2008 APS April Meeting and HEDP/HEDLA Meeting

St. Louis, Missouri

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Saturday, April 12, 2008 3:30PM - 5:18PM –

Session E3 DNP DPB: Accelerator Technology and the Physics it Enables Hyatt Regency St. Louis Riverfront (formerly Adam039;s Mark Hotel), St. Louis E

3:30PM E3.00001 Accelerator Physics Related to Rare Isotope Beams[1] PETER OSTROUMOV, Argonne National Laboratory — Extensive analysis of the existing data and theoretical models has suggested that the highest yield for a wide range of rare isotopes available for experiments can be obtained by using two accelerators: a heavy-ion driver and a post-accelerator for re-acceleration of radioisotopes. The superconducting driver linac provides the primary, 400 kW, stable-ion beams in the energy range from 580 MeV for protons to 200 MeV/u for uranium required to produce the radioisotopes. To overcome intensity limitations from the most advanced ECR ion sources, the driver linac is designed for the simultaneous acceleration of two charge-states of uranium ions in the front-end and 5 charge states of uranium ions after the liquid lithium stripper. The most efficient production mechanisms for slow radioactive ions produce these ions in 1^+ or 2^+ charge states. The post-accelerator must, therefore, be able to accept such low charge-to-mass ratio ions. However, this option results in an expensive post-accelerator. One approach is to increase the charge state of the ions before acceleration via a charge booster stage. The intensity of rare isotope beams can be enhanced by the acceleration of multiple charge state beams.

[1]This work was supported by the U.S. Department of Energy, Office of Nuclear Physics, under Contract No. DE-AC-02-06CH11357.

4:06PM E3.00002 Concepts for High Luminosity Electron-Ion Colliders: Developments and Current Status , CHRISTOPH TSCHALAER, MIT — Three concepts for a polarized, high luminosity (10^{33}-10^{35} cm^{-2} sec^{-1}) electron-ion collider (EIC) of 50 – 150 GeV center-of-mass energy are currently studied in the US: A conventional ring-ring version and a more ambitious linac-ring version of eRHIC collide electrons from a storage ring or in an energy recovery linac with the hadron beams of RHIC. A more futuristic concept involves colliding figure – 8 shaped electron and hadron storage rings using electrons from CEBAF involving very high bunch collision rings to achieve maximal luminosity. First ideas for an electron-ion collider at the LHC (LHeC) are presented.

4:42PM E3.00003 SCRF and Other Technological/Conceptual Developments with Applications to Nuclear Physics Facilities , SWAPAN CHATTOPADHYAY, Cockcroft Institute — We highlight the recent developments in the science and technology of microwave superconducting radio-frequency cavities, novel concepts in particle colliders and other related technologies. This will be followed by an overview of their potential applications to high energy, high luminosity fixed target accelerators or colliders for various nuclear physics applications of electron-hadron, electron-nucleus and electron-heavy ion collisions. These facilities, designed to explore the dynamics of quarks and gluons deep inside a nucleon, could materialise at several laboratories around the world such as a possible Large electron-Hadron Collider (LHeC) at CERN, a possible electron-ion collider at BNL or Jefferson Lab, the planned 12 GeV upgrade of CEBAF and future rare isotope facilities.

Sunday, April 13, 2008 8:30AM - 10:18AM –

Session H6 DPB FIP: Impact of Major Accelerator Projects on the Development of Emergent Countries Hyatt Regency St. Louis Riverfront (formerly Adam039;s Mark Hotel), Promenade D

8:30AM H6.00001 Indian Participation in LHC and a Glimpse of the Road Ahead , VINOD CHANDRA SAHNI, Raja Ramanna Centre for Advanced Technology, Indore-452013 & Bhabha Atomic Research Centre, Mumbai-400085, India — Indian high energy physicists have been using overseas research facilities for a long time especially those at CERN. In 1991, Indian DAE brought such collaborations under an institutional framework and entered into a 10 year cooperation agreement with CERN, which later helped India join the LHC program with an expanded objective. Besides participating in detector development and physics studies, India agreed to contribute to accelerator construction, where RRCAT (earlier known as CAT, Indore) was the lead Indian institution. The 1991 cooperation agreement was extended for another 10 years and new protocols were added enabling Indian participation in the LHC Computing Grid Developments and, recently, to Indian involvement in hardware for CLIC Test facility 3 and LINAC-4. Successful India-CERN collaboration in accelerator construction has led to further Indian linkage to other international accelerator related projects such as FAIR and ILC. The talk will give an overview of the Indian contributions, benefits that have resulted through them, as well as a peek into collaborative programs for upcoming and also future projects.

