

DPF NEWSLETTER

July 2007

Message from the DPF Chair

Contributed by Natalie Roe

Communication with the DPF membership is an important function of the DPF executive committee. With this edition, we resume the tradition of the annual DPF Newsletter. This issue has some articles of special interest including an overview of the “Particle Physics Roadmap” by Joe Lykken, “A Roadmap for ILC Detectors” by Andreas Kronfeld, and “Formation of a US LHC Users Organization” by Al Goshaw. In addition we have updates on DPF elections, election of APS Fellows, highlights from recent DPF meetings and planning for future meetings.

The future of the April APS meeting was considered last year by an APS task force chaired by Chris Quigg of FNAL. Their main conclusions were that the April meeting should return to Washington on a biannual basis; that it should be re-invigorated through the use of broad themes, joint meetings, and more extensive outreach; and that the excellent plenary session talks should be made available on the web. This year’s DPF chair-elect, Bob Cahn, has posted the plenary talks from the 2007 April APS meeting on the web; see his newsletter article for details. As Chair of the 2008 April APS meeting, to be held April 12-15 in St. Louis, Missouri, I will be looking for more ways to implement the advice of the April meeting task force. Let me know if you have suggestions.

DPF Election News

Contributed by Al Goshaw and Natalie Roe

The 2007 DPF elections will be underway at the end of July with candidates selected by the end of September. The voting this year includes positions of Vice-Chair, two new Executive Committee members and a new APS Divisional Councilor. The Vice-Chair will enter our four-person Chair line (see below) and become Chair in 2010. The two Executive Committee members will join four Executive Committee members remaining on the committee. The Divisional Councilor will represent the DPF on the APS Council, the main governing body of the APS, for four years. The winners of these elections will assume their positions starting January 2008. The candidates this year are:

Vice Chair: Chip Brock (Michigan State University) and Howard Haber (UC Santa Cruz).

Executive Committee: Ed Blucher (University of Chicago), JoAnne Hewett (SLAC), Ritchie Patterson (Cornell University) and Carlos Wagner (Argonne).

APS Divisional Councilor: Janet Conrad (Columbia University) and Nick Hadley (U Maryland).

We thank the 2007 Nominating Committee (Pat Burchat, Marcela Carena (chair), Boaz Klima, Hiroshi Ooguri, Mark Oreglia, and Mike Shaevitz) for their hard work in coming up with an excellent slate of candidates. The present members of the 2007 DPF Executive Committee and the final year of their terms are:

Chair: Natalie Roe (2007)

Chair-Elect: Bob Cahn (2007)

Vice-Chair: Boris Kayser (2007)

Past Chair: Joe Lykken (2007)

Secretary-Treasurer: Al Goshaw (2009)

Division Councilor: John Jaros (2007)

Executive Committee Members: Sarah Eno and Andy Cohen (2007), Jack Ritchie and Dan Amidei (2008), Andreas Kronfeld and Cecilia Gerber (2009)

We would like to thank the DPF Executive Committee members whose terms expired in 2006: Bill Carrithers (Past Chair), Mike Tuts (Secretary-Treasurer), and Daniela Bortoletto and Hitoshi Murayama (Executive Committee members). The DPF is fortunate to have such dedicated people who give so freely of their time.

Formation of a US LHC Users Organization

Contributed by Al Goshaw

A large fraction of US-based physicists will be involved with the LHC research program over the next decade. This presents particular challenges in making contributions to the expected discoveries and solving logistical problems associated with operating a research program at CERN. To help with these issues, a US LHC Users Organization (USLUO) has been formed for scientists working on LHC experiments and accelerator development. USLUO will provide a forum for discussions of US participation in the LHC research program, with a focus on how to help the US LHC community work effectively with international colleagues doing research at CERN.

The short-term plan is to form a 12-person Executive Committee charged with further developing the organizations activities and goals. An Election Committee (Chaired by Nick Hadley) was formed, and a request for nominations has been circulated. The election period will be July 15 - August 31, 2007 with the Executive Committee members established by early September. See the web site www.usluo.org for how to register for USLUO membership, and to enter your vote for Executive Committee members.

