Conference on Precision Electromagnetic Measurements (CPEM 2018)

THE Conference on Precision Electromagnetic Measurements (CPEM) was held in Paris, France, on July 8−13, 2018, at the historic Maison de la Chimie in Paris's 7th arrondissement. It was hosted by the Laboratoire national de métrologie et d'essais (LNE), Trappes, France, in collaboration with the Centre national de la recherche scientifique (CNRS), Paris, and the Observatoire de Paris, Paris.

CPEM is arguably the most important scientific and technological conference in the field of electromagnetic measurements from DC to optical frequencies. The biennial conference had special significance in 2018: it followed the October 2017 Meeting of the International Committee for Weights and Measures (CIPM), which recommended the adoption of the revised International System of Units (SI), and it preceded the November 2018 General Conference on Weights and Measures (CGPM), which formally adopted the revised SI, which will come into practice on World Metrology Day, May 20, 2019.

The revision of the SI features new definitions for the kilogram, the ampere, the kelvin, and the mole, with all SI units based on a set of seven defining constants. The CPEM 2018 marked this most significant change in units of measure since the adoption of the meter–kilogram–second–ampere system in 1954 with a focus on quantum devices that relate electrical measurement standards to fundamental constants of physics.

In addition to the redefinition of the SI and its implementation, and realization and dissemination of the kilogram (including small mass and force metrology), conference topics included fundamental constants, time and frequency, quantum electrical standards, photonics and optical metrology, novel sensors and measurements, current, voltage, DC resistance, impedance, magnetics (including nanomagnetism and spintronics), power and energy, high voltage and current, radio-frequency and microwave measurements, and electrical measurements for micro-/nanoelectronic devices.

CPEM hosted researchers from national metrology institutes, standards laboratories, university, and industrial laboratories specialized in precision measurements and instrument manufacturers. The conference had 529 attendees from 47 countries. It featured four plenary sessions with seven keynote speakers (Michel H. Devoret, Anna Fontcuberta i Morral, Serge Haroche, Martin Milton, Klaus von Klitzing, Sheila Rowan, and Jean-Philippe Uzan), who addressed the revised SI and its foundations, quantum technologies based on optical and solid-state devices, interferometric measurements on gravitational waves, and new electronic and optoelectronic devices using semiconductor nanowires. The program had 11 oral sessions organized in three parallel tracks and three poster sessions. The Technical Program Committee, consisting of 141 people from 27 countries, reviewed over 530 summary papers submitted to the conference and accepted 481 of them (168 oral presentations and 313 poster presentations). Out of these, a total of 149 extended papers were submitted to this Special Issue. The guest editors arranged for at least two reviews per paper, taking into consideration reviewer recommendations from the session chairs, and managed the review process. Based on the reviews and the recommendations of the guest editors, the journal's Editor-in-Chief Shervin Shirmohammadi and Associate Editors-in-Chief Salvatore Baglio and Kurt Barbé accepted 92 papers for this Special Issue.

We thank the authors, reviewers, session chairs, and members of the Technical Program Committee for their valuable contributions.

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