**Monday, July 2**

8:45 - 10:30 am

**Mo1-OS Opening Session**

Room: *WW-BCD*

Opening Remarks

*Dean Jarrett*, *CPEM 2012 Chairman, National Institute of Standards and Technology*

Welcome Remarks

"The Metre Convention - its Relevance to the 21st Century"

*Dr. Barry Inglis*, *President, Comité International des Poids et Mesures (CIPM)*

Early Career Program Awards

IUPAP Awards Presentation

Keynote Address

"Precision Cosmology"

*Prof. Suzanne Staggs*, *Princeton University Physics Department*

11:00 am - 12:30 pm

**Mo2-PL1 Plenary-I**

Room: *WW-BCD*

Fundamental Constants - The Ultimate Metric

*Dr. Barry Wood*, *National Research Council of Canada*

Superconducting Quantum Standards

*Dr. Richard Harris*, *National Institute of Standards and Technology*

2:00 pm - 4:00 pm

**Mo3-SS1 Special Session on Redefinition of the SI**

*Chair: Peter Mohr*, *NIST*

Monday 2:00 - 4:10

Room: *WW-BCD*

The origins and history of the International System of Units, SI

*Terry Quinn*, *Bureau International des Poids et Mesures (BIPM)*

Adapting the International System of Units to the 21st Century

*Ian M. Mills*, *University of Reading*

Survey of Planck Constant Measurements

*Estefanía de Mirandés*, *Bureau International des Poids et Mesures (BIPM)*

Survey of Boltzmann constant measurements

*Laurent Pitre*, *LNE CNAM*
Mo3-I1

**Current-1: High Current and Pulse**

**Chair:** Jari Hallstrom, Centre for Metrology and Accreditation (MIKES)

Monday 2:00 - 4:00  
Room: Ann-1,2

Error Estimation of 20 kA CT by the Parameter Measurement

*Kunihiko Takahashi*, Japan Electric Meters Inspection Corporation

Calibration of an Instrument Current Transformer at a Ratio of 20 kA/5 A

*Renata Styblikova*, Czech Metrology Institute

CRS & Improved Equivalent Ampere Turn Method

*Kunihiko Takahashi*, Japan Electric Meters Inspection Corporation

PTB – UNIIM Bilateral Comparison on Current Transformer Measurement Systems at Currents up to 60 000A

*Enrico Mohns*, Physikalisch-Technische Bundesanstalt (PTB)

An Improved Method for Switching Impulse Evaluation

*Andreas Nilsson*, SP Technical Research Institute of Sweden

Measurement of the equivalent inductance of the high current shunts

*Xianlin Pan*, Harbin Institute of Technology

Mo3-RF1

**RF/MW-1: S Parameters, Thermal Noise**

**Chair:** Rolf Judaschke, Physikalisch-Technische Bundesanstalt (PTB)

Monday 2:00 - 4:00  
Room: Ann-3,4

A look at the sensitivity of the Thru-Reflect-Line Vector Network Analyzer calibration algorithm

*Chris Eio*, National Physical Laboratory

Investigation of a Precision Waveguide as Phase Standard for Millimeter-Wave Vector Network Analysis

*Karsten Kuhlmann*, Physikalisch-Technische Bundesanstalt (PTB)

Broadband Cryogenic Calibration Two-port Superconducting Resonators

*Jen-Hao Yeh*, University of Maryland

Double Step Attenuation Measurement Technique for High Attenuation of Variable Attenuators

*Anton Widarta*, National Metrology Institute of Japan (AIST)

A Verification Method for Noise-Temperature Measurements on Cryogenic Low-Noise Amplifiers

*Dazhen Gu*, NIST

The Calibration Target for FY-3 Space-Borne Microwave Humidity Sounder

*Chunyue Cheng*, Beijing Institute of Radio Metrology and Measurement (BIRMM)

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4:00 pm - 6:00 pm

Mo4-P1-V1  

**Poster-1: Voltage-P1**

**Chair:** Alain Rufenacht, NIST

Monday 4:00 - 6:00  
Room: CBL-1

P1  
Investigation of systematic errors of an ac Josephson voltage standard

*Peter S. Filipski*, National Research Council of Canada

P2  
Experimental Evidence for Low Current Slope in AC PJVS

*Alexander Katkov*, VNIIM - D.I. Mendeleyev Institute for Metrology
P3  A Voltage Calibrator based on programmable Josephson Arrays  
**Jinni Lee**, Physikalisch-Technische Bundesanstalt (PTB)

