

Conference on  
**Precision Electromagnetic  
Measurements**



10-15 JULY 2016 • OTTAWA • CANADA

**Friday, July 8, 2016**

09:00 - 17:00      **Satellite Meeting (By Invitation Only)**  
Executive Level  
CCM Working Group on the Realisation of the  
Kilogram (CCM WGR-kg) (By Invitation Only)  
Birch Room - Executive Level  
Chair: Horst Bettin, PTB

**Saturday, July 9, 2016**

	<b>09:00 - 17:30</b>	<b>16:00 - 17:00</b>
09:00 - 17:30	<b>Satellite Meetings (By Invitation Only)</b> Executive Level CCEM Working Group on the Electrical Methods to Monitor the Stability of the Kilogram (By Invitation Only) Oak Room - Executive Level Chair: Ian Robinson, National Physical Laboratory	Power and Energy Experts Meeting (By Invitation Only) Maple Room - Executive Level Chair: Paul Wright, NPL Chair: Gert Rietveld, VSL

**Sunday, July 10, 2016**

12:00 - 20:30	<b>Registration</b> Nunavut		
	<b>14:00 - 15:30</b>	<b>16:00 - 17:30</b>	<b>16:00 - 17:30</b>
14:00 - 17:30	<b>Satellite Meetings (By Invitation Only)</b> Executive Level		

Informal Meeting of the APMP TCEM (By Invitation Only) Oak Room - Executive Level Chair: Murray Early, Measurement Standards Laboratory of New Zealand	CCEM Working Group of Regional Metrology Organisations (WG-RMO) (By Invitation Only) Birch Room - Executive Level Chair: Ilya Budovsky, National Measurement Institute Australia	Informal EURAMET SCLF meeting (By Invitation Only) Maple Room - Executive Level Chair: Jürgen Melcher, PTB
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18:00 - 20:30

**Welcome Reception**

Provinces & Confederation Foyer

**Monday, July 11, 2016**

07:00 - 18:30

**Registration**

Nunavut

08:30 - 09:00

**Opening Session**

Governor General Ballroom

09:00 - 09:45

**Plenary Mo-PL1: Quantum-based Voltage Metrology with Superconducting Josephson Devices at NIST**

Governor General Ballroom

Presenting Author: Sam Benz, National Institute of Standards and Technology

09:45 - 10:00

**Group Picture**

Governor General Ballroom

10:00 - 18:00

**Exhibition**

Confederation Foyer

10:00 - 10:30

**Coffee Break**

Confederation Foyer

**10:30 - 10:50**

**10:50 - 11:10**

**11:10 - 11:30**

**11:30 - 11:50**

**11:50 - 12:10**

**12:10 - 12:30**

10:30 - 12:30

**Mo-1 Voltage I**

Governor General Ballroom

Chair: Alain Rufenacht, NIST

Investigations on Extending the Frequency Range of PJVS based AC Voltage Calibrations

Further Investigation for Piecewise Sampling to Overcome Transient Effect of Staircase Waveform

Stable arbitrary waveform generator as a transfer standard for ADC calibration

Presenting Author: Jaani Nissila, VTT Technical Research Center of Finland Ltd,

Characterization of the frequency response of Analog-to-Digital Converters

Presenting Author: Javier Diaz de Aguilar, Centro Español de Metrología (CEM)

Development of high precision voltage dividers and buffer for AC voltage metrology up to 1 MHz

Presenting Author: Bjørnar Karlsen, Justervesenet

Design of delta-sigma feedback loop for quantum voltage digitizer

Presenting Author: Jane Ireland, National Physical Laboratory

INMETRO

Centre for Metrology  
MIKES

10:30 - 12:30

**Mo-2 Power and Energy I**

Provinces I

Chair: Gerald FitzPatrick, NIST

Power Quality  
Propagation  
Measurements in Smart  
Grids

Asynchronous phase  
comparator for  
characterization of  
devices and PMU  
calibrator

Presenting Author: Paul  
Wright, NPL

Presenting Author:  
Umberto Pogliano,  
INRIM

A Reference Merging  
Unit and Calibration  
Setup for Sampled  
Values over Ethernet

Presenting Author:  
Tapio Lehtonen, VTT  
MIKES Metrology

Accurate Phase  
Calibration of PMUs and  
PMU Calibrators

Presenting Author: Gert  
Rietveld, VSL

Smart Grid Power  
Quality and Stability  
Measurements in  
Europe

Presenting Author: Paul  
Wright, NPL

An Accurate Phase  
Compensation  
Algorithm for PMUs

Presenting Author:  
Francisco Messina,  
Facultad de Ingeniería,  
Universidad de Buenos  
Aires, Argentina

10:30 - 12:30

**Mo-3 Radio Frequency / Microwave I**

Provinces II

Chair: Luciano Brunetti, Istituto Nazionale di Ricerca Metrologica (INRIM)

Mechanical Aspects in  
mm-wave  
Measurements

Comparative Modeling  
of Thermal Isolation  
Section in a  
Rectangular Waveguide  
Microcalorimeter

