Division of Physics of Beams Newsletter

A Division of the American Physical Society
Edited by Eric R. Colby, Member-at-Large

March 2005

Election Results for 2005 DPB Executive Committee

The election for the 2005 DPB Executive Committee was carried out according to the DPB Bylaws, Article VII, Section 3. The election was announced to the membership by e-mail and by regular mail for those members not having a valid e-mail address. The election was completed on November 4, 2004.

Most of the ballots were electronic. There were 267 cast on-line, and 11 by paper ballot. The fraction of voters was 278 out of 1165 or 24% of our membership, about the same as the previous year.

The newly-elected members of the Executive Committee are: Joseph Bisognano as Vice-Chair, and Linda Spentzouris and Jonathan Wurtele as Members-at-Large for a three-year term. The newly elected Secretary-Treasurer, also appointed for a three-year term, is Ernest Malamud.

The membership of the 2005–2006 DPB Executive Committee is thus:

Chair: Gerald Dugan (4/06)
Chair-Elect: Thomas Roser (4/06)
Vice-Chair: Joseph Bisognano (4/06)
Past Chair: Nan Phinney (4/06)
Divisional Councilor: Steve Holmes (1/06)
Secretary-Treasurer: Ernest Malamud (4/08)

Members-at-Large:
Don Hartill (4/06)
Marion White (4/06)
Eric Colby (5/07)
Frank Zimmermann (5/07)
Linda Spentzouris (4/08)
Jonathan Wurtele (4/08)

Non-Voting Members:
Linda Spentzouris, Chair, Education & Outreach Committee (12/07)
Waldo MacKay, Chair, Publications Committee (12/06)
Donald Hartill, Chair, Wilson Prize Committee (12/05)
David Rubin, Chair, Ph.D. Award Committee (12/05)
Norbert Holtkamp, PAC2005 Chair (12/05)
Swapan Chattopadhyay, PAC2005 Program Chair (12/05)
Ilan Ben-Zvi, NPSS/IEEE Representative (1/08)

Terms of office for the voting members of the Executive Committee begin after the Business Meeting in the year following election and end at the corresponding time in the year indicated. The Divisional Councilor is the sole exception and serves for four years beginning in January of the year following election.

Members of the various DPB standing committees (Nominating, Fellowship, Publications, Education and Outreach, Wilson Prize, Doctoral Research Award) are listed on the DBP website, see http://www.aps.org/units/dpb/committees/index.cfm. Terms of office begin in January of the year following appointment.

Congratulations to all of the newly-elected members of the Executive Committee and thanks to all of the candidates for their willingness to participate in the election process for our Division. Thanks as well to all of the DPB members who exercised their right to vote in the election.

In This Issue

In this edition of the Newsletter we include:

DPB Members Appointed as APS Fellows

At the APS Council Meeting of November, 2004, the following list of 2005 DPB Fellows was approved:

David A. Rice (Cornell)
"For his key role in conception and implementation of pioneering accelerator physics innovations in electron-positron colliders and storage rings."

Leonid Rivkin (PSI)
"For his scientific contribution and technical leadership role in the design and construction of accelerators for high energy physics and synchrotron light sources, and for furthering our understanding of beam instabilities."

Michael James Syphers (Fermilab)
"For his contributions to non-linear beam dynamics and beam optics design, and to education in accelerator physics."

Jonathan Syrkin Wurtele (University of California–Berkeley)
"For his many theoretical contributions to free electron lasers, laser-plasma acceleration, laser-plasma interactions, and muon beam manipulations."

Victor A. Yarba (Fermilab)
"For his technical leadership of frontier accelerator projects in Russia and the US and for fostering international collaborations."

Li-Hua Yu (BNL)
For creative contributions to the theory of self-amplified spontaneous emissions and high-gain harmonic-generation, and the experimental demonstration of the high-gain harmonic-generation free-electron laser.

Frank Zimmermann (CERN)
"For many theoretical and experimental contributions to accelerator physics including the study of beam-ion and beam-electron cloud interactions, collective instabilities, non-linear optics, and beam measurements."

