Preface

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The 6th International Conference on Trapped Charged Particles and Fundamental Physics (TCP2014) took place at Kagawa International Hall in Sunport Takamatsu Symbol Tower of Takamatsu city on the Japanese island of Shikoku during December 1–5, 2014, and was hosted by the RIKEN Nishina Center for Accelerator-based Science. The conference was the latest in a series of very successful meetings beginning in Lysekil (Sweden) in 1994 and continued in Asilomar (USA) in 1998, Wildbad Kürth (Germany) in 2002, Parksville (Canada) in 2006, and Saariselkä (Finland) in 2010. The 2014 meeting followed the theme of previous events by being close to the ocean and being isolated in a remote place to keep the participants together.

We would remind you that right after the last meeting in Finland, many participants were stranded in Helsinki for a week due to the Icelandic volcano explosion. No aircrafts were operated within the entirety of Europe. This disaster made us aware of the power of nature. Following this incident, the Great East-Japan Earthquake struck on March 11, 2011. The quakes and following Tsunami, and the accident in the nuclear power plants, hurt citizens in Japan and changed people's minds significantly. We scientists were also concerned as to whether we could continue fundamental research that required big budgets and large power consumption. Nuclear physicists were even criticized, although nuclear engineering and nuclear physics are totally different fields. If we take a deep look at history, however, nuclear fuel was synthesized by the r-process in the universe, which is one of the major subjects of our physics today, and atomic energy is the most important social application born from nuclear physics. We nuclear physicists, however, cannot escape from original sin for opening Pandora's box. We therefore worked as best we could as radiation workers with expertise in nuclear physics to help deal with the aftermath of the disaster. Although our

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contributions were very limited in such a nuclear crisis, we hoped for swift recovery from the tragedy. Thanks to the great efforts of a variety of people—those involved in management of the plants, decontamination of wide areas within Tohoku, control of agricultural products, medical service for citizen, and so on—we could avoid the worst scenario of the disaster. It allowed us to continue research activities and, thus, to organize the TCP2014 conference in late 2014.

Prior to the conference, a school (TCP school) for young researchers was organized during November 28–29, 2014, at the Nishina Hall of RIKEN, where inspiring lectures were given by S. Ulmer, R. Thompson, R. Hayano, H. Katori, V. Dzuba, Yu. Litvinov, and W. Nörtershäuser. About 60 participants enrolled in the school, half of whom went also to Takamatsu.

The conference was structured into nine sessions, covering the topics of Anti-Hydrogen, Ion Traps for HCI, Storage Rings, Application of Particle Trapping, Fundamental Interactions and Symmetries, Quantum and QED Effects, and Precision Spectroscopy and Frequency Standards. Each topic consisted of a keynote talk, invited talks and contributed talks. Many new developments and exciting results were presented in these sessions.

The conference started on Monday morning with a warm welcome by H. En'yo, the director of RIKEN Nishina Center. The first scientific session was initiated with a keynote talk by Y. Yamazaki, providing a review of anti-matter science. Since the last conference, the topic of Anti-Hydrogen advanced the most; anti-hydrogen was routinely synthesized and the competition is now focused on the precision spectroscopy of anti-matter. The Storage Ring sessions had two keynote talks, with Yu. Litvinov discussing large magnetic rings and H. Schmidt discussing small electrostatic rings. H. Wollnik reviewed the history of mass spectrometers in the Application of Particle Trapping session. In this session, many advanced features of Penning trap mass spectrometers were presented and newly available multi-reflection time-of-flight mass spectrographs at three different laboratories (RIKEN, CERN, and GSI) were also introduced. Such spectrographs were also under preparation at TRIUMF, MSU, ANL and IBS. Various studies on highly charged ions were discussed in the Ion Traps for HCI session. A highlight of this session was a sympathetically cooled HCI crystal in a linear Paul trap presented by O. Versalato. It could become a next-generation frequency standard as well as a platform for research in physics beyond the standard model. D. Leibfried gave a lecture on basics of quantum information processing in the Quantum and QED Effect session. Since NNP2014 (International Workshop on Non Neutral Plasma 2014) was held at the same time and location, a joint session was held on Wednesday morning, where E. Cornell gave the keynote talk on electron EDM studies with molecular ions. Several other talks on the topics of Anti-Hydrogen and Precision Spectroscopy and Frequency Standard were presented as well. Topics on Fundamental Interactions and Symmetries had several invited talks; some of them even used neutral particles. In total, 45 invited talks and 23 oral presentations were presented. In addition, a well-attended poster session was held on Monday evening. Among 29 posters, poster awards were given to four young participants: A. Gurierrez, J. Tarlton, F. Arai, and C. Funayama.

Overall, the conference was quite successful. Steady advances from the previous conference were seen for all topics. It is suitable to declare that the TCP conference series remains the flagship conference of these fields. During the conference, an International Advisory Committee (IAC) meeting was held to discuss the next TCP conference, which will be held in 2018. It was decided that it will take place in USA and be hosted by Michigan State

University. At this point we would like to thank the members of the IAC for their help in putting together the program of the conference.

It must be noted that the volume of these proceedings is small, with only 23 papers, while 94 contributions were presented in the conference. It is unfortunate, however, that the motivation for writing such proceedings is diminishing. Some organizations even prohibit their employees to submit proceedings due to possible overlaps with parts of their original papers. This kind of infringement becomes more serious today. On this basis, we think it is time to seriously discuss whether or not proceedings are needed.

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