

DPF Newsletter – September 2004

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

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Message from the Chair

The major activity of the DPF during this past year has been the sponsorship (along with the DNP, DPB, and DAP) of a study of the physics opportunities involving neutrinos. This is the first example of a study sponsored by multiple APS divisions, and clearly demonstrates the broad interest of our science. Stuart Freedman (LBNL) and Boris Kayser (Fermilab) deserve our thanks for the many hours they have devoted to this study and we look forward to the final report in the fall of 2004.

One of the most important activities of the DPF is always the sponsorship of our divisional meeting, which was held at the University of California at Riverside from Aug. 26-31, 2004. We are grateful to Gail Hanson (UC, Riverside) for her dedication in organizing this outstanding meeting.

The National Research Council has begun a study of particle physics (EPP2010) as part of their decadal study of physics. Information on the study is at <http://www7.nationalacademies.org/bpa/EPP2010.html>. As part of the study, the DPF will sponsor a series of town meetings, the first of which will occur in Washington on Nov. 30. I hope that many of you will take the time to write letters to the committee about your hopes for particle physics in the coming years (epp2010@nas.edu).

During recent years, the high energy community has become increasingly aware of the need to improve its efforts in outreach and education. This issue of the DPF newsletter reports on DPF efforts to communicate the vitality of particle physics. The Education and Outreach Committee under the leadership of Elizabeth Simmons (Michigan State University), and the Government Affairs Committee under the leadership of George Gollin (University of Illinois) have been active in these areas. Please feel free to email them with suggestions for activities.

DPF Election News

The DPF 2005 Elections are underway and will close on October 15, 2004. Members are voting for the positions of Vice-Chair and two new Executive Committee members. The Vice-Chair will enter our four-person Chair line (see below) and become Chair in 2007. The two Executive Committee members will join four Executive Committee members remaining on the committee. By now, all DPF members should have received an email notification for web based voting or requested a paper mail ballot (if not, please contact the DPF Secretary-Treasurer). The winners of these elections will assume their positions starting January, 2005. We thank the Nominating Committee for their hard work in coming up with an excellent slate of candidates. The candidates for Vice-Chair are Nigel Lockyer (University of Pennsylvania) and Natalie Roe (LBNL). The candidates for Executive Committee members are Claudio Campagnari (UC Santa Barbara), Andrew Cohen (Boston University), Sarah Eno (University of Maryland) and James Wells (University of Michigan).

The present members of the 2004 DPF Executive Committee and the final years of their terms are

Chair: Sally Dawson (2004).
Chair-Elect: Bill Carithers (2004).
Vice-Chair: Joe Lykken (2004).
Past Chair: Jon Bagger (2004).
Secretary-Treasurer: Mike Tuts (2006).
Division Councilor: John Jaros (2007).

Executive Committee Members: Howard Haber (2004), Elizabeth Simmons(2004), Marcela Carena (2005) and John Womersley (2005), Daniela Bortoletto (2006) and Hitoshi Murayama (2006).

We would like to take this opportunity to thank the DPF Executive Committee members whose terms expired in 2003: Stan Wojcicki (Past Chair), Nick Hadley (Secretary-Treasurer), Peter Meyers (Division Councilor) and Marty Breidenbach and Young-Kee Kim (Executive Committee members). The DPF is fortunate to have such dedicated people who give so freely of their time.

DPF Fellows

Congratulations to all those who were chosen Fellows of APS from the DPF in 2003.

Thomas E Browder (University of Hawaii), Andrew G Cohen (Boston University), John Derek Dowell (University of Birmingham), Tao Han (University of Wisconsin-Madison), Kenneth Intriligator (University of California, San Diego), Richard D.Kass (Ohio State University), Young-Kee Kim (University of Chicago), Hitoshi Murayama (University of California, Berkeley), Keith A Olive (William I. Fine Theoretical Physics Institute), Rene A Ong (University of California), J. Ritchie Patterson (Cornell University), Lisa Randall (Harvard University), Jack L Ritchie (University of Texas at Austin), Stephen H Shenker (Stanford University), Pekka Kalervo Sinervo (University of Toronto), Raman Sundrum (Johns Hopkins University), Mark Brian Wise (California Institute of Technology).

