

DPF Newsletter - November 2001

In This Issue...

Meetings

Snowmass

High-Energy Outreach at
Snowmass 2001

News from HEPAP

New NSF Center for
Cosmological Physics

New Virtual Journal
Launched

Prizes and Fellowship

The DPF newsletter is published roughly three times a year. Contributions are welcome. Send them to the Editor.

Editor:

Nicholas Hadley
(DPF Secretary-Treasurer),
Physics Dept.,
The University of Maryland,
College Park, MD 20742,
(301) 405-6063,
fax (301) 699-9195,
hadley@umdhep.umd.edu.

September 11, 2001

The Executive Committee of the Division of Particles and Fields would like to extend our condolences to all those who lost family and friends in the terrible events of September 11. We would also like to thank our many colleagues from around the world for their expressions of sympathy and support in these difficult times.

DPF and APS Election News

Sally Dawson was elected Vice-Chair of DPF in this year's election. The new Executive Committee members are Howard Haber and Elizabeth Simmons.

The members of the 2002 DPF Executive Committee and the final years of their terms are

Chair: Stan Wojcicki (2002).

Chair-Elect: Jonathan Bagger (2002).

Vice-Chair: Sally Dawson (2002).

Past Chair: Chris Quigg (2002).

Secretary-Treasurer: Nick Hadley (2003).

Division Councilors: Sally Dawson (2002),
Peter Meyers(2003).

Executive Committee Members:, Bill Carithers (2002), Janet Conrad (2002), Marty Breidenbach (2003), Young-Kee Kim (2003), Howard Haber (2004), Elizabeth Simmons (2004).

We would like to take this opportunity to thank DPF Executive Committee members whose terms are expiring in 2001: Gene Beier (Past Chair), and Vernon Barger and Glennys Farrar (Executive Committee members). We would also like express our appreciation to all who agreed to run for DPF office this year. We were fortunate to have an excellent slate of candidates.

Congratulations to Helen Quinn who was elected APS vice-president.

Meetings

The 2002 American Physical Society (APS) April meeting will take place in Albuquerque, New Mexico, April 20-23, 2002. This year, in addition to the traditional participation by the Division of Astrophysics, Division of Nuclear Physics, Division of Particles and Fields, Division of Physics of Beams, and a number of APS forums and topical groups, we are meeting jointly with the High Energy Astrophysics Division of the American Astronomical Society. You can find general information about the meeting at <http://www.aps.org/meet/APR02/>.

There will be an excellent slate of plenary talks:

- Experimental high-energy-density physics (Bruce Remington, LLNL)
- Theories of the cosmological constant (Raman Sundrum, Johns Hopkins)
- First results from RHIC (Bill Zajc, Columbia)
- Medium-size black holes (M. Coleman Miller, Maryland)
- High-resolution x-ray studies of globular clusters (Adrienne Cool, San Francisco State)
- Universal scaling laws in biology (Geoffrey West, Los Alamos)
- Solving the Solar Neutrino Problem (John Wilkerson, University of Washington)
- The Sloan Digital Sky Survey (Josh Frieman, Fermilab)
- CP Violation: the New Landscape (Helen Quinn, SLAC).

DPF 2002 will be held on the campus of the College of William and Mary in Williamsburg, Virginia, May 24-28, 2002. Details appear on the conference web site, <http://www.dpf2002.org>. It will be a beautiful time of year at Williamsburg, and this conference also features an outstanding set of plenary talks.

String Theory	Ashoke Sen (Allahabad)
Electroweak Physics (W,Z,H,top)	Chris Tully (Princeton)
Lattice QCD	Junko Shigemitsu (Ohio State)
Hot/Dense Matter, Heavy Ion	Krishna Rajagopal (MIT)
Astrophysics (CMBR, galaxy form., DM)	Max Tegmark (Penn)
Cosmology (inflation, dark energy)	Andy Albrecht (Davis)
Non-terrestrial Neutrino Physics	John Beacom (FNAL)
Terrestrial Neutrino Physics	Bonnie Fleming (Columbia)
Beyond the Standard Model	
New Ideas in Theory	Hitoshi Murayama (Berkeley)
Phenomenology	JoAnne Hewett (SLAC)
Experiment	David Stuart (Fnl)
Heavy Quark Physics	
B decays, lifetimes, mixing, CP	Patricia Burchat (Stanford)

Charm physics, CKM, radiative B	Marina Artuso (Syracuse)
QCD	Werner Vogelsang (BNL)
New Detectors	Dan Green (FNAL)
Summary	Joe Lykken (FNAL)

There will be a large number of parallel sessions at both meetings and the organizers are strongly encouraging contributed abstracts and talks. Both the April meeting and the DPF meeting provide a unique opportunity for younger physicists to present their works.