The Particle Physics Roadmap

Contributed by Joe Lykken

Funding for particle physics in the U.S. comes primarily through the Office of Science of the Department of Energy and the Directorate for Mathematical and Physical Sciences of the NSF. These entities have a permanent joint advisory body called HEPAP, currently chaired by Mel Shochet. The 26 physicists serving on HEPAP provide expertise in all areas of particle physics and related subfields. The current membership includes the DPF chair-elect Bob Cahn, as well as several past-chairs of the DPF. We have an understanding with DOE and NSF that at least one member of the DPF chair line will always have a simultaneous appointment to HEPAP.

HEPAP conducts three open meetings per year in Washington. Most of the work of HEPAP is done through subcommittees and subpanels. Subcommittees of HEPAP carry out charges to HEPAP, producing reports that are considered for ratification at the open meetings. Subpanels are distinct from the HEPAP membership, appointed by the HEPAP chair, and charged by DOE and NSF. The most important subpanel of HEPAP is P5, the Particle Physics Project Prioritization Panel, chaired by Abe Seiden. The current membership of P5 includes Boris Kayser, the vice-chair of the DPF.

P5 was created in response to a recommendation of the 2001 Bagger-Barish Subpanel on Long Range Planning for U.S. High Energy Physics. The Bagger-Barish subpanel had been charged with creating a roadmap for the future of U.S. particle physics over the next twenty years. However this panel advised that any such plan would be ineffective without a new mechanism to assist DOE and NSF in updating the roadmap and in prioritizing new initiatives. The Bagger-Barish report recommended that "P5 should meet on a regular basis and serve as the guardian of the roadmap."

Last year P5 produced the first major update of the particle physics roadmap. Their report recommended a specific prioritization for the funding of new initiatives, as well as estimates for when future major reviews of various parts of the U.S. program will be required. The P5 roadmap was based upon budget guidance from the agencies, guidance that was immediately disrupted by the crisis of the FY 2007 continuing resolution. Of course the vagaries of budgets only emphasizes the need for a continuing P5 process.

At the February 2007 meeting of HEPAP Ray Orbach, Director of the Office of Science, asked Fermilab Director Pier Oddone to develop a plan to maximize the physics discovery opportunities for Fermilab during the years when the lab's first priority will be R&D for the ILC. Oddone set up a Fermilab Steering Group (chaired by Young-Kee Kim) charged with producing such a plan by August of this year.

Some months ago DPF chair Natalie Roe initiated discussions with Mel Shochet, Abe Seiden, Robin Staffin of DOE and Joe Dehmer of NSF, to clarify how Ray Orbach's request would fit into the overall roadmap process. It was agreed by all that the output of the Fermilab group will serve as input to P5, which will meet annually to review the roadmap in the light of new developments, such as the Fermilab report.

In areas that have substantial overlap with nuclear physics or astrophysics, program planning requires coordination between HEPAP and its sister panels NSAC and AAAC. This is handled by the creation of "SAG"s, subpanels that report jointly to HEPAP and another advisory panel. The current SAGs are NuSAG, which has produced two reports advising on neutrino physics opportunities for the U.S. program, and DMSAG, which has just produced a report on opportunities for dark matter detection.

Another important report was just submitted to HEPAP from the Universities Grants Program Subpanel, chaired by Homer Neal. This report makes a strong case for increased support and attention to the university component of the U.S. program. The report singles out the especially urgent need to support university based infrastructure, long-term research scientists, and theory students working on phenomenology.

Apart from HEPAP, the DOE and NSF also solicit advice from the National Research Council's Board on Physics and Astronomy. A charge to the NRC led to the creation of the recent EPP2010 committee chaired by Harold Shapiro. Membership of NRC panels may be very broad, drawing upon captains of industry and leading scientists from other fields. Currently DOE and NASA have jointly charged an NRC committee to prioritize opportunities related to NASA's Beyond Einstein program. The report of this committee is expected in September 2007.

A Roadmap for ILC Detectors

Contributed by Andreas Kronfeld

Recently, there have been some important new developments on the ILC detector scene. This article explains what is going on worldwide in this area, starting with some background information for context.