These Fellows will receive their citations and pins at the Award Session held during the 2005 Particle Accelerator Conference in Knoxville.

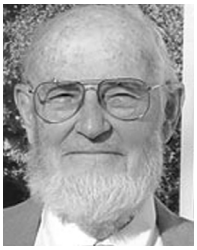
We congratulate all of these worthy candidates for the recognition bestowed upon them by the APS.

Nominations for APS Fellowship should be sent by March 15th, 2005 to the APS, Attention: Fellowship Program, with a copy to the Fellowship committee chair, Joseph Bisognano (jbisognano@mail.src.wisc.edu). Guidelines for nominating may be found at http://www.aps.org/praw/nomguide.cfm.

Wilson Prize

The DPB and DPF jointly sponsor the Robert R. Wilson Prize to recognize and encourage outstanding achievement in the physics of particle accelerators.

2005 Winner



Keith R. Symon

In 2005, the $5000 prize was awarded to **Keith R. Symon** of University of Wisconsin-Madison, *"For fundamental contributions to accelerator science including the FFAG concept and the invention of the RF phase manipulation technique that was essential to the success of the ISR and all subsequent hadron colliders."*

We congratulate this outstanding beam physicist for this well-deserved honor.

Nominations for the 2006 Wilson prize should be sent to the Wilson Prize selection committee chair, Don Hartill (d1h@Ins62.1ns.cornell.edu) by July 1, 2005. Guidelines for nominating may be found at http://www.aps.org/praw/nomguide.cfm.

Outstanding Doctoral Research Prize in Beam Physics

This award is sponsored by the DPB, in conjunction with Universities Research Association, Southeastern Universities Research Association, and Brookhaven Science Associates.

The 2005 winner is **Eduard Pozdeyev** of Michigan State University, who was cited *"For pioneering research on space charge effects of beams in the isochronous regime, including simulations and experimental verification following the design and construction of the Small Isochronous Ring"*. His thesis advisor was Professor Felix Marti at Michigan State University and his thesis is entitled "CYCO and SIR: New Tools for Numerical and Experimental Studies of Space Charge Effects in the Isochronous Regime."

Congratulations to this young physicist for this community honor.

Nominations for the 2006 Outstanding Thesis prize should be sent to David Rubin (dlh@lns62.lns.cornell.edu) by September 15, 2005. Guidelines for nominating may be found at http://www.aps.org/praw/nomguide.cfm.

Business Meetings

As required by our Bylaws, the DPB holds an annual business meeting. In 2004, the meeting was held at the 2004 April APS Meeting, on May 3, 2004. The next annual Business Meeting will take place at PAC2005 in Knoxville, May 16-20, 2005. PAC2005 will be chaired by Norbert Holtkamp and the Program Committee is chaired by Swapan Chattopadhyay. The Meeting is organized jointly by SNS and TJNAF. The following PAC is being planned for Albuquerque in late June, 2007.

Proceedings of the Particle Accelerators Conference Available Online

Remember when attending a Particle Accelerator Conference meant that several months later a box would arrive containing the proceedings in 2-5 rather thick volumes? Starting with the US conference in 1995, electronic submission of papers meant that CDs began replacing these books. But it was easy to lose the CDs, and the distribution of our collective wisdom was limited to those who attended the conferences. In 1996 Ilan Ben-Zvi proposed a solution to this problem, and his idea has blossomed into the Joint Accelerator Conferences Website at www.jacow.org. Housed on two servers in Europe and Asia (the American server was found to be unnecessary due to the copious bandwidth between Europe and America), the contents of these CDs from America, Asia and Europe along with specific conferences such as Linac, Cyclotrons, DIPAC and ICALEPCS can all be found on this common website. Free access, coupled with a comprehensive search engine, has made this website a premier research tool for accelerator scientists.

