of the Study

The CISA subcommittee will examine the terms of access to major facilities for physics research from the perspective of the user community in the United States. Terms of access are evolving, as is the organizational and international agreements under which

major facilities are constructed and operated. This evolution may vary across different fields of physics and in different nations and regions of the world. A specific aim of the CISA study is to articulate this evolution and assess its impact on access for U.S. physicists. While many reports address major facilities in the US, Europe, Japan and elsewhere, most of these reports focus on the "scientific case" for their establishment or on selection and planning for their construction. Some of these reports may also mention access issues, however, almost none deal exclusively with terms of access.

**Fields and Facilities Involved**

The study will likely focus upon the following fields of physics and/or type of major facility:

Particle physics
Nuclear physics
Plasma physics
Astrophysics
Synchrotron light sources
Neutron scattering sources

For each of these, representatives from APS Divisions will serve on the subcommittee to ensure completeness, accuracy and credibility (see list of members below). In order to narrow the scope of the study, the subcommittee is considering the following criteria for facilities to include/exclude:

Facilities that have a program committee that reviews proposals for use should be included.
Facilities that are inexpensive enough that many nations have one so that there is essentially no access issue should not be included. Small synchrotron light sources and small nuclear reactors at universities might fall in this category.

While the study will identify the current access conditions for the existing international facilities (i.e., how they have evolved, and what they are projected to be in the future), it will also examine the projected terms of access in facilities planned for the next 10-15 years, d rawing upon existing reports where possible. Likewise, subcommittee members will interview facility directors, managers and planners, as well as reach out to other APS units and international physicists for further input. Any recommendations for the U.S. physics community will appear in their final report, targeted for completion by the end of 2005.

For additional information, please contact the CISA subcommittee Chair, Henry Glyde, at: glyde@udel.edu, or, Amy Flatten, APS Director of International Affairs, at flatten@aps.org.

**Subcommittee Members (To Date)**

**Henry Glyde**, Subcommittee Chair *(Neutron and other Materials Facilities)*
University of Delaware

**Edmond L. Berger** , CISA Member *(Particle Physics)*
HEP 362
Argonne National Laboratory

**Robert M. Briber***(Neutron Facilities)*
President, Neutron Scattering Society of America
Department of Materials Science & Engineering

**Charles Glashausser***(Nuclear Physics)*
Department of Physics and Astronomy
Rutgers University

**John Peoples, Jr.** *(Particle Physics)*
Fermi National Accelerator Laboratory

**Sunil K. Sinha** *(Synchrotron Facilities)*
University of California, San Diego

## Observations on the Status of Women in Physics

*Contributed by Marc Sher*

Some interesting data were released this spring concerning the status of women in physics. An analysis by the American Institute of Physics showed that the so-called "leaky pipeline" is **not** leaking between the bachelor's degree and faculty positions. The percentage of new physics faculty positions obtained by women is the same as the percentage of Ph.D's awarded to women several years earlier; the percentage of PhD's awarded to women is the same as the percentage of bachelor's degrees awarded to women several years earlier. If the pipeline continues to hold, the percentage of women in physics will approach 25% in future years. The pipeline still does leak between high school and college graduation. While 50% of students taking high school physics are women, only 25% of those receiving physics bachelor's degrees are women. Hopefully, this leakage will slow as faculties become more diverse. This does not mean that there aren't serious obstacles for post-graduate women in physics, but the numbers are encouraging.

However, particle physics seems to be well behind the curve, and this may have a serious impact on the field. There is substantial anecdotal evidence that the percentage of women is lower than other fields, especially in particle theory. This is based on:

1. Of the last 100 physicists who got job offers (in U.S. universities) for new faculty positions in particle theory, up through the end of 2003-4, only 8 were women. Yet 15% of the new physics faculty positions nationwide went to women. During

the 2004-5 year, of the 17 offers (at the time of this writing) of new particle theory faculty positions in U.S. universities, only one went to a woman.
2. Several very high-ranking officials at the NSF and DOE have made comments about the apparent dearth of women in particle physics. There is indication that this may hurt financially—in the words of one official, there will be reluctance to fund a "men's club". It is important to note that the perception of these officials is as important as the reality—they control the purse-strings.
3. Many of those conducting job searches have noted the relatively small number of highly qualified female applicants, relative to other fields.
4. At DPF2000 only one woman was a plenary speaker. At DPF2002, which I organized, seven (out of 17) of the plenary speakers were women. Alas, at DPF2004, the number slipped back to one. This furthers the perception of our field as a "men's club".