Presenting Author:  
Markus Zeier, METAS

Presenting Author:  
Xiaohai Cui, National  
Institute of Metrology,  
China

V-band Waveguide  
Microcalorimeter for  
Millimeter-wave Power  
Standards

Presenting Author: Jae-  
Yong Kwon, KRISS

A Nonlinear Verification  
Device for Nonlinear  
Vector Network  
Analyzers

Presenting Author:  
David Humphreys,  
National Physical  
Laboratory

Improvement of  
Uncertainty Analysis for  
Waveguide VNA  
Measurement at  
Terahertz Frequency

Presenting Author:  
Masahiro Horibe, NMIJ /  
AIST

Establishment of  
Attenuation Standards  
of 110 GHz to 170 GHz  
using a mm-Wave VNA

Presenting Author:  
Anton Widarta, National  
Metrology Institute of  
Japan

12:30 - 14:00

**Lunch**

Confederation II & III

**14:00 - 14:20**

**14:20 - 14:40**

**14:40 - 15:00**

**15:00 - 15:20**

**15:20 - 15:40**

**15:40 - 16:00**

14:00 - 16:00

**Mo-4 Quantum Standards I**

Governor General Ballroom

Chair: Jan-Theodoor Janssen, National Physical Laboratory

From AC Quantum  
Voltmeter to Quantum  
Calibrator

Simultaneous Double  
Waveform Synthesis  
with a Single  
Programmable  
Josephson Voltage  
Standard

Presenting Author: Jinni  
Lee, Physikalisch-  
Technische  
Bundesanstalt

Presenting Author: Alain

Improvement of  
Leakage Resistance of  
PJVS for NIST-4 Watt  
Balance Experiment

Presenting Author: Yi-  
hua Tang, National  
Institute of Standards

Dry cooling of a 10 V  
programmable  
Josephson voltage  
standard array

Presenting Author:  
Michael Starkloff,  
Supracon AG

A Differential  
Programmable  
Josephson Voltage  
Standard for Low-  
voltage Measurement

Presenting Author:  
Honghui Li, National

10 Volt Automated  
Direct Comparison of  
Two Cryocooled  
Programmable  
Josephson Voltage  
Standards

Presenting Author: Alain

		Rufenacht, NIST	and Technology		Institute of Metrology	Rufenacht, NIST	
14:00 - 16:00	<b>Mo-5 Impedance I</b> Provinces I Chair: Rado Lapuh, Metrology Institute of The Republic of Slovenia	Reference Micropotentiometer Resistors for AC-DC Transfer and Phase Error Measurements	The frequency dependence of a 10 nF gas-dielectric capacitor	An AC-DC Resistor based on a silicon wafer	Uncertainty Evaluation using the Monte-Carlo Method	Traceable DC – 18 GHz Impedance Characterization of Coaxial 50 Ω Impedance Standards	measurements up to 13 MHz Presenting Author: Francois Ziadé, LNE
	Presenting Author: Ilya Budovsky, National Measurement Institute Australia	Presenting Author: Luca Callegaro, Istituto Nazionale di Ricerca Metrologica (INRIM)	Presenting Author: Kwang Min Yu, Korea Research Institute of Standards and Science(KRISS)	Presenting Author: Hyung-Kew Lee, KRISS	Presenting Author: Gert Rietveld, VSL		
14:00 - 16:00	<b>Mo-6 Current I</b> Provinces II Chair: Jari Hällström, MIKES-VTT	Ultrastable Low-Noise Current Amplifiers With Extended Range and Improved Accuracy	A New Generation of Multijunction Thermal Current Converters	Improvements in the Performance of a Calibration System for Rogowski Coils at High Pulsed Currents	Expansion of the Measurement Range of AC Shunt Resistor Standard	Development of High Current Shunts of Cage Design with Active Cooling	A DCCT-Based 100-A DC Current Source With High Stability Presenting Author: Věra Zhengkun Li, National Nováková Zachovalová, Institute of Metrology Czech Metrology Institute
16:00 - 16:45	<b>Coffee Break</b> Confederation Foyer			Presenting Author: Dietmar Drung, Physikal isch-Technische Bundesanstalt (PTB)	Presenting Author: Seitaro Kon, AIST,NMIJ		
16:00 - 18:00	<b>Poster Sessions: Mo-PS1 to PS9</b> Confederation I						
18:00 - 19:30	<b>Satellite Meeting (By Invitation Only)</b> Executive Level						
18:00 - 19:30	Meeting of the Supplementary Comparison EURAMET.EM-S31 (By Invitation Only) Birch Room - Executive Level Chair: Juergen Schurr, PTB						

## Tuesday, July 12, 2016

07:30 - 18:30  
**Registration**  
Nunavut

08:30 - 09:15

**Kibble Plenary Tu-PL2: Nature never deals off of the bottom of the deck... but she holds all of the aces: The joys of doing precision measurement science**

Governor General Ballroom

Presenting Author: James Faller, The University of Colorado, and the University of Glasgow