Based on seed contributions from PAC2001 and the US Department of Energy, an electronic archiving project aimed at scanning and electronically posting all past US PAC proceedings was initiated in 2002. Additional financial support was given to the project by PAC2003, IEEE NPSS, and the APS DPB. Remarkably, these electronically archived paper documents are full text searchable due to the magic of optical character recognition and Adobe software that maps the text onto the scanned image in the form of PDF documents indistinguishable from their later electronically generated sisters. As of the start of 2005, all past US conferences back to the first in 1965 have been scanned, and most are posted on the JACoW website. Work has already begun on electronically archiving all past European accelerator conferences, with completion expected sometime in the summer of 2005. Other conferences such as Linac, Cyclotrons, and Applied Superconductivity are also investigating electronic archiving.

Physical Review Special Topics Accelerators and Beams

Physical Review Special Topics – Accelerators and Beams (PRST-AB) publishes manuscripts that either present new results in the science and technology of accelerators and beams or review active areas of accelerator and particle beam research. It is available without charge to readers or authors at http://prst-ab.aps.org/ thanks to the generous support of our sponsoring laboratories in the US and Canada. The APS Division of Physics of Beams and the EPS Accelerators Group are the Affiliated Professional Societies that share the responsibility for the health and vitality of the journal by providing advice and encouraging scholarly publication in accelerator science and technology.

The seventh PRST-AB volume closed at the end of 2004. It was marked by increased submissions and publications and by a new feature, a choice of format for reading. The submissions and publications represent a 10% growth over last year, and the acceptance rate has been roughly the same since PRST-AB's inception. 2004 was the second year we have published reviews, and this year there were four of them covering beam physics and accelerator technology.

PRST-AB offers APS the opportunity to develop new features before they are incorporated into their larger journals. The development this year was the introduction of a one-column format in addition to the traditional two-column format. The former is well suited for reading manuscripts on a computer screen. Give it a try!

We are pleased to serve the accelerator community worldwide. We greatly appreciate your manuscript submissions and your help with refereeing.

Divisional Councilor's Report

Steve Holmes has ably served as our APS Divisional Councilor for the past two years. Below he reports on the highlights of recent meetings of the APS Council meeting held in Seattle, WA, on November 21, 2004.

APS Neutrino Study

The APS Neutrino Study, "The Neutrino Matrix," has been released and is available at http://www.aps.org/neutrino/. This study was undertaken jointly by the Division of Particles and Fields, the Division of Physics of Beams, the Division of Nuclear Physics, and the Division of Astrophysics. The intended audiences include the public, the government, and the scientific community. An associated brochure is in production (partially funded by DPB). The major recommendations of the study include:

- Neutrinoless double-beta decay experiments
- Precision measurements of the neutrino mixing matrix, including CP violation
- Measurement of the low-energy solar neutrino spectrum

International Affairs Report

Amy Flatten reported. The issue getting all the attention here has been visas. The APS has been very active and was among the 25 signatories to a statement issued in May 2005 calling for reforms to the system. This statement got a lot of attention, including front-page coverage in the *New York Times*. The State Department has responded with significant improvements in streamlining the system over the summer, and the results are impressive:

The Visa mantis backlog has been reduced from ~2200 a year ago to ~150 today. Roughly 90% of Visa mantis requests now clear within 30 days, and 98% within 45 days. The average clearance time is now 22 days (compared with 76 days a year ago).

This represents tremendous progress, which we need to publicize to our international colleagues. Reality is probably better than the perception at this point in time. The APS still makes the following recommendations for visa applicants:

1. Apply 3-4 months ahead of time.
2. Immediately after applying, register your visa application on the National Academy of Sciences visa website (www.nationalacademies.org/visas/).

The NAS interacts every 30 days with the State Department on any application that is still pending. They have been very effective in keeping things from languishing.