What do the hard data show? In 2000-2003, the total number of PhD's in physics was 4591, of whom a little over 16% were women. The total number of PhD's in particle physics was 557, of whom 12% were women. A breakdown into theory vs. experiment would not be meaningful due to the small numbers.

So what can be done to improve the situation? Several suggestions come to mind:

1. The organizers of DPF2006 (in Hawaii next October) can invite a larger number of women to be plenary speakers. The DPF Executive Committee can be proactive in this.
2. The Committee on the Status of Women in Physics (CSWP) has a list of women physicists who are available to give colloquia. The APS will pay most of the expenses for up to two visits per year per institution. There seem to be relatively few particle physicists on the list (especially in theory). If more female particle physicists were willing to give a couple of colloquia a year, and signed up for the list, this would help.
3. In 2000, the Division of Plasma Physics was concerned about the same problem, and formed an ad-hoc committee to look at the problem. They recommended (among other things) that a standing committee on Women in Plasma Physics be formed to monitor the situation. This is discussed in detail in the Spring 2001 issue of the CSWP Gazette. They also established an award for young women in plasma physics. Perhaps some of their ideas could be borrowed.

Women in particle theory have been prominent in APS Governance (the last President and the last DPF Chair are both female particle theorists), but there seem to be fewer women entering the field than in decades past. There continues to be substantial discrimination against women in the physical sciences, but it doesn't seem (to me) to be particularly worse in particle physics than in other areas.

The CSWP has been in contact with the DPF Executive Committee and is exploring the issue. Perhaps some open discussion of the issue could take place at the April APS meeting and/or at DPF2006 in October. If you have any suggestions for improving the

situation, please contact me at mtsher@wm.edu, and your suggestions will be forwarded to the Executive Committee.

## Joint DPF, DPB, DNP, DAP Study of Physics of Neutrinos

*Contributed by Boris Kayser*

The APS Multi-Divisional Neutrino Study has been completed. This study, triggered by the very interesting physics questions raised by the discovery of neutrino mass, was sponsored by the APS Divisions of Nuclear Physics and Particles and Fields, together with the Divisions of Astrophysics and the Physics of Beams. Its goal was to create an effective, coherent strategy for a U.S. role in the global future neutrino program. It was intended that the U.S. effort complement, and cooperate with, the efforts in Asia and Europe, and make unique contributions that would not be duplicated elsewhere. The study's main report, *The Neutrino Matrix*, as well as the reports of the study's Working Groups, may be found at www.aps.org/neutrino.

While discussing many issues, *The Neutrino Matrix* makes three principal recommendations. It recommends that, as a high priority, a phased program of sensitive searches for neutrinoless nuclear double beta decay be initiated as soon as possible. The observation of this decay would establish that, unlike the quarks and charged leptons, the neutrinos are their own antiparticles. *The Neutrino Matrix* also recommends, as a high priority, a comprehensive U.S. program to complete our understanding of neutrino mixing, to determine the character of the neutrino mass spectrum, and to search for CP violation among neutrinos. This program should involve a reactor experiment, a long-baseline accelerator experiment, and a proton driver in the megawatt class with an appropriate large detector making possible the observation of CP violation in neutrino oscillation. Determining whether the neutrino mass spectrum is of normal character, with the closely-spaced pair of mass eigenstates at the bottom of the spectrum as favored by Grand Unified Theories, or of inverted character, with the closely-spaced pair at the top of the spectrum, can be a unique contribution of the U.S. neutrino program. Observing CP violation among the neutrinos could prove very interesting because of the possible deep connection between this CP violation and the matter-antimatter asymmetry of the universe. Finally, *The Neutrino Matrix* recommends the development of a solar neutrino experiment capable of measuring the energy spectrum of neutrinos from the primary pp fusion process in the sun. Such an experiment would allow us to test whether we correctly understand how the sun generates its energy.

The APS Multi-Divisional study was a grass-roots, democratic effort with no precedent. Remarkably enough, it achieved a high degree of consensus on its main recommendations. As co-chairs, Stuart Freedman and I would like to thank all the participants for their insight, thoughtfulness, wisdom, creativity, cooperative spirit, and hard work. Special thanks are due to the Working Group Leaders, the Organizing Committee, and the Writing Committee. In addition, special mention must be made of the extraordinary contributions of Janet Conrad and Hamish Robertson. Janet Conrad made an enormous number of highly-creative and critical contributions, from physics points to

the design of the main report, to the production of a popular brochure, to the creation of a neutrino-fest and writers' workshop. Hamish Robertson chaired, with great skill, diplomacy, and wisdom, the Writing Committee in which the main consensus was achieved.