09:15 - 10:00

**Kibble Plenary Tu-PL2: Precision Atom Interferometry**

Governor General Ballroom

Presenting Author: Mark Kasevich, Stanford University

10:00 - 18:00

**Exhibition**

Confederation Foyer

10:00 - 10:30

**Coffee Break**

Confederation Foyer

**10:30 - 10:50**

**10:50 - 11:10**

**11:10 - 11:30**

**11:30 - 11:50**

**11:50 - 12:10**

**12:10 - 12:30**

10:30 - 12:30

**Tu-1 Watt Balances I**

Governor General Ballroom

Chair: Beat Jeckelmann, Federal Institute of Metrology METAS

First mass measurements with the NIST-4 watt balance

The METAS Watt Balance MARK II

Noise Reductions in the NRC Watt Balance

The Construction of the New Joule Balance at the NIM

Progress on the BIPM watt balance

Towards the next generation NPL watt balance

Presenting Author: Darine Haddad, National Institute of Standards and Technology

Presenting Author: Ali Eichenberger, METAS

Presenting Author: Barry Wood, National Research Council Canada

Presenting Author: Zhengkun Li, National Institute of Metrology (P. R. China)

Presenting Author: Hao Fang, BIPM

Presenting Author: Ian Robinson, National Physical Laboratory

10:30 - 12:30

**Tu-2 Power & Energy II**

Provinces I

Chair: Thomas Nelson, NIST

Comparison of Two Realisations of a Power Standard

A computer-controlled calibrator for instrument transformer test sets

Calibration of Electronic Transformer with Digital Output Based on Synchronous Sampling

Precision Loss Measurement of Reactive Compensation Components by Sampling Voltage and Current

An AC Current Transformer Measuring System for Power Frequencies

Development of HF Power Source for the Calibration of Electrosurgical Analyzer

Presenting Author: Ilya Budovsky, National Measurement Institute Australia

Presenting Author: Christian Mester, Federal Institute of Metrology METAS

Presenting Author: Yang Pan, Shanghai Institute of Measurement and Testing Technology

Presenting Author: Enrico Mohns, PTB

Presenting Author: Enrico Mohns, PTB

Presenting Author: Wei Zhao, National Institute of Metrology, China

10:30 - 12:30

**Tu-3 Time and Frequency I**

Provinces II

Chair: Mikko Merimaa, VTT Technical Research Centre of Finland Ltd.

QPN Limited Stability

Operational Strontium

Progress toward a new

Optical Cryogenic

Sub-Doppler laser

Dependence of Scale

and BBR Shift Uncertainty of NRC's Sr+ Atomic Clock	optical lattice clocks  Presenting Author: Eva Bookjans, Observatoire de Paris	implementation of an In+ optical clock  Presenting Author: Ying Li, National Institute of information and Communications Technology	Silicon Resonators  Presenting Author: Thomas Legero, Physik alisch-Technische Bundesanstalt	spectroscopy of molecular iodine at 578 nm  Presenting Author: Takumi Kobayashi, National Metrology Institute of Japan	Factor on Initial Cloud Size for an Atom-Ball Gyroscope  Presenting Author: Bruno Pelle, National Institute of Standards and Technology
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12:30 - 14:00

**Lunch**

Confederation II & III

14:00 - 16:00

**Poster Sessions: Tu-PS1 to PS8**

Confederation I

14:30 - 15:15

**Coffee Break**

Confederation Foyer

**16:00 - 16:20**

**16:20 - 16:40**

**16:40 - 17:00**

**17:00 - 17:20**

**17:20 - 17:40**

**17:40 - 18:00**

16:00 - 18:00

**Tu-4 Quantum Standards II**

Governor General Ballroom

Chair: Stephane Solve, BIPM

2 Volt Pulse-Driven  
Josephson Arbitrary  
Waveform Synthesizer

First Metrological  
Applications of the PTB  
1 V Josephson Arbitrary  
Waveform Synthesizer

Direct Comparison of a  
Pulse-driven JAWS and  
a PJVS at 1 Volt

Presenting Author: Alain  
Rufenacht, NIST

Presenting Author:  
Nathan Flowers-Jacobs,  
NIST

Presenting Author: Luis  
Palafox-Gámir, PTB

Precision  $\mu$ V-  
Synthesizer Based on a  
Pulse-driven Josephson  
Array

Presenting Author: Ralf  
Behr, Physikalisch-  
Technische  
Bundesanstalt

AC-DC Calibrations  
With a Pulse-driven AC  
Josephson Voltage  
Standard Operated in a  
Small Cryostat

Presenting Author:  
Helko van den Brom,  
VSL

Implementation of a  
Programmable  
Josephson Voltage  
Standard in a Zero Boil-  
off Dewar

Presenting Author: Tom  
Stewart, Measurement  
Standards Laboratory of  
New Zealand

16:00 - 18:00

**Tu-5 Impedance II**

Provinces I

Chair: Luca Callegaro, Istituto Nazionale di Ricerca Metrologica (INRIM)