In 2003, the DPF will hold its divisional meeting in Philadelphia, in conjunction with the APS April Meeting, April 5 - 8, 2003. We have agreed to join the DPF Meeting to the APS April Meeting in odd-numbered years, to enhance communication with DAP and DNP.

In 2004, the APS April meeting will be in Denver, May 1-4.

Snowmass

Contributed by Chris Quigg

Twelve hundred physicists gathered for three weeks in July in the Colorado Rockies to consider the future of particle physics in the United States and indeed the entire world. The summer study, held in the traditional location of Snowmass Village (altitude 2600 meters) was organized by the Division of Particles and Fields and the Division of Physics of Beams of the American Physical Society, under the leadership of Alex Chao (SLAC), Ron Davidson (Princeton), and Chris Quigg (Fermilab). The participants were a thoroughly cosmopolitan group, representing particle physics in all its diversity: more than 200 came from outside the U.S., a similar number described themselves (no questions asked) as "young," and more than eighty were graduate students.

The overall goal of Snowmass 2001 was to survey our aspirations for particle physics over thirty years, and to articulate a comprehensive vision of particle physics (and the sciences it touches), to make our case effectively to ourselves, to other scientists, and to society at large. The main work of the summer study was carried out by twenty-seven working groups organized around physics issues, experimental approaches, accelerator concepts, and technologies.

The experimental working groups included the extra-added attraction of "High-Minded Outsiders," senior scientists who served as friendly skeptics. The HMOs probed and strengthened arguments and, by the example of their time and effort, help lead many others to see Snowmass as a forum for engaging in the ideas and aspirations of others.

Building-and manifesting-community was an important goal of the summer study, and Snowmass 2001 enjoyed an unprecedented level of institutional solidarity. The workshop received generous support from the U.S. Department of Energy, the National Science Foundation, and NASA; from ten U.S. labs engaged in particle physics; and from private

donors. To supplement the activity of the working groups, the IEEE Nuclear and Plasma Sciences Society sponsored an outstanding series of noontime lectures and short courses that featured technology leaders from the particle physics community and beyond. Other special events included half-day "teach-ins" on opportunities in accelerator research and development and on the new world of astro/cosmo/particle physics, and communications workshops that brought together science writers, Washington communicators, and physicists. The HEPAP subpanel on long-range planning, led by Jonathan Bagger and Barry Barish, participated actively in the work of Snowmass 2001, and used the workshop as an opportunity to solicit and receive input of many kinds from the community. The NAS/NRC Committee on Physics of the Universe, led by Mike Turner, also met at Snowmass, as did the High Energy Physics Advisory Panel.

We profited from the contributions-formal and informal-of international laboratory directors Alessandro Bettini (Gran Sasso), Luciano Maiani (CERN), Alexander Skrinsky (BINP), Hirotaka Sugawara(KEK), and Albrecht Wagner (DESY), as well as the spirited participation of the leaders of U.S. laboratories, Jonathan Dorfan (SLAC), Tom Kirk (BNL), Maury Tigner (Cornell), and Mike Witherell (Fermilab). Ian Corbett brought important insights into the work of the Global Science Forum, while Ferdi Willeke reported on the work of the ICFA Committees exploring the idea of a Global Accelerator Network. Lorenzo Fo and Satoru Yamashita presented conclusions of the European and Japanese planning exercises.

Young physicists plunged into the activities of the working groups and also created a vigorous program of their own, which culminated in a Young Physicists Forum attended by many Snowmass participants of all ages. A Young Particle Physicists organization is taking shape. For the latest word, see the web site at: <http://ypp.hep.net>; results of the survey carried out by the young physicists can be found at http://ypp.hep.net/ypp_survey.cfm.

Snowmass 2001 was notable for its diverse and energetic program of outreach and public education, coordinated by Elizabeth Simmons (Boston University). Hundreds of the Snowmass participants took part, and reached a wide and enthusiastic audience of all ages. Highlights included children's science activities in daycamps, a science book fair at Explore Booksellers, La Noche de la Ciencia in Carbondale, Quarknet teacher training, and public lectures by Natalie Roe on "What's the Matter with Antimatter," under the auspices of the Aspen Center for Physics, and Lawrence Krauss, "An Atom from Snowmass." A generous donation enabled students and teachers from the Roaring Fork Valley and Illinois to construct and commission SALTA, the Snowmass Area Large-Scale Time-Coincidence Array, under the guidance of Greg Snow (Nebraska) and Jeff Wilkes (Washington). SALTA will join a projected North American array to search for extensive air showers on an unprecedented scale. Science Weekend on the Snowmass Mall, July 7 and 8, drew many visitors to a multifaceted celebration of science.