9:06AM H6.00002 Impact of Pohang Accelerator on Large-scale Science Programs in Korea[1] , WON NAMKUNG, POSTECH — Emerging countries pursue their industrialization based mainly on technology. However, governments of these countries often encounter difficulties pursuing a fast-track approach to advanced R&D programs due to a lack of resources, especially in trained man-power. There are a few successful countries, for example, in Korea. The government R&D budget has been increased by more than five-fold in the last decade in Korea, which has stimulated a large number of trained scientists and engineers to return home to Korea. Satisfied with positive results for industrialization based on technology, the government has now begun to promote the basic science required for improving applied science and industries. At the same time, since the successful construction and operations of Pohang Light Source (PLS) initiated by POSTECH, the Korean government, and the steel company, POSCO, the Korean government has been promoting new large-scale scientific facilities for multi-disciplinary science, for example by joining the ITER tokamak project. This paper presents recent progress in and prospects for science and technology programs in Korea as an emerging country.

[1]This work is supported by Korea Ministry of Science and Technology (MOST) and POSTECH

9:42AM H6.00003 The Impact of the SESAME Project on Science and Society in the Middle East , HERMAN WINICK, SLAC/SSRL/Stanford University — SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East) is a UNESCO-sponsored project that is constructing an international research laboratory, closely modeled on CERN, in Jordan (www.sesame.org.jo). Ten Members of the governing Council (Bahrain, Cyprus, Egypt, Iran, Iraq, Israel, Jordan, Pakistan, Palestinian Authority, and Turkey) have responsibility for the project, led by Herwig Schopper, Council President since 1999. In late 2008 Chris Llewellyn-Smith will become Council President. SESAME was initiated by a gift from Germany of the decommissioned BESSY I facility. The BESSY I 0.8 GeV injector is now being installed in the recently completed building, funded by Jordan, as components are procured for a new 133 m circumference, 2.5 GeV third-generation storage ring with 12 locations for insertion devices. Beam line equipment has been provided by laboratories in France, UK, and US. Support also comes from EU, IAEA, ICTP, Japan Society for the Promotion of Science, the US Department of Energy and State Department, and laboratories around the world. The broad scientific program includes biomedical, environmental, and archaeological programs particularly relevant to the Middle East. Five scientific workshops and six annual Users' meetings have brought together several hundred scientists from the region, along with researchers from around the world. Training programs have enabled about 100 scientists from the region to work at synchrotron radiation laboratories. These activities have already had significant impact on science and society in the Middle East, for example leading to collaborations between scientists from countries that are not particularly friendly with each other, and to national planning emphasizing synchrotron radiation research. When research starts in 2011 this impact will grow as graduate students are trained in the region in many scientific disciplines, and scientists working abroad are attracted to return.

Sunday, April 13, 2008 10:45AM - 12:33PM –

Session J5 FEd DPB: The U.S. Particle Accelerator School Hyatt Regency St. Louis Riverfront (formerly Adam039;s Mark Hotel), Promenade C