P4  Expanding the Operating Range of the Pulse-Driven AC Josephson Voltage Standard  
**Helko van den Brom**, VSL - Dutch Metrology Institute

P5  Application of a Pulse-driven ac Josephson Voltage Standard to ac-dc Difference Measurement in KRISS  
**Yonuk Chong**, Korea Research Institute of Standards and Science (KRISS)

P6  Study of Dry Etching Process Using SF6 and CF4/O2 for Nb/NbxSi1-x/Nb Josephson-Junction Fabrication  
**Jianting Zhao**, National Institute of Metrology (NIM) China

Mo4-P1-V2  Poster-1: Voltage-P2  
**Chair: Karl-Erik Rydler**, SP Technical Research Institute of Sweden  
Monday 4:00 - 6:00  
Room: CBL-2

P7  Development of Thermodynamic Temperature Measurement Technique Based on Quantum Standards at NMIJ/AIST  
**Chiharu Urano**, National Metrology Institute of Japan (AIST)

P8  New Drive System for Programmable Josephson Voltage Standard Using Pulse Packet Bias  
**Michitaka Maruyama**, National Institute of Advanced Industrial Science and Technology (AIST)

P9  A Bias Source for the Voltage Reference of the BIPM Watt Balance  
**Stephane P. Solve**, Bureau International des Poids et Mesures (BIPM)

P10  Combining Josephson Systems for Pure AC Waveforms with Large Amplitudes  
**Ralf Behr**, Physikalisch-Technische Bundesanstalt (PTB)

P11  An Optically-Powered Current Source Operating Under Cryogenic Conditions  
**Jarle Gran**, Justervesenet

P12  Preliminary accuracy investigation of an AC voltage standard based on square wave biased Josephson voltage reference  
**Jaani Nissila**, Centre for Metrology and Accreditation (MIKES)

Mo4-P1-V3  Poster-1: Voltage-P3  
**Chair: Laurie Christian**, Measurement Standards Laboratory of New Zealand  
Monday 4:00 - 6:00  
Room: CBL-3

P16  Dissemination of CMS Voltage Standard by Using NIST 10 V Programmable Josephson Voltage Standard System  
**Shih-Fang Chen**, Industrial Technology Research Institute (ITRI)

P17  Low Frequency Characterization of a Planar Multijunction Thermal Converter using a Programmable Josephson Voltage Standard  
**Gunnar Eklund**, SP Technical Research Institute of Sweden

P18  Investigation of ADC-Aided AC Measurement through the use of PJVS  
**Gleb Gubler**, D.I. Mendeleyev Institute for Metrology (VNIIM)

P19  Improvements of the 10 V CENAM Josephson Voltage Standard to reach a standard uncertainty at 1 nV level  
**Carlos David Aviles Castro**, Centro Nacional de Metrologia (CENAM)
Poster-1: Materials

Chair: Michael Janezic, NIST

Monday 4:00 - 6:00
Room: CBL-5

P20 Direct comparison of Josephson Voltage Standards at 10 V between BIPM and CENAM
Carlos David Aviles Castro, Centro Nacional de Metrologia (CENAM)

P34 Determination of the Efficiency of Energy Harvesters
Bernhard Schumacher, Physikalisch-Technische Bundesanstalt (PTB)

P33 A Zero Boil-Off Dewar for Use with a Cryogenic Current Comparator
Tim Lawson, Industrial Research, Ltd.

P32 A Millimeter Wave Breast Cancer Imaging Methodology
Liu Chao, Tufts University

P31 Precision Measurements of Dielectric Permittivity of Common Thin Film Materials at Microwave and Terahertz Frequencies
Liu Chao, Tufts University

P27 Arbitrary waveform generator for simulation of energy harvesters
Rado Lapuh, Slovenian Institute of Quality and Metrology (SIQ)

P28 Characterization of dielectric properties of insulating materials for use in an HVDC reference divider
Alf-Peter Elg, SP Technical Research Institute of Sweden

P29 Harmonic analysis method for electromechanical characterizations of MEMS based energy harvesters
Alexandre Bounouh, Laboratoire national de métrologie et d’essais (LNE)