Current Status and Next Steps Toward the International Linear Collider

Roy Rubinstein (Fermilab)
Secretary, International Committee for Future Accelerators (ICFA)

A Brief History to 2002

Over the past decade there has been increasing activity in the particle physics community towards the goal of constructing a linear collider of several hundred GeV cm energy. In 1995, the International Linear Collider Technical Review Committee (chaired by Greg Loew) gave a first technical comparison of the several machines that had been proposed up to that time. Early in the 2000s, independent studies of the future of particle physics in the three regions of Asia, Europe and North America all came to the same conclusion, namely that the next large facility for particle physics after completion of the LHC should be a linear collider initially operating at ~500 GeV c.m., and upgradeable later to ~1000 GeV c.m. International bodies (such as the science ministers of OECD countries in 2004) have taken note of this consensus of the particle physics community. It has been realized for some time that due to its probable cost, a linear collider would have to be constructed and operated as a global project, which is unprecedented for a large accelerator.

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Division Membership Drive

DPB serves as the professional "home" for those who design, operate, and continually improve the accelerators on which scientific programs across many different fields are based. It provides many services to the accelerator community and its users, including the PRST-AB Journal devoted to all aspects of accelerator science, the biennial Particle Accelerator Conference, APS Prizes and Fellowships, and representation of the accelerator field in the broader APS society and society at large. DPB has also co-funded the scanning and web archiving of all PAC proceedings since 1965 (available at www.JACoW.org).

DPB membership over the last several years has steadily declined even as APS Membership has been on the rise. DPB needs to maintain a membership level of 3% of the APS membership in order to retain its status as a division. In rough terms this means having 150 people join DPB this year. Please take a moment and make sure your beam physics students and colleagues are members of both APS and DPB. Students and recent graduates may join APS at discounted rates (students join free for the first year).

For APS membership: http://www.aps.org/memb/joinaps.cfm
To add DPB as a unit: http://www.aps.org/memb/unitapp.cfm

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However, since rough estimates of a linear collider cost are all in excess of several billion dollars, governments have not, understandably, so far been rushing to approve such a project, although many governments around the world have supported some R&D and design activities. In order to provide some coordination to the effort, ICFA, as a body with representation from the international particle physics field, took up this task. In 2001 it requested that the International Linear Collider Technical Review Committee again assess the current technical status of proposed linear colliders. This committee reported (in 2003, see http://www.slac.stanford.edu/xorg/ilc-trc/2002/2002/report/03rep.htm) that there were no insurmountable obstacles to building a linear collider in the next few years based on either X-band, C-band or superconducting technology for the main linac. In 2002 ICFA set up the International Linear Collider Steering Committee (ILCSC), chaired by Maury Tigner, to lead the effort by the particle physics field towards a linear collider.

ILCSC Activities During the Past Two Years

The ILCSC set up a Parameters Subcommittee, which in 2003 produced a report (http://www.fnal.gov/directorate/icfa/LC_parameters.pdf) listing the performance goals (luminosity, etc.) for a linear collider, in order to have a common realistic set to which all involved groups could work. Following the 2003 report of the International Linear Collider Technical Review Committee, discussed above, ILCSC formed the International Technology Recommendation Panel (ITRP), chaired by Barry Barish, to make a recommendation on the rf technology for the ILC main linac. Several proposals of a decade earlier had coalesced into two, mainly differing in the main linac rf technology—either superconducting L-band or room temperature X-band (with room temperature C-band as a possible backup). A choice between these two was needed, since there currently are limited resources available for linear collider activities, and the international community was divided and not working towards a common project. As is now well known, on August 20, 2004, ICFA announced its approval of the ITRP recommendation of the superconducting technology (see http://www.fnal.gov/directorate/icfa/ITRP_Report_Final.pdf).

Following the technology choice announcement, the particle physics community has quickly united behind the superconducting option. The ILCSC suggested a workshop where all accelerator physicists who had been working on the linear collider, both superconducting and room temperature, could come together and start working towards a single design. This workshop (ILC1) was rapidly organized by KEK, and took place there on November 13-15, 2004. It was felt by participants and observers to have been very successful in uniting the field. Working groups were formed to study the following topics: overall design, main linac, injector, beam delivery, and high-gradient cavities. Considerable progress was made, although, as expected, many technical questions were raised which will need much work over the next several months.