10:45AM J5.00001 Overview of USPAS and its role in educating the next generation of accelerator scientists and engineers , WILLIAM BARLETTA, USPAS / Dept. of Physics, MIT / Fermi National Acceleratot Laboratory — Accelerators are essential engines of discovery in fundamental physics, biology, and chemistry. Particle beam based instruments in medicine, industry and national security constitute a multi-billion dollar per year industry. More than 55,000 peer-reviewed papers having accelerator as a keyword are available on the Web. Yet only a handful of universities offer any formal training in accelerator science. Several reasons can be cited: 1) The science and technology of particle beams and other non-neutral plasmas cuts across traditional academic disciplines. 2) Electrical engineering departments have evolved toward micro- and nano-technology and computing science. 3) Nuclear engineering departments have atrophied at many major universities. 4) With few exceptions, interest at individual universities is not extensive enough to support a strong faculty line. The United States Particle Accelerator School (USPAS) is National Graduate Educational Program that has developed a highly successful educational paradigm that, over the past twenty-years, has granted more university credit in accelerator / beam science and technology than any university in the world. Governed and supported by a consortium of nine DOE laboratories and two NSF university laboratories, USPAS offers a responsive and balanced curriculum of science, engineering, computational and hands-on courses. Sessions are held twice annually, hosted by major US research universities that approve course credit, certify the USPAS faculty, and grant course credit. The USPAS paradigm is readily extensible to other rapidly developing, cross-disciplinary research areas such as high energy density physics.

11:21AM J5.00002 USPAS from a student's perspective: learning about accelerator physics.

, EVGENYA SMIRNOVA, Los Alamos National Laboratory — Overall, graduate education in the US is widely considered to be of the highest quality with the students from around the world entering our Universities. The difference between the US and European (in particularly, Russian) graduate educations is the availability of scholarly part in the US graduate programs. It consists of a number of classes (often mandatory) which help students to master their particular specialty and compensate for the lack of special classes during undergraduate years mostly overloaded with general studies. However, accelerator physics specialty has somehow historically become an exclusion with very few Universities offering classes in accelerators. The USPAS has became an essential part of my graduate education in accelerator physics, compensated for the lack of coursework at MIT, and greatly expedited my progress in thesis research.

11:57AM J5.00003 The USPAS from the perspective of the instructor[1] , MICHAEL SYPHERS, Fermi National Accelerator Laboratory — The evolution of the U.S. Particle Accelerator School over the past two decades is examined from the perspective of one instructor with experience teaching graduate students, undergraduate students, accelerator professionals and other "interested parties," throughout the history of the school's university credit program.

[1]Operated by Fermi Research Alliance, LLC under Contract No. DE-AC02-07CH11359 with the United States Department of Energy.

Monday, April 14, 2008 10:45AM - 12:33PM –

Session R5 DPB DPP: Advanced Acceleration Techniques Hyatt Regency St. Louis Riverfront (formerly Adam039;s Mark Hotel), Promenade C

10:45AM R5.00001 Plasma Acceleration , CHAN JOSHI[1], UCLA — The energy frontier of particle physics is several trillion electron volts, but colliders capable of reaching this regime are costly and time-consuming to build; it is therefore important to explore new methods of accelerating particles to high energies. Plasma-based accelerators are particularly attractive because they are capable of producing accelerating fields that are orders of magnitude larger than those used in conventional colliders. In these accelerators, a drive beam (either laser or particle) produces a plasma wave (wakefield) that accelerates charged particles. The ultimate utility of plasma accelerators will depend on sustaining ultrahigh accelerating fields over a substantial length to achieve a significant energy gain. In this talk I will show recent results on the energy doubling of 42 GeV electrons at the Stanford Linear Accelerator Center (SLAC) in less than one meter using a plasma accelerator. Most of the beam electrons lose energy in exciting the plasma wave, but some electrons in the back of the same beam pulse are accelerated with a field of $\sim$52 GV m^{-1}. This effectively doubles their energy, producing the energy gain of the 3-km-long SLAC accelerator in less than a metre for a small fraction of the electrons in the injected bunch. I will discuss how this new technique may affect future colliders for high energy physics.

[1]On behalf of the E167 collaboration

11:21AM R5.00002 High energy particle accelerators that can fit on a (large) tabletop by using lasers[1] , WIM LEEMANS, Lawrence Berkeley National Laboratory — Accelerators are essential tools of discovery and have many practical uses. At the forefront of accelerator technology are the machines that deliver beams for particle physics, for synchrotron and free electron based radiation sources. The technology that drives these accelerators is extremely sophisticated but is limited by the maximum sustainable accelerating field. This impacts the size and cost of the device. More than two decades ago, lasers were proposed as power source for driving novel accelerators based on plasmas as the accelerating medium. An overview will be presented of what these devices can produce to date, including the 2004 demonstration of high quality electron beams [1] and the 2006 demonstration of GeV class beams from a 3 cm long accelerating structure [2]. We then discuss the key challenges for broad applicability of the technology and our goal of making a laser accelerator driven a VUV/soft x-ray free electron laser.