Early this year, the Global Design Effort (GDE) for the International Linear Collider made public its Reference Design Report (RDR) and Value plus Manpower Estimate for the ILC [1]. Having completed this significant milestone, the GDE is now calling for an Engineering Design Report (EDR) for the ILC accelerator complex by 2010. The design calls for two detectors in a “push-pull” configuration, i.e., one detector taking data at a time. Clearly the detectors are of utmost importance: without them the ILC would produce no scientific results.

Until now, physics and detector studies for the ILC have been coordinated by a grass-roots organization called the Worldwide Study of the Physics and Detectors for Future Linear e^+e^- Colliders (WWS), along with regional Studies in Asia, Europe, and the Americas. This effort has reviewed and characterized the ILC detector R&D that goes on worldwide, scheduled a series of international meetings on the physics and detectors for the ILC, and documented machine requirements for ILC physics. In the last two years, it has also fostered the development of complete detector concepts—coherent and integrated designs for ILC experiments—by calling for Detector Outline Documents. Documents have been produced for four detector concepts. Under WWS auspices descriptions of them are now being combined into the Detector Concept Report (DCR), which summarizes the case for the physics and detectors of the ILC. The DCR will serve as a companion document to the RDR prepared by the GDE. Both will be formally released later this summer.

The GDE’s progress has stimulated the international community of experimental physicists who hope one day to carry out experiments at the ILC. There is a healthy spirit of cooperation and competition. To support the accelerator EDR, however, it has become clear that the organization of ILC detector activities has to evolve, so that the community can produce two detector EDRs on the same time-scale as that for the machine.

With this in mind, the International Linear Collider Steering Committee (ILCSC) asked the Organizing Committee of the WWS (WWS-OC) to propose a roadmap to guide the transition from the current status to the EDR phase of the ILC. At the recent WWS-GDE conference at DESY, 30 May–3 June, the WWS-OC presented its proposal to the ILC community and to the ILCSC. The main elements are as follows.

The first step is to recruit an ILC Research Director. This is foreseen to be a full-time position, roughly parallel to the GDE Director overseeing the machine effort. The Research Director would be charged with facilitating the process of organizing the ILC experimental community into two proto-collaborations, which would then be charged with producing detector EDRs to complement the accelerator EDR. The Research Director will

also have to ensure that ILC detector R&D continues to be pursued vigorously, both in the current framework of the existing R&D Collaborations and in the new framework provided by the two detector concepts selected for the EDR. It is hoped that a single person with a global view will aid communication with the GDE and with those outside the ILC enterprise: other scientists, politicians, funding agencies, and the public. At DESY, the ILC-SC accepted this step and formed a committee to search for the ILC Research Director.

The next step is for the ILCSC to issue a call for Letters of Intent (LoIs) to produce engineering designs for ILC detectors. This call is expected to come this summer, and the LoIs will likely be due in Summer 2008. The process of moving from the LoIs to the definition of two complementary and contrasting experiment designs will be guided by the Research Director and an International Detector Advisory Group (IDAG), and is to be complete by the end of 2008. The time-table for completing the ILC Detector EDRs will require a great deal of technical and organizational effort from (would-be) ILC experimenters. This is not a surprise—it mirrors what has happened on the accelerator side.

At a meeting of HEPAP last February, Dr. Ray Orbach, Undersecretary for Science at the DOE, expressed his views on the uncertainty in the overall timetable for the ILC. Since then, some have asked why the ILC continues with its plan to finish an EDR by the end of 2010. To address this question, the GDE Director, Barry Barish, has written [2] “the difference [in timelines] comes primarily from [Dr. Orbach’s] estimate of how much time it will take to make government agreements, to determine the division of responsibilities and resources, to obtain funding, and finally to agree where to site the project.... We should consider the conservative schedule presented by Ray to be effectively a good ‘kick in the pants.’ If we really want to complete the ILC on a timescale around the end of the next decade, we must begin a major effort to put together the collaboration, responsibilities and government commitments, and in parallel continue with our work toward an engineering design.” The latter work includes the ILC detectors, and the recent developments are intended to bring the detectors into synchrony with the accelerator.

