Proceedings of the 1997 Particle Accelerator Conference

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Editors
M. Comyn, M.K. Craddock, M. Reiser, J. Thomson

Volume 1 of 3
Plenary and Special Sessions; Accelerators and Storage Rings

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FOREWORD

The 17th Particle Accelerator Conference was held at the Hotel Vancouver, Vancouver, British Columbia, from May 12–16, 1997, under the joint auspices of the Nuclear and Plasma Sciences Society of the IEEE, and the Division of Physics of Beams of the APS. This was the second time the meeting has been held in Canada and once again TRIUMF was honoured to have been chosen as host; the Institute for Plasma Research at the University of Maryland was responsible for organizing the program. Though the attendance (1221) was not an all-time record, it was up 20% from the 1985 Vancouver meeting and up 15% from PAC'95, indicating the continuing vitality of the discipline even in these fiscally stringent times. The international component is also growing, with 33% of the delegates coming from 23 countries outside North America.

PAC'97 might well be said to mark the centenary of accelerator technology, since Thomson's measurement of the mass of the electron and his identification of it as sub-atomic were published 100 years ago to the month, and his was the first important experiment to rely on the accurate formation and measurement of a particle beam in well-defined electric and magnetic fields. As the first speaker noted, the masses of the electron and its sister particles remain of central interest in physics today!

Scientific Program: The opening plenary session covered four highlights of the conference: recent important advances for both normal and superconducting linear colliders (B. Richter), and for several varieties of laser accelerators (C. Joshi); and the initial operation of two major accelerator projects – the CERN LEP2 collider, which has reached 93 GeV, comfortably exceeding the W-production threshold (S. Myers), and the highest energy third-generation light source SPring-8 (H. Kamitsubo). Several more machines reported initial beam commissioning, including the PEP-II B-factory high-energy ring, RHIC (one sextant) and the IUCF Cooler Injection Synchrotron. Many reports described projects under construction, ranging from the Large Hadron Collider at CERN and the Main Injector at Fermilab (now joined by a permanent-magnet Recycler) to the BESSY-II light source and various radioactive ion-beam accelerators, including the development of a cw RFQ at TRIUMF. A number of major proposals are also close to approval: the 1 GeV 1 MW National Spallation Neutron Source at Oak Ridge, the compact 2.9 GeV Canadian Light Source at Saskatoon, the 50 GeV 0.01 mA Japanese Hadron Facility at KEK, and the RI-Beam Factory at RIKEN, which includes a 400 MeV/A superconducting ring cyclotron and the MUSES storage rings. Somewhat further off are the challenging prospects of the APT linac for producing tritium and the muon collider.

Interesting advances were reported in all areas of accelerator technology, especially superconducting rf and magnets. In the related areas of high-current multi-particle beam dynamics and pulsed-power and high-intensity beams, noteworthy progress was reported through the Z-pinch and the induction-linac flash X-radiography approaches. In beam instrumentation, novel measurements were reported on ultrashort bunches: emittance measurements with picosecond resolution at BNL, and bunch-length measurements down to 100 femtoseconds using coherent radiation at Jefferson Lab. Controls highlights were the growing acceptance of the EPICS system and a growing trend to use more programmable devices in safety systems.

Accelerators continue to serve a multitude of applications: cancer therapy, neutron radiography, sterilization, and production of isotopes, spallation neutrons and synchrotron light, are now joined by interesting schemes for contraband detection and high-energy proton radiography. Notable developments were reported at free-electron laser facilities: provision of photon beams from sub-eV to multi-MeV energies at the Duke FEL user facility, first operation of the Jefferson Lab's cw FEL, and the use of self-amplified spontaneous emission (SASE) for the TESLA FEL at DESY.

The final plenary session offered a look to the future. J. Peoples and K. Gelbke surveyed future directions for high-energy physics and nuclear physics respectively, H. Winick described the bright prospects for fourth-generation light sources, and finally W. Weng (who will be chairing the next PAC, to be held in New York, March 29 - April 2, 1999) reviewed a new class of machines with a variety

of applications - ultra-high-intensity proton accelerators.

In all, 1564 abstracts were submitted, for 76 invited and 120 contributed talks, and 1368 posters. In addition, a very successful 3-day industrial exhibition was held, limited by space to 30 participants, and over 40 satellite topical and committee meetings were scheduled.

Social Program and Awards: The social program began on Monday evening with a Pacific Coast salmon barbecue for 1000 at TRIUMF, followed by a tour of the laboratory. The conference banquet was held in the Hotel Vancouver on Wednesday evening and attended by a record 980 – attracted perhaps by the subsequent Awards Ceremony and some memorable entertainment by the Physics Chanteuse, Lynda Williams. The conference is indebted to Advanced Ferrite Technology, MDS Nordion and TRIUMF for their generous contributions as co-sponsors of these events.

The IEEE/PAC Technology Awards went to K. Leung (LBNL) for ion source development and to D. Sutter (DOE) for developing federal R&D programs for advanced accelerator technologies. The US Particle Accelerator School Prizes were given to D. Boussard (CERN) for contributions to superconducting rf, beam dynamics and feedback, and to C. Joshi (UCLA) for pioneering plasma beatwave accelerators. The APS Award for Outstanding Doctoral Thesis Research went to L. Spentzouris for her application of plasma physics to measurements of non-linear coherent phenomena, and finally the APS R.R. Wilson Prize was presented to A.M. Sessler for a broad range of advances in beam dynamics, including the negative-mass and resistive-wall instabilities, free-electron lasers and the two-beam accelerator concept.

The number of companions registered was 211, and many of these enjoyed a Welcome Breakfast and orientation talk and walk, various tours of Vancouver, and excursions to Victoria and Whistler – all assisted by a week of good weather.

Proceedings: As at PAC'95, electronic publication was the norm, but with the innovation of direct submission of abstracts to the APS. This relieved the organizers of a huge task and resulted in the early posting of the complete program of abstracts on the Web version of the APS Bulletin. The proceedings are being published by IEEE in both book and CD-ROM form, and are also available on a combined PAC/EPAC/APAC Web site. The sessions do not follow the same order as in the conference program: instead, oral and poster sessions on the same topic have been grouped together under the title of the oral session, and these amalgamated sessions have been grouped with ones on similar topics:

Volume 1: Plenary and Special Sessions; Accelerators and Storage Rings.

Volume 2: Beam Dynamics, Instrumentation and Controls.

Volume 3: Subsystems, Technology and Applications.

Altogether, 1261 papers are included, just 1.5% below the all-time record, and the highest number per registrant (1.04) so far. Publication has been supported by generous grants from the US Department of Energy, National Science Foundation and Office of Naval Research.

Acknowledgements: Space is unfortunately too short to thank individually all those people whose dedicated efforts, often over a period of many months, were responsible for the success of the conference – especially the members of the Organizing Committee, Program Committee, Local Arrangements Committee, and members of IEEE, APS and TRIUMF staff. Exceptions must be made however for Elly Driessen, the Conference Coordinator, who showed an amazing facility for dealing with all manner of inquiries from all quarters of the globe; Martin Comyn, the database manager, responsible for organizing the vast amount of information relating to the abstracts and registration, and for the technical editing of the proceedings; and to Raso Samarasekera and Carol Bellamy, who not only acted as our respective secretaries, but took on other major responsibilities connected with registration and the program respectively.

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