P30 System for electromagnetic characterization of ceramics
Borut Pinter, Slovenian Institute of Quality and Metrology (SIQ)

Poster-1:RF/MW-P1

Chair: Thomas M. Wallis, NIST

Monday 4:00 - 6:00
Room: CBL-6

P39 Bilateral comparison on calibration factor of a 2.92 mm power sensor
Rolf Judaschke, Physikalisch-Technische Bundesanstalt (PTB)

P38 A Broadband Waveguide Calorimeter for mm-Wave Power Meter Calibration in the Frequency Range from 50 GHz to 110 GHz
Kazuhiro Shimaoka, National Metrology Institute of Japan (AIST)

P37 Coaxial Power Sensor Calibration with Adaptor by Direct Comparison Transfer
Yang Cai, Nanyang Technological University, Singapore

P46 RF power standard for low frequencies (100 kHz to 1 GHz)
Michaël Charles, Laboratoire national de métrologie et d’essais (LNE)

P47 Waveguide 50 – 110 GHz Power Sensor Calibration System by Direct Comparison Transfer
Yueyan Shan, National Metrology Centre A*Star (NMC)
Monday 4:00 - 6:00  
Room: CBL-7

**Poster-1: RF/MW-P2**

*Chair: Jeong-Hwan Kim, Korea Research Institute of Standards and Science (KRISS)*  
Monday 4:00 - 6:00  
Room: CBL-7

**P48** Scattering Parameter Measurement Comparison between NMC and INRIM on Vector Network Analyzer Using WR15 and WR10 Connectors  
*Yueyan Shan, National Metrology Centre A*Star (NMC)*

**P50** Development of S-parameter Standard for Coaxial 3.5 mm Connectors in the Frequency Range from 10 MHz to 100 MHz  
*Ryoko Kishikawa, National Metrology Institute of Japan (AIST)*

**P49** Numerical Evaluation of Coaxial RF Calibration Standards  
*Alain Michaud, National Research Council of Canada*

**P58** Modelling the Pin Gap Effect in Coaxial Connectors  
*Qian Cynthia Zhu, National Measurement Institute, Australia*

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**Mo4-P1-RF2**

**Poster-1: RF/MW-P3**  
*Chair: Yozo Shimada, National Metrology Institute of Japan (AIST)*  
Monday 4:00 - 6:00  
Room: CBL-8

**P59** Covariance-Matrix-Based Uncertainty Propagation Analysis for Complex-Valued Quantities throughout VNA S-parameter Measurements and Power-meter Calibration  
*Yichi Zhang, Harbin Institute of Technology*

**P60** An NVNA Poly-Harmonic Inter-modulation Phase Reference Based on SRD Comb Generator and Multi-tone Stimulus  
*Yichi Zhang, Harbin Institute of Technology*

**P62** Traceable Measurement of Source and Receiver EVM using a Real-Time Oscilloscope  
*David A. Humphreys, National Physical Laboratory*

**P61** A Method for the Complex Residual Errors of a VNA in One-port Measurements  
*Jeong-Hwan Kim, Korea Research Institute of Standards and Science (KRISS)*

**P67** Optimization of the Atomic Candle Signal Used for Microwave Power Standard Based on the Rabi Frequency  
*Moto Kinoshita, National Institute of Advanced Industrial Science and Technology (AIST)*

**P68** Evaluation of Complex Measurement Uncertainty in Polar Coordinate for Equivalent Source Reflection Coefficient  
*Yu Song Meng, National Metrology Centre A*Star (NMC)*

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**Mo4-P1-Po1**

**Poster-1: Power-P1**  
*Chair: Zuliang Lu, National Institute of Metrology (NIM) China*  
Monday 4:00 - 6:00  
Room: CBL-9

**P54** Bilateral three-phase 50 Hz power comparison  
*Jari Hallstrom, Centre for Metrology and Accreditation (MIKES)*

**P53** Evaluation of the Dynamic Performance Characteristic of Electrical Energy Meters  
*Zuliang Lu, National Institute of Metrology (NIM) China*
Poster-1: Power-P2
Chair: Umberto Pogliano, Instituto Nazionale di Ricerca Metrologica (INRiM)
Monday 4:00 - 6:00 Room: CBL-10