Reference:

1. <http://www.linearcollider.org/cms/>
2. <http://www.linearcollider.org/cms/?pid=1000397>

Update on DPF Prizes

Contributed by John Jaros

The DPF sponsors three of the prizes offered annually by the American Physical Society, the Robert R. Wilson Prize for achievement in the physics of particle accelerators (jointly with DPB), the J.J. Sakurai Prize for outstanding achievement in particle theory, and the W. K. H. Panofsky Prize for outstanding achievement in experimental particle physics. All three prizes were established in the mid-1980's, and until this year each included an award of \$5000, a citation, and travel expenses to the April APS meeting where the prizes are presented. Most APS prizes now carry awards of \$10,000, and the DPF has been seeking ways to increase the endowment of each of its awards in order to follow suit. These efforts have been successful: the awards for the 2008 Sakurai and Panofsky Prizes will be boosted to \$10,000, and the 2008 Wilson Prize will increase to \$7500 with a further increase to \$10,000 within the next five years.

Some APS awards depend on sponsoring institutions, but the DPF prizes rely on endowment funds, which were established at the time the prizes were created and are managed by the Society. Continuing contributions to both the Wilson and Sakurai Prize endowment funds over the years have raised them to the levels required to fund the new awards. The DPF will fund the travel expenses for Wilson prize recipients in coming years, which will enable the fund to grow to a sufficient level to support a \$10,000 award. A special contribution of \$50,000 to the Panofsky Prize endowment by SLAC and Stanford University just this past year, matched by the DPF general funds, has nearly doubled the original endowment and made possible the higher award level.

Physicists in DPF also have a strong intellectual connection to the Dannie Heinemann Prize for Mathematical Physics, which was established in 1959 by the Heineman Foundation for Research, Educational, Charitable, and Scientific Purposes, Inc., and is administered jointly by the American Physical Society and the American Institute of Physics. The Heinemann Prize award is currently \$7500.

The nomination deadlines for the 2008 prizes have already passed, and the respective Prize Committees will soon be hard at work reviewing candidates. A call for nominations for the 2009 prizes will be announced again next Spring. Full information about APS's prizes and awards, including those sponsored by DPF, can be found on the APS webpage, <http://www.aps.org/programs/honors/index.cfm>. See the article about the 2007 DPF meeting for this year's Prize winners.

DPF Fellowships

Each year no more than one-half of one percent of the current membership of the Society are recognized by their peers for election to the status of Fellow in The American Physical Society. Sixteen of our DPF-nominated colleagues were selected for Fellowship in the APS in 2006 as listed below.

The 2007 Fellowship nominations were due by April 3, 2007, with the results to be announced in November. For details of future Fellowship nomination see <http://www.aps.org/programs/honors/fellowships/nominations.cfm>.

2006 APS Fellows Nominated by DPF

For citations see <http://www.aps.org/programs/honors/fellowships/2006-fellows.cfm>.

Daniel Bauer (Fermilab)

Ulrich Becker (MIT)

Edward Blucher (U. of Chicago)

Peter Fisher (MIT)

Ian Hinchliffe (LBNL)

Yury Kolomensky (U. of California, Berkeley)

Robert Leigh (U. of Illinois, Urbana-Champaign)

William Morse (BNL)

Stephen Reucroft (Northeastern U.)

Ina Sarcevic (U. of Arizona)

Mats Selen (U. of Illinois)

Paul Sheldon (Vanderbilt U.)

William Spalding (Fermilab)

Kerry Whisnant (Iowa State U.)

Scott Willenbrock (U. of Illinois)

John Yelton (U. of Florida)

2006 DPF Meeting

Contributed by Steve Olsen

Following the lead of our colleagues in the Division of Nuclear Physics, who have held two highly successful joint meetings on Maui with their counterpart organization in Japan, the 2006 DPF meeting, held at the Sheraton Waikiki in Honolulu, October 30- November 3, 2006, was also the annual Fall meeting of the Japan Particle Physics community. In addition, there was participation from other Pacific Region particle physics communities including Australia, Canada, China, Japan, Korea, Mexico, Russia and Taiwan, as well as Europe.

The meeting, which had 650 registered participants, was characterized by a large number (over 500) parallel talks in 19 different parallel sequences covering subjects ranging from Accelerator Physics to String Theory. In addition there was a well attended Poster Session and a special evening forum where issues relating to Publishing in Particle Physics were discussed.