Wonderful things happened at Snowmass 2001. We rediscovered our community and our sense of common destiny. We celebrated the astonishing progress and remarkable promise of particle physics, broadly understood. No one should miss the conclusion that

ours is a community on the move, worldwide. We took pleasure in the inventiveness and careful thought of our colleagues who dream, design, and build accelerators and the components that make them possible. We mixed: we engaged with each other's aspirations and significantly advanced a number of ideas. All the major future accelerator projects emerged from Snowmass stronger than before. We received excellent coverage in the scientific and popular press. A number of excellent reporters and science writers spent time at Snowmass. They saw a vibrant community in action and met many of our interesting colleagues.

At Snowmass 2001, a widespread feeling emerged that the world community should move urgently to construct a TeV-scale linear collider as an international project. Much work—indeed, a phase change in the intensity of activity on both machine and experimental program—will be needed to make a linear collider a reality in the near term. Many other promising ideas, large-scale and small, were explored at Snowmass. We need to continue the conversation about the degree of scientific diversity, including scale diversity, that we need to build a healthy and productive future for particle physics.

The main products of Snowmass 2001 will, as always, be the individual contributions and the working group summaries to appear in the Proceedings. This year, we undertook two special projects as well. The Division of Particles and Fields has produced a twenty-page illustrated survey of the grand themes and aspirations of particle physics, called "Quarks Unbound," which will soon appear in the mailboxes of all DPF members. "Quarks Unbound" was written by science writer Sharon Butler, based on her interviews and discussions with many members of the community. We owe a special debt of gratitude to two members of the Snowmass Organizing Committee, Joe Lykken (Fermilab) and Maria Spiropulu (Chicago), for their dedication to the project. We will be using "Quarks Unbound" widely to communicate the excitement and promise of particle physics. The Division of Physics of Beams has used the work at Snowmass to create a cogent blueprint for future accelerator research and development (see <http://www.hep.anl.gov/pvs/dpb/Snowmass.pdf>). All this is only the beginning; we planted many seeds at Snowmass 2001, and we will be harvesting their fruits for many years.

Snowmass 2001 could not have happened without remarkable support from the major laboratories. We particularly appreciate Fermilab's contributions to the work of the local organizing committee led by Jeff Appel, and SLAC's support through Norman Graf and colleagues for the Proceedings. Our greatest thanks go to the participants, whose passion, energy, creativity, and commitment truly did begin to change the world.

High-Energy Outreach at Snowmass 2001

Contributed by Elizabeth Simmons

In July 2001, scores of physicists participated in an energetic and diverse program of outreach and public education while attending the Snowmass 2001 Summer Study on the Future of Particle Physics. Over the three week span of the conference, a variety of

activities were arranged for K-12 teachers, K-12 students, physicists, the local Latino community, and the general public. The centerpiece was an ambitious Science Weekend that reached over 1400 people and featured hands-on science exhibits on the Snowmass Mall, public lectures, planetarium shows, physics theatre, and an on-line "virtual science fair".

A key strength of this effort was the breadth of support it enjoyed. The roughly 100 volunteers who made the program possible came from all parts of the high-energy physics community: universities, national labs, funding agencies, K-12 schools, and science museums. Funding, likewise, came from diverse sources. Details, along with a photo-essay on the proceedings are on the web-site of E.H. Simmons, the Chair of the Snowmass 2001 Outreach Committee, at <http://smyrd.bu.edu/hepap-talk/> (HEPAP presentation of July 13, 2001) and <http://smyrd.bu.edu/rpm-lbl/> (talk given at LBL on Sept. 11, 2001).

News from HEPAP

An NSF/DOE HEPAP subpanel on long range planning has been formed "to review the central scientific issues that define the intellectual frontier of particle physics research and, based on that review, to develop a long range plan for the U.S. High Energy Physics program." The subpanel, chaired by Barry Barish and Jon Bagger, has now submitted a draft report.

The chairs of the subpanel have asked that the following letter be sent to the DPF community.

Dear Colleague --

The draft report of the HEPAP Subpanel on Long Range Planning was presented to HEPAP on October 29. The draft is available from the subpanel's web site, http://doe-hep.hep.net/lrp_panel/index.cfm. The final version is due in January.

