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## Preface

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## Preface

The 13th International Particle Accelerator Conference, IPAC'22, took place at IMPACT Exhibition and Convention Center, Bangkok, Thailand from Sunday, June 12 to Friday, June 17, 2022. IPAC'22 was organized as the first in-person IPAC since the emergence of COVID-19 as a global pandemic and was attended by 742 delegates from 37 countries on all continents. The total includes 118 industry and exhibitor delegates. Hosted by Synchrotron Light Research Institute (Public Organization) - SLRI. SLRI was established in 1996 (originally as National Synchrotron Research Center - NSRC) and is the national synchrotron research institute which also known as “Thai Synchrotron National Lab”, situated in Nakhon Ratchasima, Thailand. SLRI performs its main duties on development, operation, and management of synchrotron light source “Siam Photon Source (SPS)” in order to achieve one of its main goals in production of synchrotron light and provide it for user application on research. The Local Organizing Committee (LOC) consisted of 66 staff from SLRI.

There were 169 young scientists or students from all over the world attending the conference. Student grants were offered to 60 of these students thanks to the sponsorship of societies, institutes and laboratories worldwide. The Americas region grants were sponsored by APS-DB, ODU, CLS, SLAC, FRIB, and Jefferson Lab. The Europe region sponsors are EPS-AG, GSI, CNRS/IN2P3, INFN/LNL, CERN, DESY, PSI, CEA Saclay, ELETTRA, CELLS/ALBA, HZB, ESS, Cockcroft Institute, KIT, SOLEIL, ESRF, STFC/DL/ASTeC, MAX IV, and FZJ. The Asian region was sponsored by IPAC'22, SLRI, IPAC'19, ANSTO, SUT, GIT, LION, NSF, iRCT, Ti, Prime Street Advisory, NXPO, PUDITEC, and SPECS. The organizers of IPAC'22 are grateful to all sponsors for their valued support of students.

Welcome remarks were made by Prapong Klysubun (SLRI), Chair of the Organizing Committee (OC). Yoshihiro Funakoshi (KEK), Enrica Chiadroni (INFN/LNF), and David Tarazona (Cornell University) opened the scientific program with presentations, respectively, on “The SuperKEKB Has Broken the World Record of the Luminosity”, “Progress Towards Demonstration of a Plasma Based FEL”, and “The Accelerator and Beam Physics of the g-2 Experiment”. The conference opening ceremony was on Monday afternoon and presided over by H.R.H. Princess Maha Chakri Sirindhorn featuring Special Plenary Talks from Chris Polly (Fermilab) on “Growing Expectations for New Physics” and Prapaiwan Sunwong (SLRI) on “SPS-II: A 4th Generation Synchrotron Light Source in Southeast Asia”.

The program was closed with illuminating presentations by Mike Seidel (PSI) on “Towards Efficient Particle Accelerators - a Review”; Manjit Dosanjh (CERN/Oxford University) on “Accelerating the Future: Designing a Robust and Affordable Radiation Therapy Treatment System for Challenging Environments”; and Tomoki Nakamura (Tohoku University) on “Synchrotron Light Illuminates the Origin of the Solar System”.

There were 36 invited and 52 contributed oral presentations of very high quality presented dur-



ing the week. The regional distribution of talks was 16.7 % from Asia, 59.1 % from Europe, and 24.2 % from the Americas. The gender ratio for oral presentations was 71.6 % male and 28.4 % female. The oral presentations were 79.5 % onsite talks and 20.5 % remote talks.

The scientific program was developed by the 16-member IPAC'22 Scientific Program Committee (SPC) comprising 8 leads from Asia and 1 deputy each from the Americas and Europe under the leadership of Hitoshi Tanaka (RIKEN). Valued suggestions for invited talks were contributed by the 90-member Scientific Advisory Board (SAB) representing accelerator laboratories worldwide. Oral sessions were grouped according to the eight IPAC Main Classifications, with Poster Sessions Grouped according to Sub Classifications. The conference program spanned four and a half days, with plenary talks on Monday morning and afternoon in the opening ceremony and Friday morning, and on Thursday afternoon for the Accelerator Awards Session. All other sessions were composed of two invited or contributed talks in parallel.