The Establishment of a Reference System at VSL for On-Site Calibration of HV Revenue Metering Systems
Gert Rietveld, VSL - Dutch Metrology Institute

Development of high voltage ac energy meter
Xuefeng Ma, Shandong Institute of Metrology

High-CURRENT AC Current Transformer Calibration Using an Automated Sampling System
Helko van den Brom, VSL - Dutch Metrology Institute

Comparative Study of Temperature Influence on Thick film and Wire wound Precision HV Resistive Divider
Kul Bhushan Ravat, National Physical Laboratory, India

Poster-1: Power-P3
Chair: Tom Nelson, NIST
Monday 4:00 - 6:00 Room: CBL-11

Swerlein’s and Least Squares Algorithms for Estimating Signal Harmonics: A Comparative Study
Gregory A. Kyriazis, INMETRO - Instituto Nacional de Metrologia, Qualidade e Tecnologia

Precise Resistive Voltage Divider for Harmonic Measurements
Gregory A. Kyriazis, INMETRO - Instituto Nacional de Metrologia, Qualidade e Tecnologia

A Polyharmonic Digital Synthesizer for the Calibration of Phase Sensitive Measuring Systems up to Ultrasonic Band
Bruno Trinchera, Instituto Nazionale di Ricerca Metrologica (INRiM)

A Transfer Standard of Harmonic Voltage and Current at Power Frequency
Wang Lei, National Institute of Metrology (NIM) China

Synchronized Sampling Controller for Harmonic Measurement
Wang Lei, National Institute of Metrology (NIM) China

Resistive Voltage Divider with Two Stage Voltage Buffer for Harmonic Measurement
Wang Lei, National Institute of Metrology (NIM) China
Mo4-P1-I1  Poster-1: Current-P1

**Chair:** Antti J. Manninen, Centre for Metrology and Accreditation (MIKES)

**Monday 4:00 - 6:00**  
**Room:** CBL-12

P71 Towards a sub-femto ampere current amplifier based on a cryogenic current comparator  
*Francois Piquemal*, LNE

P72 Comparison of MIKES and PTB Precision Current Sources Based on Capacitor Charging  
*Ilkka Iisakka*, Centre for Metrology and Accreditation (MIKES)

P73 Investigated drift of the CT error and an aluminum shielding  
*Takuya Tadokoro*, Japan Electric Meters Inspection Corporation

P74 Rebuilding of the Scales for AC-DC Transfer at PTB with Reduced Uncertainties of Measurement  
*Torsten Funck*, Physikalisch-Technische Bundesanstalt (PTB)

P70 Error Compensation of Capacitive Effects in Current Transformers  
*Daniel Slomovitz*, UTE - Administración Nacional de Usinas y Trasmisiones Eléctricas

**Mo4-P1-I2**  
**Poster-1: Current-P2**

**Chair:** Joseph R. Kinard, NIST

**Monday 4:00 - 6:00**  
**Room:** CBL-13

P78 Measurement of the level dependence in phase angle errors of the high current shunts  
*Xianlin Pan*, Harbin Institute of Technology

P77 Selfcalibrated Primary Alternative Current Ratio Standard  
*Micaheld Surdu*, Ukrmetereststandard

P76 Automatic Calibration of DC Low Level Current at SCL  
*Hoi Shan (Brenda) Lam*, Standards and Calibration Laboratory

P75 Calibration of AC Current from 10 μA to 1 mA at 10 kHz  
*Yue Liu*, National Institute of Metrology (NIM) China

**Tuesday, July 3**  
**8:30 am - 10:30 am**

Tu1-V1  **Voltage-1: Josephson Voltage Standards**

**Chair:** Peter S. Filipski, National Research Council of Canada  
**Tuesday 8:30 - 10:30**  
**Room:** WW-BC

Method for Ensuring Accurate AC Waveforms with Programmable Josephson Voltage Standards  
*Charles J. Burroughs*, NIST

Josephson waveform generation using multilevel Delta-Sigma modulation  
*Ilya Budovsky*, National Measurement Institute, Australia

Differential Sampling Measurement of a 7 V rms Sine Wave and a Programmable Josephson Voltage Standard  
*Alain Rufenacht*, NIST

Inmetro 10 V Programmable Josephson Voltage Standard Implementation  
*Regis Landim*, INMETRO - Instituto Nacional de Metrologia, Qualidade e Tecnologia
Magnetic Flux Measurement with Binary Josephson System  
**Yuan Gao, National Institute of Metrology (NIM) China**