The report is the result of a long process, which included a series of Town Meetings at Brookhaven, Fermilab and SLAC; extensive interactions with the community at Snowmass; and consideration of many thoughtful letters received from the community. The key points and recommendations are summarized below:

The subpanel reaffirmed the science and future prospects for particle physics, and advocated that the U.S. maintain a leadership position in our field. It highlighted the global nature of our science, and emphasized our increasing connections to neighboring disciplines. The subpanel acknowledged the role we play in furthering the health, welfare and security of our nation. It also acknowledged the importance of education and outreach, and proposed doubling our effort in that area.

The subpanel presented a twenty year roadmap for our field, with a primary physics goal of exploring matter, energy, space and time. The subpanel outlined

our immediate objectives and described a diverse set of approaches to reach them. The subpanel acknowledged that all cannot be done; it proposed a continuing mechanism to set priorities and ensure the health of the field. The roadmap and the prioritization process were designed to allow the field to adjust its priorities in light of scientific advances made over the next twenty years.

The subpanel determined that a linear collider is the next major goal of the field, and central to our science goals. The subpanel gave its highest recommendation to participation in such a machine, wherever it is built in the world. There is now a worldwide consensus on this priority.

The subpanel advocated that the U.S. should prepare to bid to host the linear collider.

Finally, the subpanel emphasized the importance of accelerator R&D to the long term future of the field.

The subpanel is preparing the draft for final submission to HEPAP in October. The subpanel invites comments. Please send them to panel@pha.jhu.edu.

Sincerely,

Jonathan Bagger
Barry Barish
Subpanel Co-chairs

New NSF Center for Cosmological Physics

Submitted by Bruce Winstein, Director, CfCP

The National Science Foundation has recently established a new national research center that will probe cosmological phenomena still unexplained by the known laws of physics. The duration is initially for 5 years. The center will be housed in the University of Chicago's Laboratory for Astrophysics and Space Research building. The new center is among a small number of the NSF's inaugural Physics Frontier Centers, which are designed to pursue major advances at the intellectual frontiers of physics by providing resources not usually available to individual scientists or to small groups. The frontier that we're poised to explore is perhaps the ultimate frontier because it involves the laws governing the entire universe.

As Particle physicists, we seek evidence for phenomena beyond the standard model. In cosmology we do have clear signs of such new phenomena. These are addressable by experiment and, due to rapid changes in technology, they can be probed ever more incisively. Some of our 11 charter faculty are members of the DPF; these include Sean Carroll, Mike Turner, Ed Blucher, Simon Swordy, Angela Olinto and Jim Cronin while others are better known in Astrophysical circles: John Carlstrom, Josh Frieman, Wayne Hu, and Stephan Meyer. This mixture, which includes experiment and theory, emphasizes the interdisciplinary nature of our center.

In addition to the faculty, the Center will be able to support 10 postdoctoral fellows who are free to work on any of the projects of the Center. Our intention is to train young researchers in this interdisciplinary environment. The Center also has an extensive program for visitors (both short and long term). We will hold roughly 2 symposia per year on topics of current interest in Cosmological Physics and again these will cater to a diverse audience. We also have a program where high energy physicists can spend some time in the center to see if this is a research direction they want to explore. Collaborations with colleagues at Princeton University, the University of California, Berkeley, and elsewhere are already in place and additional affiliations will be developed with other institutions. An extensive outreach program at the new center includes public lectures and symposia at the Adler Planetarium, an annual retreat for undergraduate women who major in science, and an Inner City K-12 Enrichment Program.

The initial slate of problems involve three distinct but related areas:

1. Exploring the nature of the Dark Energy.
2. Looking for phenomena that can address whether the universe rapidly inflated in its earliest moments.
3. Understanding the possible fundamental physics in the origin of the highest energy particles from space

In addition to a strong theoretical component, each of these areas involves two projects. These include studies of galaxy clusters and their redshift dependence as a means of getting at Dark Energy; measuring the anisotropy in the polarization of the cosmic microwave radiation, and in the infrared background; and participation in the Auger and VERITAS projects.

More Information on the Center for Cosmological Physics can be found at <http://CfCP.uchicago.edu/>

New Virtual Journal Launched

The American Physical Society and the American Institute of Physics have launched a new Virtual Journal of Applications of Superconductivity (<http://www.vjsuper.org>) that contains many articles of interest to members of the DPF community.

Prizes and Fellowship

Information about 2002 DPF Prize winners will appear in the February Newsletter.

Please consider making a nomination for APS Fellowship for DPF members. See <http://www.aps.org/fellowship/> for details on how to make a fellowship nomination. The application deadline is April 2, 2002.