PREFACE

The 8th International Particle Accelerator Conference, IPAC'17, took place at the Bella Center Copenhagen, Denmark, from Sunday to Friday, 14 to 19 May, 2017.

It was attended by more than 1350 full time delegates from approximately 34 different countries. All participants considered (incl. JACOW team, grant students and exhibitors), IPAC'17 was visited by 1550 people.

Hosted by the European Spallation Source (ESS), it was supported by MAXIV and Aarhus University. It was organized under the auspices of the European Physical Society Accelerator Group (EPS-AG) and the International Union of Pure and Applied Physics (IUPAP).

The attendance of almost 100 young scientists and engineers from all over the world was made possible through the sponsorship of the following societies, institutes and laboratories (in alphabetical order):

The International Union of Pure and Applied Physics (IUPAP), The American Physical Society Division of Physics of Beams APS-DB and the United States National Science Foundation (Plasma Physics and Accelerator Science) from the Americas, the Asian Committee for Future Accelerators (ACFA) with contributions from AS, IBS, IHEP, IMP, KAERI, KEK, KIRAMS, NSRRC, PAL, RIKEN Nishina, RIKEN Spring-8, SSRF from Asia, the European Physical Society Accelerator Group (EPS-AG) with contributions from ALBA, CEA Saclay, CERN, Cockcroft Institute, DESY, Diamond, Elettra Sincrotrone Trieste, ESRF, ESS, GANIL, GSI/FAIR, HZB, IN2P3, INFN, John Adams Institute, PSI, SOLEIL, STFC from Europe.
The organisers of IPAC'17 are grateful to all sponsors for their valuable support.

Gianluigi Arduini (CERN), Chair of the Organising Committee (OC) and Mats Lindroos (ESS), Chair of the Local Organising Committee (LOC), opened the conference. Their appearances framed welcoming words by:

- Danish Minister for Higher Education and Science Søren Pind
- Swedish State Secretary to the Minister for Higher Education and Research Karin Röding
- ESS Director General John Womersley

Winfried Decking (DESY) opened the scientific programme with a presentation on the *Commissioning of the European XFEL*, followed by *Progress on the ESS Project Construction*, presented by Roland Garoby (ESS). The other plenary talks on Monday morning were presented by Jorg Wenninger (CERN), Akira Yamamoto (KEK) and Walter Wuensch (CERN), respectively on *Approaching the Nominal Performance at the LHC*, *The Future of Superconducting Technology for Accelerators*, and *Ultimate Field Gradient in Metallic Structures*.

Inspiring closing presentations were delivered by Yuri Oganessian (JINR, Dubna) with *Discovery of the Island of Stability for Super Heavy Elements*, Klaus Mølmer (Aarhus University) with thoughts *From Niels Bohr to Quantum Computing*, and Joachim Mnich (DESY) on *The Future of High Energy Accelerators*.

In total, forty-five invited and fifty-one contributed oral presentations of very high quality were made during the week, including a hugely popular "Entertainment" presentation by Jeffrey Hangst (Aarhus University) on *Illuminating Antimatter: The ALPHA Antihydrogen Experiment at CERN*.

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The scientific programme was developed by the IPAC'17 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 to Friday mornings, and on Thursday afternoon. All other sessions were composed of two oral sessions in parallel, followed by poster sessions at the end of each afternoon during which 1455 posters were scheduled. These proceedings contain more than 1400 contributions.

A total of 124 posters were presented by young scientists and engineers in the Special Student Poster Session on Sunday, 14 May 2017.

An industrial exhibition took place during the first three days of the conference, plus the Welcome Reception on Sunday evening. Industrial exhibitors (115 companies from 16 countries) occupied the Exhibition area and presented their high technology products and services to the delegates in a superb set-up and anexcellent atmosphere conducive to discussions.

During the Accelerator Awards Session, the EPS-AG best student poster prizes were awarded to: Annalisa Romano (CERN, Geneva), for her contribution entitled *Macroparticle Simulation Studies of LHC Beam Dynamics in the Presence of the E-Cloud* (TUPVA018) and to Daniel Leslie Hall (Cornell University (CLASSE), Ithaca, New York), for his contribution *Impact of Trapped Magnetic Flux and Thermal Gradients on the Performance of Nb3Sn Cavities* (MOPVA118).

The Rolf Wideröe Prize for "outstanding work in the accelerator field without age limit" was awarded to Dr. Lyndon Evans of CERN *foror his many major professional accomplishments in the field of accelerator design, construction and operation, including his contributions to the SPS, where he was essential for converting the SPS to a proton-anti-proton collider that led to the discovery of the W and Z Bosons and the design and construction of the LHC which led to the discovery of the Higgs Boson in 2012. The LHC at CERN is the most powerful and complex collider ever build and one of the most ambitious science projects. Dr. Lyndon Evans' leadership abilities and experience were essential ingredients for the successful completion of the LHC construction.*

The Gersh Budker Prize, for "a recent significant, original contribution to the accelerator field, with no age limit," was awarded to Dr. Pantaleo Raimondi of ESRF *for the invention of the Hybrid Multi Bend Achromat HMBA-lattice, reducing the emittance of the ESRF Synchrotron Light Source by a factor of 30, while still keeping a large enough dynamic aperture. The design of the cell shows Dr. Raimondi's ability to foster new ideas, his deep understanding of accelerator physics and mastering of technological aspects. The HMBA-lattice has been adopted as the basis for the design for most future 4th generation storage ring light sources (APS-U, Spring8-2, ALS-U, SSRF, IHEP).*