**Tu1-SS2**  
**Special Session on Optical Clocks and the Possible Redefinition of the Second**  
*Chair: Luc Erard, Laboratoire national de métrologie et d'essais (LNE)*  
Tuesday 8:30 - 10:30  
Room: **WW-D**

Operation of a Primary Frequency Standard in the Real World  
**Thomas Parker, NIST**

Use of frequency standards in TAI: present and future  
**Gerard Petit, Bureau International des Poids et Mesures (BIPM)**

Strontium and Mercury optical lattice clocks at LNE-SYRTE  
**Sebastien Bize, SYRTE**

Comparison of clocks using optical fiber links: recent results and future projects  
**Harald Schnatz, Physikalisch-Technische Bundesanstalt (PTB)**

Possibilities for a future Redefinition of the Second  
**Patrick Gill, National Physical Laboratory**

**Tu1-R1**  
**Resistance**  
*Chair: Jan-Theodoor Janssen, National Physical Laboratory*  
Tuesday 8:30 - 10:30  
Room: **Ann-1,2**

Investigation of On-Chip Double-Shielded QHR Device in AC Regime  
**Nobu-hisa Kaneko, National Metrology Institute of Japan (AIST)**

A Simple Resistive Transfer Standard to Compare the Quantized Hall Resistance to 10 kohms  
**Félix Raso Alonso, Centro Español de Metrología (CEM)**

Evaluation of Low-Ohmic Resistance Measurement Capabilities between VSL and NIST  
**Gert Rietveld, VSL - Dutch Metrology Institute**

Selection and characterization of resistors for a HVDC reference divider  
**Ernest Houtzager, VSL**

Active-arm Resistance Bridge with Voltage Null-detection for Precision Measurement of Resistances above 1 MΩ  
**Gert Rietveld, VSL - Dutch Metrology Institute**

**11:00 am - 12:40 pm**

**Tu2-Po1**  
**Power-1**  
*Chair: Murray Early, Measurement Standards Laboratory of New Zealand*  
Tuesday 11:00 - 12:40  
Room: **WW-BC**

A Simple Algorithm for Estimating Parameters of Complex Modulated Signals from Prior Information about Modulating Signals  
**Gregory A. Kyriazis, INMETRO - Instituto Nacional de Metrologia, Qualidade e Tecnologia**
A Bilateral Comparison Between NIST Quantum-Based Power Standard and NRC Current-Comparator-Based Power Standard

**Thomas L. Nelson**, NIST

An International Comparison of 50/60 Hz Reactive Power Meter Calibrations between NRC, NIST, CENAM, NIM, and KRISS

**Eddy So**, National Research Council of Canada

Design of a wideband HVDC reference divider

**Jari Hallstrom**, Centre for Metrology and Accreditation (MIKES)

An Improved Current-Comparator-Based Power Standard at 120 V/5 A, 50 Hz - 60 Hz, with an Uncertainty of 2.5 µW/VA (k = 1)

**Eddy So**, National Research Council of Canada

**Tu2-FC1**

**Fundamental Constants-1: G, k_B, and R_∞**

*Chair: Michael Stock, BIPM*

Tuesday 11:00 - 12:40  
Room: **WW-D**

The BIPM G experiment Mk II

**Terry Quinn**, Bureau International des Poids et Mesures (BIPM)

The Measurement of the Newtonian Constant of Gravitation: One Recent Experiment and Some General Comments

**James E. Faller**, JILA, University of Colorado and NIST

Johnson Noise Thermometry Measurement of the Boltzmann Constant with a 200 Ω Sense Resistor