Four Poster Sessions were held each afternoon on Monday through Thursday, during which 838 posters from 164 institutions were scheduled for presentation. There were 169 students from 81 institutions, representing 17 countries, who attended IPAC'22, with 60 students supported via the student grant program. The Sunday afternoon student poster session was again a successful event and saw 111 student posters presented and was judged by a team of 27 judges, organized by Toshiyuki Mitsuhashi (KEK).

These proceedings contain the reports of 874 total contributions. The regional breakdown is 16 % Asia, 24 % Americas and 60 % Europe. The breakdown by Main Classifications is as follows: MC1 Circular and Linear Colliders with 81 contributions; MC2 Photon Sources and Electron Accelerators with 161 contributions; MC3 Novel Particle Sources and Acceleration Techniques with 60 contributions; MC4 Hadron Accelerators with 75 contributions; MC5 Beam Dynamics and EM Fields with 149 contributions; MC6 Beam Instrumentation, Controls, Feedback, and Operational Aspects with 136 contributions; MC7 Accelerator Technology with 152 contributions; MC8 Applications of Accelerators, Technology Transfer and Industrial Relations with 57 contributions.

The scientific program was supplemented by a variety of special sessions and events.

The Industry Session was held on Wednesday and was in a form of round table session with a moderators, and 6 speakers on the stage based on the topic "Particle Accelerator Technology: From Research to Industry - Present Global, Overview and How to Move Forward". Raffaella Geometrante (Kyma SpA) is the moderator of the session. Presentations were given by Wiboon Rugsanchaoenphol (The Federation of Thai Industries) on "Strategy of collaboration with industry in Thailand"; Hans Priem (VDL ETG T&D) on "From big size markets to small size markets"; Enrico Braidotti (CAEN ELS s.r.l.) on "How a small size market company can cross the chasm between a niche market towards wider industrial markets?"; Maurizio Vretenar (CERN) on "The quest for the miniature accelerator: wishful thinking or the key to expanding the particle accelerator market?"; Sandra Biedron (Element Aero and CBB) on "Present status and opportunities for implementing disruptive technologies arising in particle accelerator R&D to industrial market"; and Suzie Sheehy (University of Melbourne) on "Impact of disruptive particle accelerator technologies on human health".

"Lunch and Learn Session" was supported by IPAC'22 for industrial speakers to present and discuss on their innovations and research products as non-commercial talks. This special session allowed accelerator scientists, engineers, students and industrial partners to exchange informa-

tion and ideas regarding accelerator science and technology through informal interactions.

The industrial exhibition took place from Monday to Thursday. Industrial exhibitors (56 companies) occupied 53 booths at which they presented their high technology products and services to the delegates. Four learned society booths also exhibited during the same 4-day period. This industrial exhibition area featured networking lounges to facilitate discussion and was co-located with the poster areas. It must be acknowledged that the conference would not be possible in its present format without the generous support of the IPAC industry exhibitors and sponsors.

IPAC'22 hosted a range of satellite meetings, including IPACCC meeting, IPAC'22 OC2 meeting, JACoW Stakeholders' meeting, SPC meetings IPAC'23 as well as the film "The fantastic journey of particles in an accelerator" presented by Phu Anh Phi NGHIEM (CAE-IRFU) and the session "Join us for day of education and exploration with Sirepo" by RadiaSoft.

The 2022 Asian Committee for Future Accelerators (ACFA) and IPAC'22 were honored to announce the following award winners during the awards session:

The Xie Jialin Prize for outstanding work in the accelerator field, with no age limit was awarded to Prof. Zhentang Zhao for his significant contributions to the developments of the FEL theory and experiments including the first lasing of the EEHG-FEL in the world and also to the various facility constructions as the main project leader such as SSRF, SDUV-FEL and SXFEL.

The Nishikawa Tetsuji Prize for a recent, significant, original contribution to the accelerator field, with no age limit was awarded to Dr. Xiaobiao Huang for his contribution to the field of particle accelerators, especially in the domain of accelerator design and operation, model-independent beam dynamics analysis, beam-based optimization and control.

The Hogil Kim Prize for a recent, significant, original contribution to the accelerator field, awarded to an individual in the early part of his or her career was awarded to Dr. Daniel Winkler for his contribution to develop innovative designs of compact, high-current cyclotrons which make new opportunities for high intensity particle physics and industrial applications.