The recently discovered mixing in the B_s meson system was the subject of a number of parallel session talks, an excellent plenary report by Joe Kroll, and a major topic of informal discussions during coffee breaks.

On the Saturday preceeding the conference, QuarkNet staff from Fermilab and Berkeley set up cosmic ray detectors in an outdoor area a Honolulu shopping mall and explained their operation and the phenomenon of cosmic rays to people in the community. In addition, there was a public lecture entitled "E=mc²" by Young Kee Kim. One parallel session concentrated on outreach and included a number of research reports by undergraduate students.

The meeting was very international in character. In addition to 338 US attendees, there were 247 participants from Japan, 35 from other Pacific Region countries and 30 from Europe.

2007 DPF Meeting

Contributed by Bob Cahn

The April 2007 APS meeting in Jacksonville, Florida served as the annual meeting of the DPF as well. Following tradition, there were presentations by the winners of the Panofsky Prize (Heinrich Wahl, Italo Mannelli, Bruce Winstein for measurement of direct CP violation in K decays), the Heineman Prize (Juan Maldacena, Joe Polchinski, for work in quantum field theory, string theory, and gravity), and the Sakurai Prize (Stan Brodsky, for applications of perturbative QCD). Lisa Randall received the Lilienfeld Prize for her work on particle physics and cosmology and her achievements in popularizing recent developments in particle theory. A special treat were the talks by the recent Nobel Prize winners, John Mather and George Smoot, on the results of COBE on the cosmic microwave background.

But this was not just a celebration of past triumphs! Just days after the first announcement at Fermilab, the MiniBooNE results were presented showing no indication of a fourth neutrino. Perhaps the biggest buzz was created by new limits on the direct detection of dark matter obtained using noble liquids. Another very recent result presented was the demonstration mixing of neutral D

and anti-D mesons by both the BaBar and Belle Collaborations.

Tevatron Collider results from D0 and CDF provided the largest contribution to the meeting, followed by results from BaBar. All three experiments are benefiting from increased luminosity and are thus more productive than ever. That great B physics can be done at hadron colliders was demonstrated by the measurement of the mass splitting between the two mass eigenstates of the B_s meson. New results are coming in on CP violation on decays of B_d from the B factories, and on both B_d and B_s from Fermilab.

The future of particle physics will be dominated by LHC and there were presentations on both the detectors and the anticipated physics. Another session focused on the challenge of mounting enormous international projects, with a review of the successes of LHC and ITER and a presentation of the developing work on ILC. Naturally dark energy attracted much attention, with sessions devoted both to ground-based experiments and to space-based experiments.

Slides from most of the invited talks are available at: <http://www.aps.org/meetings/multimedia/april2007/>

2008 DPF Meeting "A New Era for US Particle Physics"

Contributed by Natalie Roe

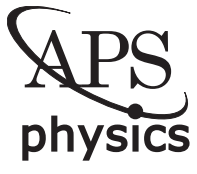
The US particle physics community will be going through a transition of historic proportions in the next few years as the successful and productive US-based collider programs come to an end. Many US physicists will work abroad on experiments at the Large Hadron Collider in Geneva, Switzerland, while others embark on a new generation of experiments on neutrinos, dark matter and dark energy, or work on R&D towards future projects such as the International Linear Collider.

The 2008 DPF meeting will celebrate the exciting physics results from current experiments, and look ahead at the challenges and opportunities of the next decade. Special plenary talks, invited sessions, a panel discussion and Town Hall meeting are planned to explore the future of US particle physics and invite community input. The 2008 DPF meeting will be held in conjunction with the April APS meeting in St. Louis, Missouri from April 12-15, 2008.

2009 DPF Meeting: Solicitation for Proposals

Contributed by Al Goshaw

The DPF Executive Committee is seeking offers to host the 2009 DPF Meeting. This should be a very exciting time for our field, with first measurements from the LHC, mature results from the Tevatron and the B Factories, and continuing developments in neutrino and astrophysics. If your institution is interested in making a bid to host DPF2009, please contact Natalie Roe (naroe@lbl.gov) and Al Goshaw (goshaw@phy.duke.edu). We would like to receive expressions of interest by September 15, 2007, including proposed dates, a summary of conference facilities and an overview of lodging and transportation options.



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