The DOE and NSF responses to the study appear to be very positive. These agencies have asked HEPAP AND NSAC to form the Neutrino Scientific Assessment Group (NuSAG), a new committee charged with determining the best experiment (or experiments) in each of the near-term experimental directions recommended by the APS study. NuSAG is now in the process of carrying out its charge.

The scientific opportunities in neutrino physics are very exciting. We hope that the output from the APS Multi-Divisional Neutrino Study will help these opportunities to be realized.

## Update on the National Academy EPP2010 Study

*Contributed by Sally Dawson*

The National Research Council of the National Academy of Sciences has charged a committee, *EPP2010: Elementary Particle Physics in the 21 st Century*, to examine the scientific questions of elementary particle physics and to prioritize these questions and recommend a 15 year implementation plan. The committee is chaired by Harold Shapiro, the president emeritus of Princeton, and contains roughly half particle physicists and half non-particle physicists. Information can be found on the committee web page, http://www7.nationalacademies.org/bpa/EPP2010.html.

The committee has had three meetings so far. The first meeting, Nov 30-Dec 1, 2004, was held in Washington, DC and focused on general issues of priority setting in particle physics. The second meeting, at SLAC on Jan 31-Feb 1, 2005, had introductory physics presentations to set the stage for the non-particle physicists on the committee, along with a presentation from SLAC director Jonathan Dorfan, of his vision for the future of SLAC. The third meeting, at Fermilab on May 16-17, 2005, heard physics presentations, along with Fermilab director Mike Witherell's vision for the future of the U.S. national program, and Fermilab director designate Pier Oddone's vision for the Fermilab future. A major focus of the Fermilab meeting was planning for the future in an international context and there were presentations by A. Wagner (DESY), Y. Totsuka (KEK), and I. Halliday (PPARC). The first three meetings also had Town Meetings organized by the DPF executive committee.

The fourth meeting of the committee will be at Cornell , Aug 2-3, 2005. At this meeting, the committee will hear from Barry Barrish about the Global Design Effort for the International Linear Collider and from Maury Tigner about Cornell's plans for the future. In addition, the results of the HEPAP subpanel on ILC/LHC connections will be presented and there will be a student forum.

The committee actively seeks input from the community and you are encouraged to write to the committee at epp2010@nas.edu. The committee report is expected to be finalized by the end of 2005 and presented at the AAAS meeting in St. Louis in Feb. 2005.

## The Global Design Effort for the International Linear Collider

*Contributed by Barry C Barish*

The dream of building a 1 TeV scale $e^+e^-$ linear collider has been with us for more than a decade. The challenges were enormous, due to the combination of large gradient and very high luminosity required, along with the need to focus the beams to extremely small spot sizes. The proof of concept for such a machine was the Stanford Linear Collider, but it is a very long extrapolation from that machine to a 1 TeV linear collider.

By the beginning of this new millennium, an impressive R&D program had demonstrated the key elements required to undertake construction of a linear collider, remarkably, for two different technologies for the main linac, superconducting rf and room temperature copper structures. Choosing between them proved to be a daunting task

Last August 2004, a crucial milestone was passed when the International Technology Recommendation Panel (ITRP), which I chaired, submitted its recommendation to the International Linear Collider Steering Committee (ILCSC) chaired by Maury Tigner and to its parent body, ICFA, chaired by Jonathan Dorfan. The recommendation read:

*"We recommend that the linear collider be based on superconducting rf technology. This recommendation is made with the understanding that we are recommending a technology, not a design. We expect the final design to be developed by a team drawn from the combined warm and cold linear collider communities, taking full advantage of the experience and expertise of both." (from the ITRP Report Executive Summary)*

Following this recommendation and decision, KEK and SLAC quickly reorganized their efforts toward a design based on the cold technology. A workshop at KEK last October provided a forum to organize the community toward a global design. Working groups were formed, alternate schemes for key systems in the machine design were identified and the ILC R&D programs were redirected.

The next step was to form a central group to lead the design effort. That group was initiated in March 2005 with my appointment as director of the Global Design Effort (GDE). The GDE is rapidly taking form as three regional directors, Gerry Dugan for North America, Fumihiko Takasaki for Asia and Brian Foster for Europe have been appointed.

The next milestone will be the Snowmass Workshop this August, at which time the GDE will kick-off its effort to produce a conceptual design by the end of 2006 and a technical design a couple of years later. At that point, we will be ready to propose a new international project and hopefully early results from LHC will be as exciting as we all

expect, making the scientific case irresistible as we seek funding to create a new international project for high energy physics.