The prizes for best student posters were awarded to Cristhian Eduardo Gonzalez-Ortiz (Michigan State University) for "Third-order Resonance Compensation at the FNAL Recycler Ring"; and Annika Gabriel (University of California and SLAC) for "Temporal and Spatial Characterization of Ultrafast Terahertz Near-Fields for Particle Acceleration".

The proceedings of IPAC'22 are published on the JACoW site ([www.jacow.org](http://www.jacow.org)). The processing of the electronic manuscripts was achieved by IPAC'22 Editorial Team consisting of 28 strong JACoW team members from 18 different institutions prior to, and during the conference. The team, led by Thakonwat Chanwattana (SLRI), Volker RW Schaa (GSI), and Christine Petit-Jean-Genaz (CERN), is a Hybrid Editorial Team includes JACoW experts who also trained less experienced editors, and 6 remote editors who dedicate their time to work remotely regardless of different time zones. In this year, more than 70% of contributions were submitted in a LaTeX format. This is a big improvement in ratio between LaTeX and Word contributions. Some editors have trained themselves during the conference to become LaTeX editors. We can manage the greater number of LaTeX papers also thanks to great supports from remote editors.

The JACoW Collaboration is formed by electronic publishing experts and technicians volunteered by laboratories worldwide. Tasks performed by the proceedings office include: author

reception, processing of contributions and transparencies, checking that references are formatted to journal standards, and crosschecking of titles and authors. Setting up the computers and internet network, presentations management and poster session management were a collaborative effort between the LOC and JACoW. Thanks to the work of this dedicated team, a pre-press version with on-time author's submissions that were processed by editors published totaling more than 800 contributions by the last day of the conference. The final version was published at the JACoW site just weeks after the conference. This is yet another impressive record set by the JACoW Collaboration, which is sincerely grateful to the supervisors and institutes of each of the team members for releasing them from their usual duties.

IPAC'22 would also like to acknowledge two brilliant tools, known as JACoW Reference Search tool and JACoW Cat Scan Editor Tool, developed from IPAC'19 by ANSTO in collaboration with JACoW, to assist both authors and editors. These tools allowed the generation of citations of JACoW publications in the corrected format, and the identification of formatting errors in Word DOCX contributions. A significant rise of these tools' usage is a good sign of contributions' quality improvement and efficient contribution processing for the entire JACoW conference community.

IPAC'22 supports light peer review of a limited number of papers to be published as part of the Institute of Physics Journal of Physics: Conference Series. Papers are reviewed by the SAB, while the SPC under the leadership of the Scientific Publication Board Chair, Frank Zimmermann, performed the function of editorial board. Candidate papers were submitted two weeks in advance of the normal deadline to allow a cycle of review, revision, and final review. Over 117 papers were submitted, many were revised, and 111 were approved. Nawin Juntong and Todd Satogata managed the review process within the JACoW SPMS database.

The success of IPAC'22 was achieved thanks to the strong collaboration between the international teams of the OC, SPC and the LOC. Membership of the LOC included the following:

Porntip Sudmuang (SLRI): LOC Chair

Thapakron Pulampong (SLRI): Co-LOC Chair

Prapaiwan Sunwong (SLRI): Scientific Secretariat and SPMS Administration

Siriwan Jummunt (SLRI): Student Program Manager

Thakonwat Chanwattana (SLRI): Proceedings Manager

Natthawut Suradet (SLRI): IT Manager

Athikarn Thongwat (SLRI): IT Manager

Thanapong Phimsen (SLRI): Exhibitor and Sponsor Manager and Poster Presentation Manager

Sasipun Tritan (SLRI): Conference Support Manager

Pinit Kidkhunthod (SLRI): Registration Manager and Facility Tour Manager

and all our supportive LOC members.

It is clear that on this 13th conference of the series that IPAC remains a focus for the coming together of the worldwide accelerator community and the fruitful exchange of ideas, unbounded by nationality, experience or background. Being the first of this conference series to be hosted in the Southeast Asia, it was especially pleasing to see a strong participation from the international community, despite the travel difficulties due to COVID-19 pandemic and Ukraine-Russia conflict, and the extra distance.

The 14th IPAC will return to the European super-region and will take place in Venice, Italy.

**Porntip Sudmuang (SLRI) Chair of the IPAC'22 Local Organising Committee**