Measurement of Time  
Constant of Four-  
terminal Resistor Based  
on Dissipation Factor

Improvements on the  
Design of a Four  
Terminal-Pair Coaxial  
Bridge

Transport Behaviour  
and Stability of  
Inductors for  
International  
Comparisons

Presenting Author: Jian  
Feng, Shanghai Institute  
of Measurement and  
Testing Technology

Presenting Author:  
Gean Geronymo,  
Inmetro

Presenting Author:  
Jürgen Melcher, PTB

Calibration of a LCR-  
Meter at Arbitrary Phase  
Angles using a Fully  
Automated Impedance  
Simulator

Presenting Author:  
Frédéric Overney,  
Federal Institute of  
Metrology METAS

Development of a  
programmable small  
capacitance standard at  
LNE

Presenting Author:  
Olivier Thévenot,  
Laboratoire National de  
métrologie et d'Essais

16:00 - 18:00

**Tu-6 Radio Frequency / Microwave II**

Provinces II

Chair: Masahiro Horibe, NMIJ / AIST

Thermoelectric Power Transfer Standards for V- and W-Band	Characterization of high-speed photodetectors using a laser-based vector network analyzer	Temperature Control of Waveguide Extenders	Uncertainty Evaluation of Balanced S Parameter Measurements	Development of Verification Process for On-Wafer Measurement at Millimeter-Wave Frequency	CENAM's Primary Standard for Microwave Power up to 18 GHz
Presenting Author: Rolf Judaschke, PTB	Presenting Author: Paul Struszewski, Physikalische Technische Bundesanstalt	Presenting Author: Johannes Hoffmann, METAS	Presenting Author: Francois Ziadé, LNE	Presenting Author: Ryo Sakamaki, National Institute of Advanced Industrial Science and Technology	Presenting Author: Mariano Botello-Perez, CENAM

**18:00 - 18:30**

**18:00 - 19:30**

18:00 - 19:30

**Satellite Meetings (By Invitation Only)**

Executive Level

EURAMET EM, DC & Quantum Metrology

Experts Meeting (By Invitation Only)

Oak Room - Executive Level

Chair: Jan-Theodoor Janssen, National Physical Laboratory

EURAMET TC-EM Working Group on Strategic

Planning WGSP (By Invitation Only)

Oak Room - Executive Level

Chair: Luca Callegaro, Istituto Nazionale di Ricerca Metrologica (INRIM)

**Wednesday, July 13, 2016**

07:30 - 18:30

**Registration**

Nunavut

08:30 - 09:15

**Plenary We-PL3: Linking the International System of Units to Fundamental Constants**

Governor General Ballroom

Presenting Author: Joachim Ullrich, Physikalisch-Technische Bundesanstalt

09:15 - 10:00

**Plenary We-PL3: Optical atomic clock**

Governor General Ballroom

Presenting Author: Jun Ye, National Institute of Standards and Technology and University of Colorado

10:00 - 18:00

**Exhibition**

Confederation Foyer

10:00 - 10:30

**Coffee Break**

Confederation Foyer

**10:30 - 10:50**

**10:50 - 11:10**

**11:10 - 11:30**

**11:30 - 11:50**

**11:50 - 12:10**

**12:10 - 12:30**

10:30 - 12:30

**We-1 Quantum Standards III**

Governor General Ballroom

Chair: Antti Manninen, VTT Technical Research Centre of Finland Ltd

Accuracy verification of single-electron pumps with 0.2 ppm uncertainty	Universality of the tunable-barrier pump at the part-per-million level	Robustness of single-electron pumps at sub-ppm level	Robustness of Potential-Profile-Tunable Electron Pump	Scaling the current from a GHz electron pump using a CCC	Towards a programmable quantum current generator
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Presenting Author:

Frank Hohls, Physikalisches-Technische Bundesanstalt

Presenting Author: Stephen Giblin, National Physical Laboratory

Presenting Author:

Frank Hohls, Physikalisches-Technische Bundesanstalt

Presenting Author:

Myung-Ho Bae, Korea Research Institute of Standards and Science

Presenting Author:

Stephen Giblin, National Physical Laboratory

Presenting Author:

Wilfrid Poirier, Laboratoire National de métrologie et d'Essais

10:30 - 12:30

### We-2 Impedance III

Provinces I

Chair: Ralf Behr, Physikalisches-Technische Bundesanstalt

Impedance Bridge Based on Pulse-Driven Josephson Arrays for Arbitrary Impedance Ratios

Systematic Error Analysis in a Josephson Impedance Bridge  
Presenting Author: Thomas Hagen, PTB

Josephson-Based Full Digital Bridge for High-Accuracy Impedance Comparisons

Presenting Author:

Frédéric Overney, Federal Institute of Metrology METAS

A three-arm 4TP digitally-assisted bridge for the comparison of arbitrary impedances

Presenting Author:

Massimo Ortolano, Politecnico di Torino

A Digital Four-Terminal Pair Impedance Bridge

Presenting Author:

Waldemar Guilherme Kürten Ihlenfeld, INMETRO

Large Capacitance Measurement System Based on Dual Balance Bridge

Presenting Author: You

Li, Beijing Orient Institute of Measurement and Test

Presenting Author:

Stephan Bauer, Physikalisches-Technische Bundesanstalt

10:30 - 12:30

### We-3 Voltage II

Provinces II

Chair: Ilya Budovsky, National Measurement Institute Australia

10 V Transconductance Amplifier for the Comparison of Josephson Standards and Thermal Converters

Low-Voltage AC-DC transfer standards at NMIJ  
Presenting Author: Hiroyuki Fujiki, National Metrology Institute of Japan

A Simple Model for the Prediction of AC-DC Difference of Multi-Junction Thermal Converters

Presenting Author: Stefan Cular, National Institute of Standards and Technology

Calibration of Inductive Voltage Dividers at Power Frequencies Using an AC-PJVS

Presenting Author:

Jimmy Hsu, Center for Measurement Standards (CMS/ITRI)

Establishing of 1000V Multi-decade Inductive Voltage Divider Standard at NIM

Presenting Author: Wei

Wang, National Institute of Metrology P.R.China

Improved Setup for Bridge Standard Calibration up to 5 kHz

Presenting Author: Marc

Beug, Physikalisches-Technische Bundesanstalt

Presenting Author: Ilya Budovsky, National Measurement Institute Australia

12:30 - 14:00

### Lunch

Confederation II & III

14:00 - 14:20

14:20 - 14:40

14:40 - 15:00

15:00 - 15:20

15:20 - 15:40

15:40 - 16:00

14:00 - 16:00

### We-4 Fundamental Constants I

Governor General Ballroom

Chair: Horst Bettin, PTB



Mass measurement of <sup>28</sup> Si-enriched spheres at NMIJ for determination of the Avogadro constant	Results from the Magnetic Suspension Mass Comparator for Vacuum-to-Air Mass Dissemination	Comparison of two methods for determining the sorption correction for a vacuum-realized kilogram	Improvements of A Kilogram Level Inertial Mass Measurement Experiment	Piston Guide and Magnet Assembly for the KRISS Watt Balance	Surface layer analysis of Si spheres both in vacuum and in air by an improved ellipsometer
Presenting Author: Shigeki Mizushima, National Metrology Institute of Japan	Presenting Author: Corey Stambaugh, National Institute of Standards and Technology	Presenting Author: Patrick Abbott, NIST	Presenting Author: Zhuang Fu, Tsinghua University	Presenting Author: Kwang-Cheol Lee, KRISS	Presenting Author: Kazuaki Fujita, National Metrology Institute of Japan / National Institute of Advanced Industrial Science and Techno

14:00 - 16:00

**We-5 Power & Energy III**

Provinces I

Chair: Rene David Carranza, Centro Nacional De Metrologia

A Calibration Setup for IEC 61850-9-2 Test Sets	Calibration of 90° Phase Difference Measured by Digital Sampling Method	An Electronic Load to Verify Harmonic Emission Compliance	A Proposal to Establish a System for Calibration of Harmonic Power Analyzers	Improvement of Agilent 3458a Performances in Wideband Complex Transfer Function Measurement	Harmonics and Interharmonics Spectral Analysis by ANN
Presenting Author: Marco Agustoni, Federal Institute of Metrology (METAS)	Presenting Author: Jian Feng, Shanghai Institute of Measurement and Testing Technology	Presenting Author: Peter Davis, National Physical Laboratory	Presenting Author: Hongtao Huang, National Institute of Metrology	Presenting Author: Domenico Giordano, Istituto Nazionale di Ricerca Metrologica	Presenting Author: Javier Diaz de Aguilar, Centro Español de Metrología (CEM)

14:00 - 16:00

**We-6 Resistance I**

Provinces II

Chair: François Piquemal, LNE

Convenient graphene-based quantum Hall resistance standards	Magnetocapacitance and Dissipation Factor of Epitaxial Graphene Hall Bars	Millimeter-sized Graphene Quantum Hall Devices for Resistance Standards	Tests of Series Quantum Hall Arrays Based on Epitaxial Graphene	Towards a cryogen-free table-top primary resistance standard	AC quantum Hall effect in epitaxial graphene
Presenting Author: Wilfrid Poirier, Laboratoire National de métrologie et d'Essais	Presenting Author: Juergen Schurr, PTB	Presenting Author: Yanfei Yang, National Institute of Standards and Technology	Presenting Author: Antti Manninen, VTT Technical Research Centre of Finland Ltd	Presenting Author: Jan-Theodoor Janssen, National Physical Laboratory	Presenting Author: Felix Lüönd, METAS

16:00 - 16:45

**Coffee Break**

Confederation Foyer

16:00 - 18:00

**Poster Sessions: We-PS1 to PS7**

Confederation I

18:15 - 19:00 **Transportation from the Westin to the Banquet Venue**  
Canadian Museum of History

19:00 - 21:00 **Banquet at the Canadian Museum of History**  
Canadian Museum of History