[1] C.G.R. Geddes et al., Nature **431**, 538-541 (2004); S.P.D. Mangles et al., ibid 535-538; J. Faure et al., ibid. 541-544.
[2] W.P. Leemans et al., Nature Physics **2**, 696-699 (2006).

[1]Work supported by DOE, DARPA and NSF.

11:57AM R5.00003 High Gradient Dielectric Structure Based Wakefield Experiments at ANL[1]

, WEI GAI, Argonne National Lab, Argonne, IL 60438 — The Argonne Wakefield Accelerator Facility (AWA) is dedicated to the study of electron beam physics and the development of accelerating structures based on electron beam driven wakefields. In order to carry out these studies, the facility employs a photocathode RF gun capable of generating electron beams with high bunch charges (up to 100 nC) and short bunch lengths. This high intensity beam is used to excite wakefields in the structures under investigation. The wakefield structures presently under development are dielectric loaded cylindrical waveguides with operating frequencies of 10 -15 GHz. Recent experiments have shown $\sim$ 100 MV/m gradient in a dielectric structure without any sign of break down with the wakefield pulse length of several nano-seconds. We present the detailed experimental results and future plan for the potential HEP accelerator applications.

[1]Supported by HEP Division, DOE

Monday, April 14, 2008 1:30PM - 2:54PM –

Session S12 DPB: Accelerator Physics Hyatt Regency St. Louis Riverfront (formerly Adam039;s Mark Hotel), St. Louis C

1:30PM S12.00001 Proton Linac Front End for High Intensity Neutrino Source at Fermilab

, WAI-MING TAM, GIORGIO APOLLINARI, ROBYN MADRAK, ALFRED MORETTI, LEONARDO RISTORI, GENNADY ROMANOV, JAMES STEIMEL, ROBERT WEBBER, DAVID WILDMAN, Fermilab — Fermilab has recently proposed the construction of an 8 GeV superconducting linac for the exploration of the high intensity frontier. The High Intensity Neutrino Source (HINS) R&D program was established to explore the feasibility of certain technical solutions proposed for the front end of a high intensity linac. The low energy ($\sim$60 MeV) section operates at 325 MHz and comprises an RFQ, two re-buncher cavities, 16 room temperature (RT) and 29 superconducting cross-bar H-type resonators, and superconducting solenoid focusing elements. One of the distinguishing features of this linac is the use of one klystron to feed multiple radio frequency (RF) elements. As an example, the RFQ, the re-bunchers and the 16 RT cavities are powered by a single 2.5 MW pulsed klystron. To achieve individual control over the phase and the voltage amplitude, each of the RF elements is equipped with a high power vector modulator. The RF control system will be discussed. The first RT cavity is completed with a power coupler, two mechanical tuners, vacuum and cooling systems, and has been RF conditioned. Preliminary tests on resonance frequency stability control and tests results of the cavity resonance frequency response to cooling water temperature and tuner position will also be discussed.

1:42PM S12.00002 Experimental verification of predicted oscillations near a spin resonance[1]

, V.S. MOROZOV, A.W. CHAO, A.D. KRISCH, M.A. LEONOVA, R.S. RAYMOND, D.W. SIVERS, V.K. WONG, Univ. of Michigan, Ann Arbor, MI 48109-1040, A. GARISHVILI, R. GEBEL, A. LEHRACH, B. LORENTZ, R. MAIER, D. PRASUHN, H. STOCKHORST, D. WELSCH, Forschungszentrum Jülich, IKP, D-52425 Jülich, F. HINTERBERGER, K. ULBRICH, Helmholtz Inst., Univ. Bonn, D-53115 Bonn, A. SCHNASE, JAEA/J-PARC, Tokai-Mura, Ibaraki 319-1195, Japan, E.J. STEPHENSON, IUCF, Indiana Univ., Bloomington, IN 47408-0768, N.P.M. BRANTJES, C.J.G. ONDERWATER, M. DA SILVA, Univ. of Groningen, the Netherlands — The Chao matrix formalism allows analytic calculations of a beam's polarization behavior inside a spin resonance. We recently tested its prediction of polarization oscillations occurring in a stored beam of polarized particles near a spin resonance. Using a 1.85 GeV/c polarized deuteron beam stored in COSY, we swept a new rf solenoid's frequency rather rapidly through 400 Hz during 100 ms, while varying the distance between the sweep's end frequency and the central frequency of an rf-induced spin resonance. Our measurements of the deuteron's polarization near and inside the resonance agree with the Chao formalism's predicted oscillations.