DPF Meeting

Contributed by Gail Hanson

The DPF meeting took place at the University of California at Riverside from Aug. 26-31, 2004. The website for the meeting is <http://www.dpf2004.org>. More information can be found on that page.

The scientific program consisted of 16 plenary talks and 20 parallel sessions covering the fields of high energy physics, particle astrophysics, cosmology and heavy ion physics. The proceedings will be published in the International Journal of Modern Physics A.

In addition to the scientific program, there were luncheons organized by the Young Particle Physicists and women in physics. The last part of Monday afternoon was devoted to a DPF Town Meeting, with representatives from the funding agencies present. There was a public lecture and a public concert as well as a conference banquet. The reception on the evening of August 26 was held at the Mission Inn, a National Historic Landmark Hotel. Sunday August 29 was a free day with excursions planned to several sites in Southern California.

Denver APS Meeting Travel Grants

The DPF, together with the generous support of a grant from the NSF, was able to award travel grants of \$300 to 34 students that attended the Denver 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.

Education and Outreach Subcommittee Report

Contributed by Liz Simmons

The DPF Education & Outreach Subcommittee has been active on several fronts in recent months.

From <http://www.physics2005.org>: The World Year of Physics 2005 plans to bring the excitement of physics to the public and inspire a new generation of scientists. Timed to coincide with the centennial celebration of Albert Einstein's "miraculous year," the World Year of Physics will be coming to YOU before you know it.

The EOS will work with labs and universities to coordinate "Einstein for a Day" in concert with events being held in Europe in March 2005. Participating institutions will hold day-long workshops for high-school students and teachers, including hands-on experiments, on-line challenge exercises, demos, presentations, and lab tours. We hope to draw on DPF members' wide experience in organizing similar events as part of participation in outreach networks like CROP, WALTA and QuarkNet. To indicate interest in running a local "Einstein for a Day," drop a note to the EOS at dpfeando@fnal.gov.

In summer 2004, members of the EOS have been running a workshop on physics education and outreach together with colleagues from the Astrophysics and Condensed Matter Physics communities. Physicists, high-school teachers, and educators from labs and museums are pooling resources, sharing information on best practices, and forming new collaborations. Results of the workshop will soon be available to all at <http://www-ed.fnal.gov/aspen/>

The EOS representative to the European Physics Outreach Group reports that CERN is planning a 50th anniversary celebration for October 16, 2004. For details or to volunteer see <http://info.web.cern.ch/info/ES/CERN50/>.

As always, DPF members are invited to visit the EOS web page at <http://www.aps.org/units/dpf/education/> to find resources for starting or supplementing their own outreach efforts. The EOS welcomes suggestions of additional links for our site or talks to include in our database (dpfeando@fnal.gov).

Government Affairs Subcommittee

Contributed by George Gollin

The Government Affairs subcommittee has been formed with the following members: George Gollin (Chair), Jon Bagger, Daniela Bortoletto, Sally Dawson, Chris Potter, Mike Tuts, Herman White, John Womersley, and Mike Zeller. The subcommittee met in July to discuss how it might better establish working relationships with the staffs of congressional offices. The committee felt that it has tended to focus too narrowly, with too short a time horizon, and that broader issues (support for basic science, the importance of long term planning, etc.) should be considered. It will meet again in September to discuss possible tactics and strategies.

Visa Issues

Contributed by Amy Flatten

As you may have read on the front page of the July issue of APS News, the APS had joined more than 20 other science, higher education and engineering organizations in developing a joint statement urging the Federal government to adopt six practical recommendations for improving the current visa processing crisis by removing unnecessary barriers to multi-national collaborations. (The statement was released on May 12, 2004, with the full text available at: http://www.aps.org/statements/03_1.cfm.) Taken together, the group represented 95% of the U.S. research community. It was the first time that U.S. science and academic leaders have endorsed a comprehensive plan to address the visa-processing quagmire in the wake of heightened security concerns following the 9/11 terrorist attacks.