21:00 - 21:30 **Transportation from the Banquet Venue to the Westin**  
Canadian Museum of History

**Thursday, July 14, 2016**

08:00 - 18:30 **Registration**  
Nunavut

<b>08:30 - 08:50</b>	<b>08:50 - 09:10</b>	<b>09:10 - 09:30</b>	<b>09:30 - 09:50</b>	<b>09:50 - 10:10</b>
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08:30 - 10:10 **Th-1 Voltage III**  
Governor General Ballroom  
Chair: Yi-hua Tang, National Institute of Standards and Technology

Measurement of Boltzmann Constant Using Superconducting Integrated Circuit	Accuracy of the New Voltage Standard Using Josephson Junctions Cooled to 77 K	Temperature sensitivity coefficients of the BIPM secondary voltage standards	Development of a Compact Zener DC Voltage Standard with Detachable Module System	Digital Phase Standard of High Accuracy up to the MHz-Range
Presenting Author: Chiharu Urano, National Institute of Advanced Industrial Science and Technology	Presenting Author: Alexander Klushin, Institute for Physics of Microstructures of the Russian Academy of Sciences (IPM RAS)	Presenting Author: Stephane Solve, BIPM	Presenting Author: Nobu-Hisa Kaneko, NMIJ/AIST	Presenting Author: Waldemar Guilherme Kürten Ihlenfeld, INMETRO

08:30 - 10:10 **Th-2 Power & Energy IV**  
Provinces I  
Chair: Eddy So, National Research Council Canada

Study on High-Frequency Power Calibration Technology for Electrosurgical Analyzer	Phase Shift Correction of Reference Sampling Multimeter for Electronic Transformer Calibration	Upgrade of Accuracy and Traceability the SP Sampling Wattmeter	Traceability and On-Site Frequency Calibration of the NRC-MSS Depolarization Current Measurements	Frequency Calibration of MV Voltage Transformer under Actual Waveforms
Presenting Author: Wei Zhao, National Institute of Metrology, China	Presenting Author: Yang Pan, Shanghai Institute of Measurement and Testing Technology	Presenting Author: Stefan Svensson, SP National Research Inst. of Sweden	Presenting Author: Refat Ghunem, National Research Council Canada	Presenting Author: Gabriella Crotti, Istituto Nazionale di Ricerca Metrologica

08:30 - 10:10 **Th-3 Impedance IV**  
Provinces II

Chair: Jürgen Melcher, PTB

Determination of impedance meter nonlinearity with a capacitance build-up method

The Optimal Hollow Active Auxiliary Electrode and Its Additional Functions Research

Evaluation of a Continuously Variable Calculable Capacitor

Presenting Author: Yicheng Wang, NIST

Progress Report on Measuring the von Kiltzing Constant at the BIPM

Presenting Author: Pierre Gournay, BIPM

Progress report on the determination of RK at LNE

Presenting Author: Olivier Thévenot, Laboratoire National de métrologie et d'Essais

Presenting Author: Faranak Pourdanesh, Istituto Nazionale di Ricerca Metrologica (INRIM); Politecnico di Torino

Presenting Author: Lu Huang, National Institute of Metrology, China

10:00 - 16:00

### Exhibition

Confederation Foyer

10:00 - 10:30

### Coffee Break

Confederation Foyer

**10:30 - 10:50**

**10:50 - 11:10**

**11:10 - 11:30**

**11:30 - 11:50**

**11:50 - 12:10**

**12:10 - 12:30**

10:30 - 12:30

### Th-4 Quantum Standards IV

Governor General Ballroom

Chair: Nick Fletcher, Bureau International des Poids et Mesures (BIPM)

Universality test of the quantum Hall effect on topological insulator

Direct Comparison of Fractional and Integer Quantized Hall Resistances: Status and Perspectives

Development of 1-M $\Omega$  Quantum Hall Array Resistance Standards

Presenting Author: Takehiko Oe, NMIJ/AIST

Investigation of Niobium nanoSQUIDs Based on Nanobridge Junctions

Presenting Author: Xueshen Wang, National Institute of Metrology

A direct DC 10 V comparison between the NIMJ and the BIPM Programmable

Josephson Voltage Standards

Presenting Author: Stephane Solve, BIPM

Characterization of High-Stability AC Source Using AC-PJVS

Presenting Author: Yasutaka Amagai, National Metrology Institute of Japan

10:30 - 12:30

### Th-5 Time and Frequency II

Provinces I

Chair: François Nez, Laboratoire Kastler Brossel /CNRS/UPMC/ENS

Study of the OP-PTB Link by Carrier-Phase Two-Way Satellite Time and Frequency Transfer

Current Status of Terahertz Frequency Metrology at NICT

NIST on a Chip with Alkali Vapor Cells: Initial Results

Presenting Author: John Kitching, NIST

Iodine Absorption Cells Quality Evaluation

Presenting Author: Jan Hrabina, Institute of Scientific Instruments v.v.i., Czech Academy of Sciences

