



PREFACE

The fifth International Particle Accelerator Conference, IPAC'14, took place at the Dresden International Convention Center, Dresden, Germany from Sunday to Friday, 15 to 20 June, 2014. It was attended by more than 1200 full time delegates from approximately 36 different countries on all continents. Hosted by the Helmholtz-Zentrum Dresden-Rossendorf (HZDR), it was supported by the GSI Helmholtz-Zentrum für Schwerionenforschung, Helmholtz-Zentrum Berlin (HZB) and the Deutsches Elektronen-Synchrotron (DESY). It was organized under the auspices of the European Physical Society Accelerator Group (EPS-AG), the Asian Committee for Future Accelerators (ACFA), the American Physical Society Division of Physics of Beams (APS-DPB) and the International Union of Pure and Applied Physics (IUPAP).

The attendance of over 90 young scientists from all over the world was made possible through the sponsorship of societies, institutes and laboratories worldwide (in alphabetical order): ACFA, ALBA-CELLS, APS-DPB, ASTeC/STFC, Centro Fermi, CERN, Cockcroft Institute/STFC, CNRS-IN2P3, DESY, DIAMOND Light Source, EPS, ESRF, ESS, GSI/FAIR, HZB, HZDR, IFIC, INFN, JAI, Max-lab/Lund University, PSI. The organizers of IPAC'14 are grateful to all sponsors for their valuable support.

Andrzej Wolski (University of Liverpool), Chair of the Organizing Committee (OC) and Peter Michel (Helmholtz-Zentrum Dresden-Rossendorf), Chair of the Local Organizing Committee (LOC), opened the conference.

Frank Zimmermann (CERN) opened the scientific programme with a presentation on *Challenges for Highest Energy Circular Colliders*, followed by *Challenges in the Design of Diffraction-limited Storage Rings* presented by Robert Hettel (SLAC). The other plenary talks on Monday morning were presented by Toru Hara (RIKEN/Spring-8), Jie Wei (FRIB) and David McGinnis (ESS) respectively on *Innovative Ideas for Single-pass FELs*, *The Very High Intensity Future* and *New Design Approaches for High Intensity Superconducting Linacs – The New ESS Linac Design*.

Inspiring closing presentations were delivered by David Hawkes (University College London) with *Locating Targets for Therapy Embedded in Soft, Deforming and Moving Tissues*, Reinhard Brinkmann (DESY) on *Long-term Accelerator R&D as an Independent Research Field*, and Fabiola Gianotti (CERN) on *Options and Priorities for Accelerator-based High-energy Physics*.

Ninety-seven invited and contributed oral presentations of very high quality were made during the week, including a hugely popular and very topical “Entertainment” presentation (in view of the 2014 World Cup in Brazil) by Metin Tolan (U. Dortmund) entitled *Why is Women's Football Less Popular?*

The scientific programme was developed by the IPAC'14 Scientific Programme Committee (SPC). It was a truly international body with members coming 50% from Europe and 50% from Asia and North America. The conference programme spanned four and a half days, with plenary sessions on Monday and Friday mornings, and Thursday afternoon. All other sessions were composed of two oral sessions in parallel, with the poster sessions scheduled alone at the end of each afternoon. There were 46 invited talks and 51 contributed oral presentations; 1300 posters were scheduled during the lively poster sessions at the end of each afternoon. These proceedings contain the reports of almost 1300 contributions.

An industrial exhibition took place during the first three days of the conference. Industrial exhibitors (93 companies) occupied 100 booths and presented their high technology products and services to the delegates in an excellent atmosphere conducive to discussions.

During the Accelerator Awards Session, the EPS-AG best student poster prizes were awarded to Eléonore Roussel (PhLAM/CERCLA) for her contribution entitled *Numerical Study of the Microbunching Instability at UVSOR-III: Influence of the Resistive and Inductive Impedances* (TUPRI042) and Marton Ady (CERN) for his contribution entitled *Monte Carlo Simulations of Synchrotron Radiation and Vacuum Performance of the Max-IV Light Source* (WEPME037). A third special EPS student poster prize was awarded for a Master's Thesis student, Lieselotte Obst (HZDR) for *Scaling of TNSA-accelerated Proton Beams with Laser Energy and Focal Spot Size* (TUPME033).