[1]Supported by the German BMBF Science Ministry.

1:54PM S12.00003 RF spin resonance strength for stored polarized deuterons.

, M.A. LEONOVA, A.D. KRISCH, V.S. MOROZOV, R.S. RAYMOND, D.W. SIVERS, V.K. WONG, J.M. WILLIAMS, Univ. of Michigan, Ann Arbor, MI 48109-1040, A. GARISHVILI, R. GEBEL, A. LEHRACH, B. LORENTZ, R. MAIER, D. PRASUHN, H. STOCKHORST, D. WELSCH, Forschungszentrum Jülich, IKP, D-52425 Jülich, F. HINTERBERGER, K. ULBRICH, Helmholtz Inst., Univ. Bonn, D-53115 Bonn, A. SCHNASE, JAEA/J-PARC, Tokai-Mura, Ibaraki 319-1195, Japan, A.M. KONDRATENKO, GOO Zaryad Novosibirsk, 630058 Russia, E.J. STEPHENSON, IUCF, Indiana Univ., Bloomington, IN 47408-0768, N.P.M. BRANTJES, C.J.G. ONDERWATER, M. DA SILVA, Univ. of Groningen, the Netherlands — We studied the ratio of the measured to predicted rf spin resonance strengths $\varepsilon_{FS}/^{*}\varepsilon_{Bdl}$ for an rf dipole and an rf solenoid using 1.85 GeV/c vertically polarized deuterons at COSY. We measured ε_{FS} by fitting spin-flipping data to the Froissart-Stora equation, and we calculated each $^{*}\varepsilon_{Bdl}$ from each rf magnet's $\int Bdl$. We found no dependence on the beam's momentum spread or the rf frequency sweep range for either the rf dipole or solenoid. We saw an enhancement of $\varepsilon_{FS}/^{*}\varepsilon_{Bdl}$ near a 1^{st}-order intrinsic resonance for the rf dipole, but no enhancement for the rf solenoid. Except near the intrinsic resonance, the deuteron's ε_{FS} was very near $^{*}\varepsilon_{Bdl}$ for the rf solenoid, but was about 7 times smaller than $^{*}\varepsilon_{Bdl}$ for the rf dipole. (Supported by the German BMBF Science Ministry.)

2:06PM S12.00004 High Power Proton Beams Genrated with the Z-Petawatt Laser[1]

, MATTHIAS GEISSEL, B.W. ATHERTON, P.K. RAMBO, J. SCHWARZ, Sandia National Laboratories, E. BRAMBRINK[2], M. SCHOLLMEIER, J. SCHÜTTRUMPF, M. ROTH, Darmstadt University of Technology, K. FLIPPO[3], S. GAILLARD, M. HEGELICH, Los Alamos National Laboratory, J. GLASSMAN, Southern Illinois University — The Z-Petawatt laser system has been built up in stages over the last few years. It has been used to generate and characterize ion beam emission from solid density targets. These experiments addressed radiography and energy deposition on secondary targets, partly to be applied at the Z-Accelerator facility at Sandia National Laboratories as the capabilities of Z-Petawatt evolve. Cu, Al, Pd and Au targets were used for Target-Normal-Sheath- Acceleration of protons and heavier ions. Results from parametric studies on target edge emission will be presented along with experiments on ballistic and magnetic proton beam focusing.