Laser Refractometer as a Transfer Standard of the Pascal

Presenting Author: Patrick Egan, NIST

Using small mass and force metrology for laser power measurement

Presenting Author: Gordon Shaw, U.S. National Institute of Standards and

	de Paris	Communications Technology				Technology (NIST)
10:30 - 12:30	<b>Th-6 Radio Frequency / Microwave III</b>					
	Provinces II					
	Chair: Ron Ginley, NIST					
	Comparison between time- and frequency- domain high-frequency device characterizations	Comparison of Calibration Methods for Multiport VNAs up to 67 GHz	Quantum Based RF E- field Sensing by Using Two-photon Transition in Rydberg Atoms	Measurement Uncertainty of Free Space Antenna Factor for BI-log Antenna Using Amplitude Center	Investigation of Peak Envelope Power Measurements and Uncertainties	A Signal Processing Approach for Recovery of High-Q Dielectric Resonance Profile Measurements
	Presenting Author: Mark Bieler, Physikalisch- Technische Bundesanstalt	Presenting Author: Djamel Allal, Laboratoire National de Métrologie et d'Essais (LNE), Trappes, France	Presenting Author: Zhenfei Song, National Institute of Metrology (NIM), China	Presenting Author: Satoru Kurokawa, National Institute of Advanced Industrial Science and Technology of Japan	Presenting Author: Yu Song Meng, National Metrology Centre, A*STAR	Presenting Author: Brian O'Keefe, Tufts University
12:30 - 14:00	<b>Lunch</b>					
	Confederation II & III					
	<b>12:30 - 15:00</b>		<b>18:00 - 19:30</b>			
12:30 - 19:30	<b>Satellite Meetings (By Invitation Only)</b>					
	Executive Level					
	CPEM Executive Committee Meeting (By Invitation Only)		ACQ-PRO Project Meeting			
	Oak Room - Executive Level		Oak Room - Executive Level			
	Chair: Dean Jarrett, National Institute of Standards and Technology		Chair: Javier Diaz de Aguilar, Centro Español de Metrología (CEM)			
14:00 - 16:00	<b>Poster Sessions: Th-PS1 to PS8</b>					
	Confederation I					
14:30 - 15:15	<b>Coffee Break</b>					
	Confederation Foyer					
16:00 - 18:00	<b>Exhibition Teardown</b>					
	Confederation Foyer					
	<b>16:00 - 16:20</b>	<b>16:20 - 16:40</b>	<b>16:40 - 17:00</b>	<b>17:00 - 17:20</b>	<b>17:20 - 17:40</b>	<b>17:40 - 18:00</b>
16:00 - 18:00	<b>Th-7 Fundamental Constants II</b>					
	Governor General Ballroom					
	Chair: Peter Mohr, NIST					
	Laser spectroscopy of muonic deuterium : new contribution to the	Improved spectral aberration in Johnson Noise Thermometry	High Resolution Spectroscopy of 1S-3S Transition in Hydrogen	Upgrading the NIST Electrostatic Force Balance	An Oscillating Magnet Watt Balance	Towards a test of the Weak Equivalence Principle of gravity using

	proton puzzle				Presenting Author: Haji Ahmadov, TUBİTAK	anti-hydrogen at CERN
	Presenting Author: François Nez, Laboratoire Kastler Brossel /CNRS/UPMC/ENS	Presenting Author: Alessio Pollarolo, NIST	Presenting Author: Helene Fleurbaey, Laboratoire Kastler Brossel / UPMC / CNRS / ENS	Presenting Author: Julian Stirling, National Institute of Standards and Technology		Presenting Author: François Nez, Laboratoire Kastler Brossel /CNRS/UPMC/ENS
16:00 - 18:00	<b>Th-8 Resistance II Provinces I</b>					
	Chair: Murray Early, Measurement Standards Laboratory of New Zealand					
	Third Generation of Adapted Wheatstone Bridge for High Resistance Measurements at NIST	Ultra-High Resistance Measurement Based on Non-Contact Electrostatic Voltmeter	Development of an AC Current Comparator Based Resistance Measurement System	Development of 1 $\Omega$ and 10 $\Omega$ Metal Foil Standard Resistors	Evaluation of the Automatic Coaxial Mechanical Scanner for High-Resistance Measurement Use	Quantum Hall Resistance Traceability for the NIST-4 Watt Balance
	Presenting Author: Shamith Payagala, NIST/JQI	Presenting Author: Feipeng Lin, National Institute of Metrology, China	Presenting Author: Waldemar Guilherme Kürten Ihlenfeld, INMETRO	Presenting Author: Nobu-Hisa Kaneko, NMIJ/AIST	Presenting Author: Takehiko Oe, NMIJ/AIST	Presenting Author: Dean Jarrett, National Institute of Standards and Technology
16:00 - 18:00	<b>Th-9 Novel Sensors / Magnetics Provinces II</b>					
	Chair: Po Gyu Park, Korea Research Institute of Standards and Science (KRISS)					
	Time-resolved detection of the berry curvature in GaAs nanostructures	Methods for characterization and minimization of microwave background in cryogenic environment	Analysis of Heat Loss for Measurement of Thomson Coefficient Using AC Calorimetric Method	Coplanar Capacitive sensor for Measuring Horizontal Displacement in Joule Balance	Identification and correction of artefact in the measurement of pulsed magnetic fields	Digital Control of Magnetic Induction Waveform Applied to Silicon Steel Sheets Characterization
	Presenting Author: Mark Bieler, Physikalisch-Technische Bundesanstalt	Presenting Author: Janne Lehtinen, VTT Technical Research Centre of Finland Ltd	Presenting Author: Yasutaka Amagai, National Metrology Institute of Japan	Presenting Author: Yang Bai, Harbin Institute of Technology	Presenting Author: Domenico Giordano, Istituto Nazionale di Ricerca Metrologica	Presenting Author: Matheus Pinheiro, Universidade Federal de Goiás