The Frank Sacherer Prize for an individual in the early part of his or her career, having made a recent, significant, original contribution to the accelerator field, went to Agostino Marinelli (SLAC), *for recent important, original contributions to accelerator physics, especially to the development of techniques that significantly improve parameters of free electron lasers such as their spectrum and longitudinal coherence. Dr Marinelli's achievements include in particular the theoretical analysis and experimental demonstration of the gain modulated FEL, a novel concept to generate two or more colours from one electron bunch – a technique that enables a new class of FEL experiments.*

The Gersch Budker Prize for an individual having made a recent, significant contribution to the accelerator field with no age limit, was awarded to Tsumoru Shintake (Okinawa Institute of Science and Technology Graduate University), *for leading the design, construction, commissioning and operation of the SACLA X-Ray Free Electron Laser. Professor Shintake contributed to all aspects of the project, including the electron source, the C-Band linac and the undulator alignment. The first lasing of the FEL in June 2011 was a crowning achievement made possible by numerous technological developments. Professor Shintake's daring and visionary approach to physics matches well the style of the physicist whose name this prize bears.*

The Rolf Wideröe Prize for outstanding work in the accelerator field with no age limit was awarded to Mikael Eriksson (Max-IV Laboratory, Lund University), *for outstanding leadership in the design, construction and commissioning of the MAX-lab Synchrotron Radiation Facilities. His intense activities in different worldwide machines and in education have had an extremely important impact on numerous existing synchrotron sources. His contributions to finding innovative design and technological solutions have opened the way for the future generation of "ultimate storage rings" and diffraction limited radiation sources.*

The EPS-AG Prize d), awarded to a student registered for a PhD or diploma in accelerator physics or engineering or to a trainee accelerator physicist or engineer in the educational phase of their professional career, for the quality of work and promise for the future was awarded to Juan Esteban Muller (EPFL and CERN) *for his work 'High-accuracy Diagnostic Tool for Electron Cloud Observation in the LHC based on Synchronous Phase Measurements'.*

The EPS-AG/IPAC'14 prizes were presented by the Chair of the Prizes Selection Committee, Caterina Biscari (CELLS/ALBA). Gianluigi Arduini (CERN), Chair of the SPC, presented the student poster prizes.

On the occasion of the 20th anniversary of the Joint Universities Accelerator School (JUAS) at Archamps, Louis Rinolfi (CERN) the Director said a few words. The two 2014 best students were awarded grants to attend IPAC'14: Michele Carlà (CELLS/ALBA) and Nikolai Schmitt (TU Darmstadt).

The proceedings of IPAC'14 are published on the JACoW site (www.jacow.org). The processing of the electronic files of contributions prior to, during and immediately after the conference was achieved by the JACoW "seasoned experts", who also trained less experienced volunteers from the JACoW International Collaboration. The team was composed of 30 persons from laboratories worldwide, many accomplishing several different tasks covering IT (setting up the computers and network), processing of contributions and transparencies, presentations management, poster session management, author reception and cross-checking of titles and authors. Thanks to the work of this dynamic team and the careful preparations and guidance of Christine Petit-Jean-Genaz (retired, CERN), a pre-press version with close to 1300 contributions was published at mid-day on the last day of the conference. The final version, with the invaluable assistance of Volker Schaa, Chairman of JACoW, was published at the JACoW site just three weeks after the conference. This is yet another impressive record set by the JACoW Collaboration, which is sincerely grateful to the supervisors of all the whole team, releasing them from their usual duties.

The success of IPAC'14 was due in great part to the truly excellent collaboration between the international teams of the OC and the SPC, and the LOC. Membership of the LOC, under the leadership of Peter Michel (HZDR) included the following staff from HZDR: André Arnold, Christine Bohnet, Michael Gensch, Bertram Green, Peter Joehnk, Stephan Kraft, Michael Kuntzsch, Ulf Lehnert, Siegmur Lieber, Petra Neumann, Andrea Runow; from GSI: Oliver Boine-Frankenheim, Raphael Müller, Volker Schaa; from HZB: Stefanie Kodalle; from DESY: Sven Lederer; from INTERCOM Dresden: Sylvia Neumann, Ulf Trebesius; from CERN (retired): Christine Petit-Jean-Genaz.

The high levels of participation and enthusiasm shown at IPAC'14 clearly indicate the strong mandate for the International Particle Accelerator Conference series from the worldwide accelerator community. May future events be even more successful than this one. The sixth IPAC will return to North America and take place in Richmond, VA. We are convinced that the collaboration among the three regions, steadily enhanced in recent years, will continue to grow to the benefit of IPAC and the accelerator community worldwide.

Andrzej Wolski, U. Liverpool, Chair of the IPAC'14 Organizing Committee