Another important topic that the ILCSC has worked on over the past two years has been how the international effort to design and later build the ILC is to be organized. Particularly important is the period prior to significant government involvement and funding for the project; in that period any such organization will have to come from the particle physics community itself. An ILCSC Task Force, led by Satoshi Ozaki, produced a 2004 report (http://www.fnal.gov/directorate/icfa/04-03-31_GDI_TF_Report.pdf) which the ILCSC endorsed. A Global Design Effort (GDE) organization will be set up, to lead to a conceptual and later a construction-ready linear collider design. The two major stages (prior to significant government involvement; and subsequent to significant government involvement) have of necessity some organizational differences, but major aspects are expected to remain unchanged by this transition. A crucial piece of the GDE is the Central Team, which will be a small (10-20 persons) group, with a director, and with offices at an existing particle physics laboratory; the latter will provide the necessary infrastructure support for the Central Team. The Central Team will be the focal point for ILC project planning, holding the schedule, major milestones and parameter list; it will provide the intellectual leadership, and coordinate the R&D and design efforts of the institutions around the world which are working on the ILC.

Where Are We Now?

A second Linear Collider Workshop (ILC2) will be held at Snowmass (14-27 August 2005), which will allow review of the progress made in the nine months since ILC1 and will continue that work. Planning for ILC2 is under way; it will be concurrent with an ILC Physics and Detector Workshop held there, allowing considerable discussion of accelerator-detector interface issues. One goal of ILC2 will be to work towards a baseline design document, down to some pre-agreed WBS level. No cost estimate will be included, and it is realized that the document may need to describe alternatives to some accelerator subsystems where final design recommendations cannot yet be made. It is hoped that the baseline design document can lead to a Conceptual Design Report (CDR) by about the end of 2005, although details of precisely what will be in the CDR are still to be settled. Basically, it will define a facility which will achieve the performance specifications set out by the ILCSC Parameters Subcommittee. Eventually (~2009?) a Technical Design Report (TDR) will be produced, which will contain a detailed technical description of what will be built, and which will include a realistic cost and schedule for construction. Since producing a TDR requires significant resources in manpower and prior R&D, some support for the project by governments will be essential by then.

The ILCSC is currently working on several topics. The major one is to bring the GDE into operation so that there is some cohesion and oversight to worldwide ILC activities. Two items are particularly pressing: the choice of the director of the Central Team, and the choice of the Central Team location. The ILCSC has set up subcommittees to make recommendations on the director and on the location (there are nine offers to host the Central Team, following a 2004 solicitation of major institutions around the world). It is hoped that decisions can be made on these two items in February 2005.

Another important topic is a Memorandum of Understanding (MOU) between the institutions taking part in the GDE. The

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ILCSC has produced a draft version, which is still undergoing review. The GDE will come into effect when the MOU has been signed by a small core group of institutions, and other institutions can then join.

Note that not covered in this article is the very important topic of the ILC physics program. Information on the Worldwide Study of the Physics and Detectors for Future e^+/e^- Linear Colliders, which is the physics and detectors subcommittee of the ILCSC, is available at http://physics.uoregon.edu/~lc/wwstudy/.

Concluding Comments

There are many activities under way at present to bring the GDE into existence as a first step towards the International Linear Collider. Some are described above, but there are others, including meetings of government funding agency representatives from several countries to discuss this project. Much progress has been made recently in defining the project, and it is expected that this will continue through the coming year; these are necessary steps that, it is hoped, will eventually lead to the construction and operation of the International Linear Collider.

HEP Accelerator Highlights and Future Plans

In this newsletter we highlight the accomplishments and near-term plans of the world's largest HEP accelerators. In the next issue of the Newsletter, we will take a look at the status and plans of the world's major light sources.

CESRc

Engineering runs of CESRc (1.5-2.5 GeV beam energy e^+/e^- collider) this year began a three year period of Charm QCD physics for the CLEO collaboration at LEPP. The last six of 12, 2.1 T superconducting wigglers were installed earlier in 2004. These wigglers were built in-house in 2002-2003 and have stringent linearity requirements to accommodate the widely separated (± 2 cm) electron and positron orbits used in the "pretzel" beam separation scheme. Some 90% of the synchrotron radiation of 1.89 GeV beams is produced in these wigglers.