[1]Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energys National Nuclear Security Administration under contract DE-AC04-94AL85000.
[2]LULI - Ecole Polytechnique
[3]Los Alamos National Laboratory

2:18PM S12.00005 Proton and ion beams generated with a CO2 laser[1]

, IGOR POGORELSKY, VITALY YAKIMENKO, IGOR PAVLISHIN, DANIIL STOLYAROV, BNL, PETER SHKOLNIKOV, Stony Brook SUNY University, ALEXANDER PUKHOV, Inst. Theor. Physic I, Duesseldorf, PAUL MCKEANA, University of Strathclyde, Glasgow, ZULFIKAR NAJMUDIN, LOUISE WILLINGALE, Imperial College, London, ELENA STOLYAROVA, GEORGE FLYNN, Columbia University, New York — The proton- and ion generation experiment is initiated at the BNL's ATF where thin-foil targets are irradiated by a 1-TW, picosecond CO_2 laser. A particle beam is produced in the normal direction to the foil's rare surface. A spectrometer equipped with CR-39 dosimetry plates reveals proton- and ion spectra in the sub-MeV energy range. Comparison with results of previous experiments that used solid-state lasers allows for verification of wavelength scaling of the ion- and proton laser acceleration. We present simulations that lead the way toward further up-scaling of proton beam energy and luminocity in order to answer the demand for compact proton sources and injectors for scientific, medical and industrial applications.

[1]This work is supported by the US Department of Energy.

2:30PM S12.00006 ABSTRACT WITHDRAWN —

2:42PM S12.00007 New Concepts and Fermilab Facilities for Antimatter Research , GERALD JACKSON, Hbar Technologies, LLC — There has long been significant interest in continuing antimatter research at the Fermi National Accelerator Laboratory. Beam kinetic energies ranging from 10 GeV all the way down to the eV scale and below are of interest. There are three physics missions currently being developed: the continuation of charmonium physics utilizing an internal target; atomic physics with in-flight generated antihydrogen atoms; and deceleration to thermal energies and paasage of antiprotons through a grating system to determine their gravitation acceleration. Non-physics missions include the study of medical applications, tests of deep-space propulsion concepts, low-risk testing of nuclear fuel elements, and active interrogation for smuggled nuclear materials in support of homeland security. This paper reviews recent beam physics and accelerator technology innovations in the development of methods and new Fermilab facilities for the above missions.

Monday, April 14, 2008 3:30PM - 5:18PM –

Session T2 DPB DPF: DPB/DPF Prize Session Hyatt Regency St. Louis Riverfront (formerly Adam039;s Mark Hotel), St. Louis D

3:30PM T2.00001 The Large Hadron Collider , LYNDON EVANS, CERN — The Large Hadron Collider (LHC) at CERN is a proton-proton collider with a centre-of-mass energy of 14 TeV and is now in the final phase of hardware commissioning before the first beams are injected later this year. A brief description of some of the novel design features is given and the prospects for operation in 2008 are discussed.

4:06PM T2.00002 Accelerator PhD Thesis Prize , RAMA R. CALAGA, —

4:42PM T2.00003 High Temperature Superconductor Prospects for Accelerators , DAVID LARBALESTIER, Florida State University — In spite of the great interest in applying HTS cuprate superconductors or MgB_2 to electrotechnology, virtually all superconducting magnets made to date have been made from Nb-Ti or Nb_3Sn. Despite their need for helium cooling, there are very good reasons for this – Nb-base wires are available in many designs and current capacities, twisted and filamentary, with overall current densities that are generally higher than any higher T_c materials, while also being strong and easily reinforced if greater strength is needed. They can operate in fields up to about 23T at 2K. But new demands for even higher fields beyond the upper critical field (H_{c2}) of any Nb compound are focusing new attention on the Bi-2212 and YBCO cuprates and perhaps MgB_2 too. Following the recommendations of the recent National Research Council Panel COHMAG (Committee on High Magnetic Fields) and recent strong interest from the high energy physics community, new grand challenges of 30T NMR, 60T hybrid magnets and >50T solenoids for muon colliders are before the magnet community. To make such materials as practical conductors requires understanding and solutions to several grand challenges in the physics and materials science of vortex pinning, and grain boundary structure and properties, and the associated materials processing challenges required to make conductors that are km long. I will discuss some of the physics and materials challenges that such magnets pose and the recent progress that has got superconducting magnets to almost 30 T.