## HEPAP P5 Charge

*Contributed by Robin Staffin*

The following is the charge sent to the P5 Subpanel of HEPAP chaired by Prof. Abe Seiden (UCSC). The P5 membership consists of Hiroaki Aihara (University of Tokyo), Andy Albrecht (UCDavis), Jim Alexander (Cornell), Daniela Bortoletto ( Purdue), Claudio Campagnari (UCSB), Marcela Carena (FNAL), Fred Gilman (Carnegie Mellon University - Ex-Officio), Dan Green (FNAL), JoAnne Hewett (SLAC), Boris Kayser (FNAL), Karl Jakobs (University of Freiburg), Jay Marx (LBNL), Ann Nelson (U. of Washington), Harrison Prosper (Florida State U.), Tor Raubenheimer (SLAC), Steve Ritz (NASA), Michael Schmidt (Yale), Mel Shochet (U. of Chicago), Harry Weerts (Michigan State U.), Stanley Wojcicki (Stanford U.):

*Dear Professor Seiden:*

*As you know, the role of the P5 Subpanel is to advise and prioritize specific projects, at the request of the Department of Energy (DOE) and National Science Foundation (NSF), and to maintain the roadmap for the field. We would like P5 to begin the task of making a new roadmap for the next decade. This roadmap should be based on input from the various HEPAP subpanels, formed over the last few months, looking at specific sub-areas of particle physics. The roadmap should integrate the various projects into a coherent plan based on specific promise, cost, and technical and budgetary constraints. There are major opportunities ahead of us – the Large Hadron Collider will soon be producing data, there is a consensus among high energy physicists worldwide towards an International Linear Collider, and a number of study groups and subpanels have laid out the opportunities in such other areas as neutrino physics, dark matter and dark energy.*

*Of course, the U.S. high energy physics program already has a suite of highly productive accelerator-based efforts at Fermilab, SLAC, and Cornell, and is now reaping the scientific output of the world-leading user facilities that were built in the 1990's. The particle physics community has been aggressive in trying to exploit these investments, and the payoff has been and continues to be a rich and diverse set of physics results. Now is the time to begin considering the next phase: a plan for the Tevatron Collider and PEP-II B-factory that also makes room for other initiatives important to realizing the grand opportunities of elementary particle physics. While the opportunities are great, the budgetary environment is difficult at best. Like all experimental programs, the Tevatron and B-factory will eventually reach the point where the scientific returns diminish, or are eclipsed by other facilities. The immediate question on which we ask your advice is: when would the significant resources that are now invested in operations of these facilities have a greater scientific impact if they were to be deployed otherwise.*

*Current planning calls PEP-II to be operated until the end of FY2008 at the latest, and*

*the Tevatron collider to be operated until the end of FY2009. What factors or considerations might lead to stopping B-factory operations one year, or two years earlier than planned? When would we be in a position to make such a determination and what information would be needed? Similarly, for the Tevatron collider, what factors or considerations might lead to stopping operations one year, or two years earlier than now planned? What might lead to running longer than now planned? Again, when would we be in a position to make such a determination and what information would be needed?*

*In considering and commenting on these issues, you should understand these questions within the international context of HEP and what is planned at KEK-B and the LHC. For definitiveness, you may assume a constant funding level for the overall US HEP program; do not assume that the geographic or programmatic distribution of those funds must remain as now. For the purposes of this exercise you should understand that there would likely be no funding for any new initiatives in neutrinos, dark matter and/or dark energy, and no significant ramp-up in ILC R&D until the operations of these facilities are completed. Again, for this exercise, you should assume the availability of redirected resources will strongly impact our ability to carry out smaller initiatives within the roadmap (for example in neutrino physics, dark matter, and dark energy), but will likely impact only weakly the start date for ILC construction, which will largely be determined by other factors.*

*The DOE and the NSF would like a draft recommendation regarding the two major facilities, in the context of an initial roadmap, by the end of October 2005, with a final report by the end of November. A separate request to construct a final roadmap will be made after the conclusion of the work being done by the various HEPAP subpanels addressing the sub-areas of particle physics.*

*Thank you in advance for your dedication to addressing these important and challenging questions.*

*Sincerely,*

| | |
|---|---|
| *Dr. Robin Staffin* | *Dr. Michael Turner* |
| *Associate Director* | *Assistant Director* |
| *Office of High Energy Physics* | *Mathematical and Physical* |
| *Office of Science* | *Sciences* |
| *Department of Energy* | *National Science Foundation* |

A complete list of active HEPAP subpanels and their charges is available at http://www.science.doe.gov/hep/Subpanel%20List.shtm.

## DPF Committees

We thank the following members of our community who generously give their time to

serve on DPF committees this year:

**Nominating Committee**

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