The statement received much attention, including front page coverage by the Financial Times, and articles in the Wall Street Journal, New York Times, and Science Magazine. Four months have now passed since the scientific and educational communities spoke with a common voice on their collective concerns, and the Departments of State and Homeland Security have reportedly taken action on a number of the statement's recommendations.

In response to her signing of the joint statement, APS President Helen Quinn recently received a letter dated September 7, from Maura Harty, Assistant Secretary of State for Consular Affairs. Ms. Harty indicated that new, streamlined visa procedures arranged with the Department of Homeland Security and other Federal agencies have now reduced visa processing time. In her letter, Ms. Harty asserts that "as of September 2, 98% of all Visas Mantis cases are being cleared in less than 30 days. More than 2000 on-going cases were just cleared." She also states, "striving to enhance the transparency and predictability of the visa application process, we have recently begun posting visa appointment wait times on the Internet at: <http://www.travel.state.gov>."

According to informal reports from State and DHS officials, additional steps are also being taken to extend the duration of the Visa Mantis security clearance, although the

timing of this change also remains unclear.

While the State Department's response indicates some positive changes, many scientists remain skeptical about the reported improvements. As Helen Quinn stated in a response to Assistant Secretary Harty, "a considerable number of our colleagues have had, or know others who have had, bad experiences with visa applications and it will take some time period of better results before many have faith that the system is working well."

While the signatories of the joint statement are pleased that the Federal government appears to have responded to at least some of their collective concerns, a press release or other announcement from the scientific community should soon be forthcoming that will provide a detailed "report card" on the progress made toward each of the statement's recommendations. The APS, through its Office of International Affairs will continue partnering with the scientific and educational societies toward additional visa improvements. In the mean time there are a few things one can do to eliminate potential difficulties:

1. Despite reported improvements, continue to encourage all visa applicants to apply at least 3-4 months ahead of time.
2. Most importantly, *immediately* after applying for a visa, all applicants should register their visa information with National Academy of Sciences (NAS) visa website <http://www.nationalacademies.org/visas/>. Here, one should fill out the "Visa Questionnaire" (4th link down in the list on the right hand side of the page.)

At first glance, the NAS questionnaire merely appears to gather information statistical purposes, but it is actually much more. Once the questionnaire is completed, NAS staff review the information each week *to identify visa applications that still pending 30 days past the initial application date*. This is quite helpful, as once each week *every* case that has been pending over 30 days, is now reported by the NAS to the State Department.

If the case is not resolved the following week, the NAS *continues* to report it again each week until the case is resolved one way or another. The State Department also communicates each week to the NAS regarding which cases they have resolved.

This system helps make sure that the State Department is aware of those cases that have been significantly delayed, and also helps to make sure they don't "fall through the cracks." While this process doesn't guarantee U.S. Government action, it guarantees visibility to pending applications.

Quantum Universe Report

Contributed by Persis Drell

In October 2003, Ray Orbach, Director of the Department of Energy's Office of Science, and Michael Turner of the National Science Foundation asked the U.S. High Energy Physics Advisory Panel for a report to "illuminate the issues, and provide the funding and

science policy agencies with a clear picture of the connected, complementary experimental approaches to the truly exciting scientific questions of this century.” HEPAP appointed a committee with particle physicists, nuclear physicists, astrophysicists and the communications directors of Fermilab and SLAC (*). The report, Quantum Universe, can be found at <http://www.interactions.org/cms/?pid=1012346>.

Quantum Universe addresses the convergence of astrophysics discoveries, theory developments such as string theory and supersymmetry, and the achievements of the Standard Model. The report describes the worldwide program of particle physics that is underway to explore a revolutionary scientific landscape—in a way that is approachable and engaging to an audience with little background in particle physics.

The committee’s path from charge to final product felt at times like a random walk as we worked through 24 drafts of the text. We developed three themes. (1) Understanding the nature of the “new universe” requires particle physics—whence our title (2) We need observatories on the ground, underground and in the sky to provide the parameters of the universe and accelerator experiments to search for their quantum explanations. (3) The two ends must meet – what we learn by observing the relics of the big bang and what we learn by recreating the particles and forces of the early universe at accelerators must yield the same answers.