Tuesday, April 15, 2008 10:45AM - 12:33PM –

Session W2 DPF DPB: The LHC/ILC Era Hyatt Regency St. Louis Riverfront (formerly Adam039;s Mark Hotel), St. Louis D

10:45AM W2.00001 Status of the LHC Detectors , FABIOLA GIANOTTI, CERN — The Large Hadron Collider (LHC) will start operation in Summer 2008 at CERN. I will review the status of the experiments, and describe the presently-ongoing commissioning activities with cosmics runs. I will then discuss examples of physics measurements to be performed with the very first data in 2008-2009.

11:21AM W2.00002 LHC Upgrade Paths , DANIEL MARLOW, Princeton University — Even though CERN's Large Hadron Collider (LHC) has yet to commence operation, serious plans are already being laid for its upgrade. It is expected that the first few years of LHC operation will elucidate the basic mechanisms for electro-weak symmetry breaking, and in doing so will lead to new questions of fundamental interest. Plans therefore call for a phased upgrade of the LHC, culminating in a ten-fold increase in its luminosity by roughly 2015. To make efficient use of this new discovery potential, the detectors at the LHC will also need to be upgraded. This talk will review the physics opportunities as well as plans for upgrading the accelerator and the detectors. The possibility of doubling the energy of the LHC will also be discussed.

11:57AM W2.00003 Complementarity of the LHC and ILC[1] , HEATHER LOGAN, Carleton University — Physics at the Large Hadron Collider (LHC) and the International e^+e^- Linear Collider (ILC) will be complementary in many respects, as has been demonstrated at previous generations of hadron and lepton colliders. This talk will address the anticipated interplay between the LHC and ILC in testing the Standard Model and in discovering and determining the origin of new physics, with examples from models of weak and strong electroweak symmetry breaking, supersymmetric models, new gauge theories, models with extra dimensions, and electroweak and QCD precision physics.

[1]Supported by the Natural Sciences and Engineering Research Council of Canada.

Tuesday, April 15, 2008 1:30PM - 3:18PM –

Session X2 DPB DPF: Future Accelerator Facilities Hyatt Regency St. Louis Riverfront (formerly Adam039;s Mark Hotel), St. Louis D

1:30PM X2.00001 Super B-Factory: Physics and Technology , DAVID MACFARLANE, Stanford Linear Accelerator Center — No abstract available.

2:06PM X2.00002 Project X: Intensity-Frontier Physics Based on ILC Technology , A.J. LANKFORD, Department of Physics and Astronomy; University of California, Irvine — Project X is a concept for a high-intensity proton accelerator facility exploiting technology developed for the International Linear Collider (ILC) in order to create opportunities for exciting discoveries in neutrino science and precision physics in case ILC construction is postponed significantly. Project X would couple a linear accelerator with the currently planned characteristics of the ILC with Fermilab's existing Recycler Ring and the Main Injector accelerator. The linac would utilize cryomodules, radio-frequency distribution, cryogenics, and instrumentation that are the same as or similar to those used in the ILC, at a scale of about one percent of the full ILC linac. Building the ILC-like linac of Project X would offer substantial support for ILC development by accelerating industrialization of ILC components in the U.S. and offering an early application of ILC superconducting technology. The intense proton beam of Project X would be used to create a number of high-intensity particle beams (neutrinos, muons, charged and neutral kaons, and anti-protons) that would enable a variety of precision experiments having unprecedented sensitivity to physics beyond the standard model. Project X would also provide a foundation at Fermilab for possible future accelerator facilities such as a neutrino factory or a muon collider. This presentation will preview both the concept for the Project X accelerator facility and the physics program that it would enable.

2:42PM X2.00003 Neutrino Factories and Muon Colliders[1] , SEVE GEER, FNAL — The status of R&D on Neutrino Factories and Muon Colliders will be summarized together with plans and prospects for the future.

[1]This work was supported at Fermi National Accelerator Laboratory, which is operate by the Fermi Research Association, under contract DOE DE-AC02-76CH03000 with the U.S. Department of Energy