A radiative Bhabha based high-rate luminosity monitor was installed in August, 2004 as an important aid in tuning of the collider. During a recent engineering run (September-October) more than 6×10^{31} cm^{-2} s^{-1} peak luminosity was achieved. Luminosity development plans include a weak-strong beam-beam simulation code, including a detailed non-linear model of the transport arc (including wigglers and parasitic beam-beam interactions) to identify the best course to achieving luminosity in the 10^{32} regime. *— D. Rice, Cornell, Dec. 2004.*

KEKB

The KEKB B-Factory ran for about nine months in the year 2004. The peak luminosity $1.39x10^{34}$ $cm^{-2}s^{-1}$ was achieved, and the integrated luminosity recorded at the Belle detector reached 338 /fb (159/fb in 2004). While peak luminosity improved by 20% in a year, the daily integrated luminosity increased by 45% to a value of 944 /fb. The most important progress made in 2004 was the introduction of the Continuous Injection Mode (CIM) for both rings to top-up beams at nearly the maximum currents without interrupting the data taking. The CIM not only eliminated the loss of luminosity due to the beam lifetime, but helps stabilize the machine with the luminosity-optimized condition. So the CIM also contributed to improving the peak luminosity.

Among KEKB's several near-future plans, an introduction of crab cavities will be the most fascinating one. Two crab cavities, one for each ring, will be installed in January 2006, to make an effective head-on collision with a finite horizontal crossing angle (22 mrad). Although KEKB has already achieved a vertical beam-beam tune-shift parameter 0.057 with the crossing angle, simulations predict higher a value of >0.1 with the crab cavities. The crab cavities are now under final development process at KEK. *— K. Oide, KEK, Dec. 2004.*

PEP-II

PEP-II is an asymmetric e^+e^- collider operating at the c.m. energy of the Y(4S) resonance ("B-Factory"). Run-4 of PEP-II turned out to be its most successful so far. Breaking all previous records the luminosity steadily climbed to a peak of 9.2×10^{33} $cm^{-2}s^{-1}$, up by 50% from the previous run and more than three times its design value. This was achieved with record-breaking beam currents of 2.5 A positrons on 1.6 A electrons in 1588 bunches. The other highlight of Run-4 was the success of a new operational mode dubbed "Trickle Charge," continuous injection while the BaBar detector stays on. Commissioned first for the Low Energy Ring (LER) where injection background is typically lower, "Trickle Charge" operation requires cleanest possible injection in addition to special gating in the detector systems, blanking out a narrow window in time around the just-injected bunch for a few ms until the injection losses have subsided. Key to this success was close collaboration between BaBar and PEP-II staff, developing special diagnostics to analyze injection losses. In "trickle" mode, luminosity was integrated with more than five times the originally expected rate, for a total, lifetime integrated luminosity of 256/fb. Other improvements arose from steering the beam orbit esp. in the High Energy Ring (HER), lowering beta_y* by about 20% to near 1 cm, and shortening the bunches as well as systematic increase of beam currents and the number of bunches.

For Run 5, two new rf stations raise the beam-current limit to 3.5 and 1.8 A (LER and HER, respectively). As the number of stored bunches has already reached its maximum value, the wiggler installed in the LER may be turned on to maintain reasonable beam-beam parameters. Together with further improvements in the optics and the bunch-by-bunch feedback systems the team expects peak luminosity well in excess of 1×10^{34} $cm^{-2}s^{-1}$. *— U. Wienands, SLAC, Dec. 2004.*

FNAL Run-II Highlights

The Run II Collider program at Fermilab had a very successful 2004 run in which an integrated luminosity totaling 360 nb^{-1} was

delivered to the CDF and D0 detectors for physics. The total exceeded the design curve for the year by 100 nb^{-1}. During the course of the year the permanent magnet Recycler ring was successfully commissioned and put to use in creating record peak luminosities topping out at just over 10^{32} $cm^{-2}s^{-1}$. The luminosity performance was achieved by transferring some of the antiprotons from the antiproton Accumulator ring to the Recycler during the antiproton stacking process. Subsequently antiprotons were transferred from both the Accumulator and the Recycler into the Tevatron in order to make the record luminosities. This was done without the benefit of electron cooling in the Recycler.