We developed nine interrelated questions to articulate the revolutionary nature of 21st century particle physics. The report’s chapters discuss the questions in successively greater depth. The third chapter maps experimental tools onto the nine questions.

There were many challenges! We wanted to make the questions inclusive, we wanted a balance between traditional particle physics and cosmology, we wanted to be accurate. At the same time, we concentrated on making the questions exciting and understandable, and the arguments simple and clear. The greatest challenge came in mapping the experimental tools onto the scientific vision. The text mentions the major international experiments (including those operating, in construction and proposed) whose scientific goals relate directly to the nine questions. However, in response to our audience’s request for a graphic summary of the facilities and their primary scientific goals, we also developed a pair of tables that summarize facilities with major US participation—appropriate in a report that is commissioned by US agencies.

Quantum Universe has, so far, been very well received. Our funding and science policy agencies tell us that this document articulates an exciting vision that they can communicate effectively. They say that we have helped them understand the reasons for investments and how they relate to one another. In policy circles, this is often more important than understanding the science itself. While the report focuses on the US program, the scientific questions and the approaches of Quantum Universe are universal and we believe the report may be interesting to the international particle physics community.

Fermilab Director Search

Contributed by Ezra Heitowit

Earlier this year, Universities Research Association, Inc. (URA), the 90-member university consortium that operates Fermilab, formed a Fermilab Director Search Committee to conduct a full-field, open search for a successor to current Laboratory Director Mike Witherell, who announced that he will step down on June 30, 2005. The nineteen-member Search Committee is chaired by Neal Lane, Department of Physics and Astronomy, Rice University, and former NSF Director and Presidential Science Advisor. The Committee has representatives from the particle physics and astrophysics communities, and includes two international members. Six Fermilab scientists are on the Committee. (For a list of Committee members and the Committee charge, visit <http://www.fnal.gov/directorsearch>.)

The Committee has made use of a variety of channels to receive input on desired attributes for the next Fermilab Director, as well as for recommendations and nominations of candidates. The Committee has received communications at its public website, responses from APS division announcements, and applications from classified ads in the CERN Courier, Physics Today and Science. In addition, Prof. Lane sent letters to over 60 selected individuals in the international scientific community, and to the vice presidents for research at all 90 URA members universities, soliciting their input. Of course, Committee members have had numerous individual contacts with colleagues in the community. On April 15-16, the Committee met at Fermilab for discussions with 54 members of the Laboratory community, including the present and two past Directors. Prof. Lane briefed the community on the search at the Annual Fermilab Users Meeting on June 3, and then met separately with a group of graduate students and post-docs to get the views of younger physicists.

As a result of the input, the Committee developed an extensive list of potential candidates. At its last meeting on May 29-30, the Committee deliberated over this list to come up with a shorter, more selective list. The Committee is now seeking additional information on the qualifications of these candidates. The Committee plans on interviewing its top candidates this summer, and expects to submit its recommendations to URA's Fermilab Board of Overseers by no later than the end of September.

Linear Collider News

Contributed by Barry Barish

The high energy physics communities in Europe, Asia and the U.S. have all endorsed a TeV scale linear collider as the next major step for the field. Technical progress toward a linear collider has been truly remarkable over the past twenty years. The international R&D programs have developed two technologies capable of accessing this energy scale and have demonstrated solutions to all the major issues. The challenges were formidable and included creating high-gradient accelerating systems at a reasonable cost, controlling

nanometer scale beams, aligning components to high accuracy, and developing intense electron and positron sources with small beam emittances. It has been clear for several years that, although further engineering development is needed, a TeV-scale linear collider meeting the science goals can be built.

Two competing technologies (superconducting L band (“cold”) and room temperature Xband (“warm”) emerged as viable contenders for the main linac, and the choice between the two became a very difficult and contentious problem. As a result, the International Committee on Future Accelerators (ICFA) and its International Linear Collider Steering Committee (ILCSC) appointed the International Technology Review Panel (ITRP) consisting of twelve members to recommend which technology to use as the basis of the final design of the International Linear Collider.