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," was awarded to Dr. Anna Grassellino of Fermilab *for her major impact on the field of superconducting RF technology, in particular, the improvement of the cavity quality factor Q and more recently the accelerating field gradient and quality factor combined. The technique of "nitrogen-doping" has already been applied in ongoing accelerator projects including the technology transfer to industry around the world and the recent development of "Nitrogen-Infusion" has recently resulted in a major improvement of the maximum field gradient and quality factor combined. Both methods have the potential for revolutionizing the field of SC RF and underline the importance of her contributions to the field.*

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The **Bruno Touschek prize** winner, 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 **Fabrizio Guiseppe Bisesto of INFN/LNF** *for his contributions to the plasma related activities underway at SPARC_LAB exploiting the high-power laser FLAME. In particular, for his experimental work on the single shot diagnostics systems, including Electro Optical Sampling (EOS) for temporal measurement and Optical Transition Radiation (OTR) measurements for an innovative, one-shot emittance measurement*.

The EPS-AG/IPAC'17 prizes were presented by the Chair of the Prizes Selection Committee, Oliver Brüning (CERN). Mike Seidel (PSI), Chair of the SPC, presented the student poster prizes.

An additional Industrial Committee Student Poster Award was to be given to 2 students whose work, presented in the special session for students, most incorporates criteria relative or applicable to industry. The jury eventually decided to award 3 prizes; winners were announced during the Industry Session on Tuesday, 16 May. They are:

- Hiroaki Takeuchi (The University of Tokyo) for his work on *Structural Analysis and Evaluation of Actual PC Bridge Using 950 keV/3.95 MeV X-Band Linacs*, THPVA102
- Yumi Lee (Korea University Sejong Campus) for her *Design Study of Drift Tube Linac for BNCT Accelerator*, MOPAB099
- Jean-Michel Antoine Bereder (The University of Tokyo), for his *Development of a 3.95 Mev X-Band Linac-Driven X-Ray Combined Neutron Source*, THPVA098

The proceedings of IPAC'17 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 team. The team was composed of almost 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 the Chief Editor Volker Schaa (GSI) a pre-press version with close to 1400 contributions was published on the last conference day. The final version, was published at the JACoW site just three weeks after the conference. This is yet another impressive record set by the JACoW International Collaboration, which is sincerely grateful to the supervisors of the whole team, releasing them from their usual duties.

The success of IPAC'17 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 Mats Lindroos (ESS), included the following staff:

- Håkan Danared (ESS), *Deputy LOC Chair*
- Volker RW Schaa (GSI), *Chief Editor*
- Garry Trahern (ESS), *Proceedings Office Coordinator*
- Juliana Pranke (ESS), *Project Leader and Scientific Secretary*
- Caroline Prabert (ESS), *Student Programme Manager*
- Inga Tejedor (ESS), *Technical Tours to ESS and Poster Manager*

- Mikael Johansson (ESS), *Presentation Manager*
- Rob Yarbray (ESS), *Industrial Exhibition Manager*
- Roger Eriksson (ESS), *Sponsoring and Industry Support*
- Henno Gous and Daniel Friis (ESS), *Website Support*
- Johan Olander (ESS), *IT Manager, App and AV coordination onsite*
- Søren Pape Moeller (Aarhus University), *Public Lecture, Tour to ASTRID2*
- Sverker Werin, *General Support*
- Ann Frisenborg Marker (DTI), *Public Lecture*
- Tutti Johansson Falk (MAXI IV), *Public Affairs and Technical Tours to MAXIV*
- Dušan Stric (ESS), *Satellite Meeting Manager*
- Alexandra Schmidli (ESS), *onsite support with Students, Posters, Sessions*
- Caroline Holgersson (ESS), *onsite support with Students, Posters, Sessions*
- Julia Öberg (ESS), *Press*
- Helle Klestrup (DIS), *Overall PCO Support*
- Peder Andersen (DIS), *Industry Exhibitor Coordination*
- Rikke Blæsberg (DIS), *Visa, Registration*
- Charlotte Nielsen (DIS), *Accommodation*
- Jørgen Nielsen (Aarhus University), *Poster Police*
- Heine Dølrath (Aarhus University), *Poster Police*

Twenty years ago the first meeting among the representatives of the three major Accelerator Conferences (Particle Accelerator Conference - PAC, European Particle Accelerator Conference - EPAC and Asian Particle Accelerator Conference - APAC) took place in Vancouver. It was the first act of a collaboration effort among the three regions that culminated in the decision to introduce a three-year cycle for the particle accelerator conferences in 2007, ten years ago, leading to the First International Particle Accelerator Conference (IPAC) held in Kyoto in 2010.
Today, the continuously increasing number of delegates, confirms that IPAC, at its third cycle, provides a unique occasion for an exciting and fruitful exchange of ideas across countries and domains, between younger and more experienced colleagues, between industry and research institutes.

This success builds on the participants, on their work and enthusiasm as well as on the continuous support of societies, institutes and laboratories worldwide!
The ninth IPAC will return to the Americas and take place in Vancouver, Canada.

Gianluigi Arduini (CERN), Chair of the IPAC'17 Organising Committee