At the end of the year a three-month shutdown planned to make Run-II improvements got under way as scheduled. There were two major tasks planned for the shutdown. The first was to move the electron cooling apparatus from its development location in the fixed-target area at Fermilab to its permanent location adjacent to the Main Injector and Recycler rings. The electron beam was installed in the Recycler during the shutdown and awaits completion of the installation of the Pelletron for commissioning. The Pelletron accelerates the electrons that are used to cool the antiprotons in the Recycler.

In addition to the electron cooling work, there were many maintenance and alignment tasks completed in the Tevatron and injector chain. Meanwhile, the final installation of the NUMI neutrino line was completed, and beam has subsequently been extracted into the beam line and delivered to the end of the decay pipe. Commissioning will continue in January.

In the coming year it is expected that electron cooling will be demonstrated in the Recycler before the fall shutdown, and it will become operational during 2006. Further improvements to Run II in 2006 will come from upgrades to the antiproton stacking and cooling systems in the Accumulator. Meanwhile, the NUMI beam will begin running for physics in the spring of this year, and the Recycler will continue to be used to produce luminosity in the Tevatron. *— R. Dixon, FNAL, Jan. 2005.*

RHIC

RHIC has started its fifth run at the end of November 2004, and we expect operations to end in June 2005. During the first part of the run RHIC will operate for the first time as a 100 GeV/u Cu-Cu collider: the run with lighter ion species is necessary to compare with previous physics data from heavy ions (Run-4) Au collisions and asymmetric d-Au (Run-3) collisions. During the second part, a physics run with polarized protons at 100 GeV is planned, which will build on five successful weeks of pp machine development in Run-4.

RHIC is now in set-up phase, expected to last four weeks, in which the running mode is developed, and machine improvements planned during the summer shut down are commissioned. *— F. Pilat, BNL, Dec. 2004.*

SNS

The Spallation Neutron Source, currently under construction at Oak Ridge National Laboratory, is on schedule and on budget toward its projected completion in 2006. The product of a collaboration of six national laboratories (Oak Ridge, Brookhaven, Argonne, Los Alamos, Jefferson and Berkeley), the $1.4 billion, Office of Science-funded SNS will represent the world's leading resource for neutron scattering research. The warm linac has been successfully commissioned to ~160 MeV; commissioning of the superconducting linac will take place in the summer of 2005. A suite of up to 24 state-of-the-art instruments will receive neutrons from a mercury target, from which the neutrons have been "spalled" by the SNS linac's one-megawatt pulsed ion beam. A beam upgrade to more than two megawatts is already in the planning stages and a second target station is included on the Office of Science's Facilities for the Future plan.

— B. Cabage, ORNL, Dec. 2004.

LHC

In December 2003, the milestone of having 1 octant's worth, i.e., 154, of the LHC main dipoles delivered to CERN was met. Today, 3 octant's worth are complete, and production has reached the goal of 1 dipole per day. Globally, CERN expects to receive 45% of the total magnet quantity by the end of 2004 and to finish the whole production by summer 2006, on schedule with expectations laid out in 2002. The field quality of the magnets is very good and meets targets for beam dynamics, despite the fact that the dipoles are produced by three independent manufacturers. The quench level is very good, with more than 95% of the magnets that do not show any training to reach their operating field of 8.33 Tesla after the first thermal cycle. Installation of the magnets in the LHC tunnel will start in early 2005 and continue for approximately two years. For more information: http://lhc-new-homepage.web.cern.ch/lhc-new-homepage/DashBoard/index.asp. *— L. Rossi, CERN, Nov. 2004.*