Over the past six months, the ITRP panel carried out an intensive process of reviewing both technologies. The panel examined a broad set of criteria and found that some criteria yielding advantages for one technology and other’s the other technology. This made the choice a very difficult one, but a very detailed analysis over the whole spectrum of criteria led to a broad and consistent advantage for the cold technology. On that basis, the ITRP made a recommendation at the Beijing Conference that the final linear collider design be based on the superconducting rf technology. ICFA quickly endorsed this recommendation and the international community is now joining efforts to develop a new “cold” design.

The ITRP technology recommendation is just one step, but a crucial one, in a coordinated effort by the worldwide particle physics community to develop a unified plan for the next large particle accelerator, the International Linear Collider.

Should Have “Asked The Ethicist”

The case below is inspired by an actual incident:

“I’m a member of a large experiment, and was the person who wrote the paper describing a particular measurement that we made. It was published with the whole experiment’s author list. The experiment later published an updated analysis on a new dataset with increased statistics and a smaller error, which I did not draft, though I was a member of the author list for that paper too. To my surprise, though the scientific results were new, much of the explanatory text which I had originally written for the first paper also appeared in the second paper, without any reference or acknowledgment. Is this normal or acceptable?”

The short answer is no. The situation is understandable enough: it was natural and efficient to include the old material and concentrate on writing up what was new, and what had changed. But in doing so, the collaboration unwittingly plagiarized itself. What they failed to do, and why this constitutes plagiarism, was to fail to quote or reference their own previous work, even though they repeated it extensively.

So what? Well, collaborations large and small have time-dependent author lists, and so the author of the quoted text might not be on the current author list. Even in the case above, the basic courtesies of requesting permission to use the text and granting proper acknowledgment were not extended. More formally, the copyright agreement for the new publication required that the article was new, original, and unpublished, which was of course not strictly true. As a result, unwittingly or not, this example violated the guidelines of the American Physical Society, in its section on Ethics and Values, which states, “Plagiarism constitutes unethical scientific behavior and is never acceptable.”

Marty Blume, Editor-In-Chief for the APS Publications, is adamant that the APS journals be plagiarism free. Plagiarism, Blume informs, occurs whenever a “substantial” amount of material is copied from an unacknowledged source. Blume emphasizes that it won’t hurt you to avoid plagiarism. Just acknowledge you are quoting your own previous work, as you would with any other reference. Then plagiarism is not an issue.

Similar issues arise within large collaborations because results are freely shared. To define standards for when to quote, when to acknowledge, when to mention, is not always simple. Collaboration members routinely use each other’s work, give talks and write proceedings containing results obtained by other collaborators – this is what collaborations are for. It is however important to ensure that colleagues treat each other, and especially their junior colleagues, with respect. A good rule to apply is “would the person who produced this plot or result be surprised or offended to see it here?” If there is any doubt, ask permission from the originator of the material, or seek advice from the collaboration spokesperson(s).

Acknowledge your collaborators. Don’t plagiarize yourself. Pass it on.

DPF Committees

We thank the following members of our community who generously gave and continue to give their time to serve on DPF committees this year:

Nominating Committee

David B. Kaplan (Chair), A.J.S. Smith (Vice-Chair), John Conway, Tony Liss, Donna Naples, Mary Hall Reno

Fellowship Committee

Jonathan Bagger (Chair), William Carithers, Sally Dawson, John Jaros, Joe Lykken

W. K. H. Panofsky Prize Committee

Howard Gordon (Chair), Ian Shipsey (Vice-Chair), Jim Brau, Harrison Prosper, Bill Willis

J. J. Sakurai Prize Committee

Paul Langacker (Chair), Andreas Kronfeld (Vice Chair), George Sterman, Lance Dixon,

Steve Sharpe

Robert R. Wilson Prize Committee

Peter Limon (Chair), Donald Hartill (Vice-Chair), William Barletta, Helen Thom
Edwards, Tor Raubenheimer,

Tanaka Dissertation Award Committee

Richard Partridge (Chair), John Hobbs (Vice-Chair), Ken Heller, Usha Mallik, Vivek
Sharma