

The 1993 Particle Accelerator Conference

The fifteenth biennial Particle Accelerator Conference met May 17–20, 1993, in Washington, D.C., at the Omni Shoreham Hotel. Previously, the first, second, third, sixth, ninth, and twelfth of the series were also held at the Shoreham, and once again this site proved especially well suited for the interdisciplinary exchanges that are at the heart of the gathering. Since its inception in 1965, the conference had been organized under the auspices of the Institute of Electrical and Electronics Engineers. With the 1993 conference, the American Physical Society Division of Physics of Beams has joined with the IEEE Nuclear and Plasma Sciences Society in co-sponsorship. A memorandum of understanding has been signed to continue this relationship for future years. The support of these two major professional organizations gives the Particle Accelerator Conference a unique breadth of perspective and full recognition in both the engineering and physics communities. Conference attendance, although somewhat lower than that of the 1991 San Francisco meeting, exceeded 1300, including about 300 from outside North America. This year's 1291 papers set a record.

The Opening Plenary Session began with C. H. Llewellyn Smith's incisive talk on the "Frontiers of High Energy Particle and Nuclear Physics," which highlighted successes and limitations of the standard model as well as the puzzle of the baryon number of the universe and the experimental challenges of the Higgs, CP violation, and quark-gluon plasmas. Then B. Wiik described the very fruitful first year of HERA operations, notable for excellent beam-beam tune shift stability and physics data of remarkable clarity. After the intermission, Paul Horn of IBM startled the audience with his frank comments on the frailty of a national competitiveness argument for justifying the construction of large accelerators. Although listeners were far from convinced, Horn's comments generated healthy discussion throughout the meeting. On a more positive note, the closing talk of J. Kirz on "Soft X-Ray Microscopy with Synchrotron Radiation" clearly demonstrated with fascinating photomicroscopy of biological systems the value of accelerator technology for applications outside physics research.

The program followed a new set of topical categories that stressed the commonalities of the underlying accelerator technology and the evolution of accelerator science in recent years. In general, talks and poster papers were arranged by accelerator types rather than energy. A half-session dedicated to accelerator control systems was very well attended. During the Photon Source parallel session, the spectacular speed in commissioning and reaching beam performance milestones at the Advanced Light Source at Berkeley, the European Synchrotron Radiation Facility at Grenoble, and the SRRC in Taiwan was reported. The Advanced Accelerator Concepts presentations included John Blewett's R. R. Wilson Prize account of his involvement in many innovative accelerator developments during his career and C. Clayton's report on successful high-gradient acceleration with plasma beat waves. S. Schultz discussed the possibilities of photonic band-gap structures for particle acceleration. In the Magnet session, K. Halbach explored novel uses of permanent magnets, and R. Scanlan discussed advanced superconductors that exhibit very high critical current. Radioactive beam production and applications were overviewed by J. D'Auria and G. Alton. During the Multiparticle Beam Dynamics Session, R. Ryne explored the profound impact that massively parallel processors will have on 3-D simulation within the next few years. These are among the very many fine papers which can be found in this proceedings.

During the banquet awards ceremony, the IEEE PAC Technology Awards went to T. Collins for his invention of the long straight section and his lattice designs for Fermilab, and to L. Anderson and Y. Mori for their invention of the optically pumped negative hydrogen ion source. The APS R. R. Wilson Prize was presented to J. Blewett for his contributions to synchrotron radiation physics, alternate gradient focusing in linacs, and other developments in machine design and construction. J. Palkovic received the APS dissertation award, and R. Sheffield, J. Fraser, and M. Ross accepted awards from the U.S. Particle Accelerator School for achievements in accelerator physics and technology. New fellows of the APS and IEEE were also announced. The political satire group Capitol Steps entertained at the banquet and had the courage to present their "science nerd" routine to an audience of physicists and engineers.

The first part of the Closing Plenary Session comprised progress reports on large-scale initiatives: the Japanese B-factory and linear collider programs, the Large Hadron Collider at CERN, and the U.S. Supercollider. The final two talks explored more fundamental aspects of accelerator technology and its limits. R. Jameson discussed the mechanisms for halo formation in the high-current hadron linacs that are required for applications such as nuclear waste transmutation. For these machines, low residual beam loss is critical to prevent machine activation. M. Tigner closed the conference by delineating the fundamental limits on usable beam energy and luminosity for high energy physics that are implied by falling cross sections and rational electrical power budgets. The path to a PeV collider appears difficult.

The accelerator community experienced the loss of three of its most productive and creative talents during this past year, and their colleagues took the opportunity of the conference to honor them. The Single-Particle Beam Dynamics session was dedicated to the memory of L. Jackson Laslett, who laid the foundation of much of our understanding of nonlinear and collective phenomena in accelerators. The Multiparticle Beam Dynamics session was dedicated to the renowned beam dynamicist I. M. Kapchinskiy, and his last paper was presented by his co-worker N. V. Lazarev. During the awards ceremony, H. Winick accepted G. Fischer's APS Fellowship certificate and commented on his many contributions, including his most recent work on understanding the effects of tidal forces on LEP.

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