LHC Upgrade Taking Shape

Four US laboratories, combined in the US LARP collaboration, and the European CARE HHH network are jointly studying possibilities to boost the LHC luminosity by up to a factor of 10 to 1×10^{35} $cm^{-2}s^{-1}$ after about seven years of operation, i.e., around 2014. Upgrades would include new interaction regions, modest modifications of several subsystems to cope with a higher beam current, and, possibly, either long-range beam-beam compensation or crab cavities. A more challenging energy upgrade of the LHC may be envisioned for a later stage. A CARE workshop devoted to the LHC upgrade and to the GSI FAIR project, "HHH-2004," was held at CERN from November 8-11, 2004 (see http://care-hhh.web.cern.ch/CARE-HHH/HHH-2004)

— F. Zimmermann, CERN, Nov. 2004.

Accelerated R&D Program for CLIC

The CLIC R&D aims to develop a technology which may enable the high-energy frontier to be extended into the multi-TeV energy range. In July 2004, the CERN Council confirmed its endorsement of an accelerated R&D program for CLIC with the aim to demonstrate the key feasibility issues of CLIC technology before 2010 through a program of experimentation that is centered on the third-generation CLIC Test Facility (CTF3). This facility has recently generated 53 MW of 30 GHz rf power in 73 ns long pulses from a 6A beam using a special power-extraction structure. It is foreseen to use this power to try to run an old prototype Mo-iris accelerating structure at the nominal CLIC

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gradient and pulse length in the first run of 2005. A multi-lateral collaboration between all interested laboratories is being set up, and further participation is welcomed. The CLIC team also contributes, through CARE and EUROTeV, to ILC studies. More information is available at http://clic-collaboration-meeting.web.cern.ch/clic-collaboration-meeting.

— I. Wilson, J.-P. Delahaye, F. Zimmermann, CERN, Dec. 2004.

Beam Physics Conferences in 2005

International Linear Collider Workshop 2005
March 18-22, SLAC, Stanford, California
Conference website: http://www-conf.slac.stanford.edu/lcws05/default.htm

Workshop on the ILC Positron Source
April 11-13, 2005, Daresbury, England
Conference website: http://www.astec.ac.uk/id_mag/ID-Mag_Helical_ILC_Positron_Production_Workshop.htm

APS April Meeting
April 16-19, Tampa, Florida.
Conference website:
http://www.aps.org/meet/APR05/index.cfm
Abstract Deadline: (was January 14, 2005)
Including a joint session with the Division of Plasma Physics

Particle Accelerator Conference 2005
May 16-20, 2005, Knoxville, Tennessee
Conference website: http://www.sns.gov/pac05/
Abstract Deadline: (was December 10, 2004)
Including special events commemorating the World Year of Physics

CARE-HHH-APD Workshop on Synchrotron Design and Code Benchmarking
June 2005, with exact dates and location to be announced
Conference website:
http://care-hhh.web.cern.ch/CARE-HHH/

8th ACFA Workshop
June (July?) 2005, Korea, exact date to be announced
Conference website:
(to be announced) [http://acfahep.kek.jp/]

ILC Beam Delivery and Interaction Point Workshop
June 20-23, Royal Holloway, University of London, London, England Conference website:
http://www.pp.rhul.ac.uk/workshop/

ALCPG Workshop in Snowmass 2005
Second ILC Accelerator Workshop in Snowmass 2005
August 14-27, Snowmass, Colorado
Conference website: http://alcpg2005.colorado.edu/

Nanobeam 2005
October 17-21, Kyoto, Japan
Conference website: (to be announced)

PANIC 2005 (XVIIth Particles and Nuclei International Conference)
October 24-28, 2005, Santa Fe, New Mexico
Conference website: http://panic05.lanl.gov/circ_01.html

ECFA Linear Collider Workshop
Nov 14-17, 2005, Vienna, Austria
Conference website:
http://wwwhephy.oeaw.ac.at/p3w/ilc/ws05/

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