## Friday, July 15, 2016

08:00 - 11:30

### Registration

Nunavut

**08:30 - 08:50**

**08:50 - 09:10**

**09:10 - 09:30**

**09:30 - 09:50**

**09:50 - 10:10**

**10:10 - 10:30**

08:30 - 10:30

### Fr-1 Avogadro I

Governor General Ballroom

Chair: Michael Stock, BIPM

The new Kilogram Materialized by Silicon Isotopes	Realization of the Kilogram Based on the Planck Constant at NMIJ	A Two Thickness Interferometer for Lattice Strain Investigations	Surface characterization Measurement of silicon spheres by combined XRF and XPS analysis	reproducibility of PTB's sphere interferometer after more than a decade	Comparison of Mean Diameters of Si-Spheres Measured with both PTB-Sphere Interferometers
Presenting Author: Frank Haertig, Physikalisch-Technische Bundesanstalt	Presenting Author: Naoki Kuramoto, National Institute of Advanced Industrial Science and Technology	Presenting Author: Enrico Massa, INRIM - Istituto Nazionale di Ricerca Metrologica	Presenting Author: Michael Kolbe, Physikalisch-Technische Bundesanstalt	Presenting Author: Arnold Nicolaus, PTB Physikalisch-Technische Bundesanstalt	Presenting Author: Torsten Mai, Physikalisch-Technische Bundesanstalt

08:30 - 10:30

**Fr-2 Power & Energy V**

Provinces I

Chair: Enrico Mohns, PTB

A Buildup Method for Determining the Voltage Coefficient of High Voltage Resistors	Bilateral high voltage AC peak and rms value comparison up to 150 kV between MIKES-VTT and PTB	Voltage Dependence Measurement of a 110 kV LVE-TSVT	Traceability of No-Load Loss Measurements of High Voltage Transmission Lines	Research on Quantity Traceability for High Accuracy Two-stage Voltage Transformer	Design and Self-calibration of the RVD with Serial-parallel Connection
Presenting Author: Harold Parks, National Research Council Canada	Presenting Author: Jari Hällström, MIKES-VTT	Presenting Author: Haiming Shao, National Institute of Metrology	Presenting Author: Eddy So, National Research Council Canada	Presenting Author: Huanghui Zhang, School of Instrumentation Science and Opto-electronics Engineering, Beihang University	Presenting Author: Xianlin Pan, NIM

08:30 - 10:30

**Fr-3 Radio Frequency / Microwave IV**

Provinces II

Chair: David Humphreys, National Physical Laboratory

Estimation of waveform state levels and uncertainties using the histogram and shorth methods	Permittivity measurements for high-permittivity materials at NMIJ using resonator methods	An experimental set-up to compare measurements and simulations in MRI dosimetry	Measurement of High-Permittivity Dielectric Characteristics at Microwave and mm-wave	Leakage Effects in Millimeter-Wave Power Transfer Standards	Microwave Radiometry of Blackbody Radiation
Presenting Author: Mark Bieler, Physikalisch-Technische Bundesanstalt	Presenting Author: Yuto Kato, National Institute of Advanced Industrial Science and Technology	Presenting Author: Michele Borsero, INRIM	Presenting Author: Young-Pyo Hong, Korea Research Institute of Standards and Science	Presenting Author: Rolf Judaschke, PTB	Presenting Author: Dazhen Gu, National Institute of Standards and Technology

10:30 - 11:00

**Coffee Break**

Confederation Foyer

11:00 - 11:30      **Closing Session**  
Governor General Ballroom

11:30 - 12:00      **Transportation to NRC**

12:00 - 16:00      **NRC Laboratory Tour**  
National Research Council Laboratory Facility

16:00 - 16:30      **Transportation to the Westin Hotel**

**Saturday, July 16, 2016**

09:00 - 16:00      **Satellite Meetings (By Invitation Only)**  
Executive Level

SIM Electricity and Magnetism Metrology Working Group (By Invitation Only)	Quebec Room	CODATA Task Group on Fundamental Constants (TGFC) (By Invitation Only)	Oak Room - Executive Level
Chair: Lucas Daniel Di Lillo, Instituto Nacional De Tecnologia Industrial INTI		Chair: David Newell, NIST	