**Alessio Pollarolo**, NIST

Towards One-electron Ions in Rydberg States for Laser Spectroscopy

**Joseph N. Tan**, NIST

**Tu2-I2**

**Current-2**

*Chair: Héctor Laiz, Instituto Nacional de Tecnologia Industrial (INTI)*

Tuesday 11:00 - 12:40  
Room: **Ann-1,2**

Determination of the equivalent inductance of current shunts

**Jiangtao Zhang**, National Institute of Metrology (NIM) China

New design of coaxial current shunts for 50 A and 100 A

**Bostjan Voljc**, Slovenian Institute of Quality and Metrology (SIQ)

Study and development of a measurement set-up for high impulse currents

**Daniela Istrate**, Laboratoire national de métrologie et d'essais (LNE)

Magnetic Shielding Effectiveness of Current Comparator

**Haiming Shao**, National Institute of Metrology (NIM) China

Phase Comparator Based on Binary Inductive Current Divider up to 200 kHz

**Jiangtao Zhang**, National Institute of Metrology (NIM) China
Tu3-Po2

**Fundamental Constants-2: α, Current, and Rκ**
**Chair: Beat Jeckelmann**, Swiss Federal Office of Metrology (METAS)

Tuesday 2:00 - 4:00

Room: WW-D

Testing Phasor Measurement Units using IEEE 1588 Precision Time Protocol
**Gerard N. Stenbakken**, NIST

Demonstration of 50-Hz Electrical Active Power Measurement using a Micromechanical Magnetometer
**Jari Hallstrom**, Centre for Metrology and Accreditation (MIKES)

Traceability of Digital Electricity Meters
**Hongtao Huang**, National Institute of Metrology (NIM) China

Switching Power Meter for frequencies up to 1 MHz
**Ernest Houtzager**, VSL

Calibration of Wattmeters for Standby Power Testing to IEC 62301
**Ilya Budovsky**, National Measurement Institute, Australia

On the design of a class 0.2 HVDC electricity meter
**Stefan Svensson**, SP Technical Research Institute of Sweden

Tu3-ETS1

Emerging-Topic Session: Terahertz Metrology and Antenna Measurements above 100 GHz
**Co-Chairs: Jin-Seob Kang**, KRISS, and **Marla Dowell**, NIST

Tuesday 2:00 - 4:00

Room: Ann-1,2

Traceability to National Standards for S-parameter Measurements in Waveguide at 1.1 THz
**Masahiro Horibe**, National Metrology Institute of Japan (AIST)

Traceable Calibration of Terahertz Detectors
**Andreas Steiger**, Physikalisch-Technische Bundesanstalt (PTB)

Measurement of Channel and Propagation Properties at 300 GHz
**Thomas Kleine-Ostmann**, Physikalisch-Technische Bundesanstalt (PTB)
The Need for and Development of MM-wave Radiometer Calibration Targets with Very Low Coherent Backscatter
Richard J. Wylde, Thomas Keating Ltds & School of Physics and Astronomy, St. Andrews University

A Simultaneous-Imaging Machine-Vision Approach for the Precision Alignment of Two mm-Wave Antennas
David Novotny, NIST

Terahertz Metrology and Instrumentation
Erich Grossman, NIST

Tu3-TF1

Time and Frequency-1: Optical Clocks
Chair: Alan Madej, National Research Council of Canada
Tuesday 2:00 - 4:00
Room: Ann-3,4

Evaluation of Systematic Shifts for the $^{88}\text{Sr}^+$ 445-THz Reference Transition at the 10^{-17} Level using the NRC Next Generation Ion Trap System
Alan A. Madej, National Research Council of Canada

Frequency stabilization of laser diode to the 6S-8S two-photon transitions in cesium atoms in a vapor cell placed in an external cavity
Tomoyuki Uehara, Kyoto University

Characterization of a $^{88}\text{Sr}^+$ optical frequency standard at 445 THz by two-trap comparison
Geoffrey Barwood, National Physical Laboratory

A sub-40 mHz laser based on a silicon single-crystal optical cavity
Thomas Kessler, Physikalisch-Technische Bundesanstalt (PTB)

Polarizability of an optical lattice clock at 20 ppm
Jeff Sherman, NIST

87Sr optical lattice clocks at JILA
Michael J. Martin, JILA, University of Colorado and National Institute of Standards & Technology

4:00 pm - 6:00 pm

Tu4-P2-Po4

Poster-2: Power-P4
Chair: Eddie So, National Research Council of Canada
Tuesday 4:00 - 6:00
Room: CBL-1

P1 Spectral Leakage Errors When Using an Agilent 3458A to Measure Phase at Mains Power Frequencies
Tom J. Stewart, Industrial Research, Ltd.

P2 The Application of the Staircase Waveform of a DAC for Precise Measurements of Electrical Quantities
Zuliang Lu, National Institute of Metrology (NIM) China

P3 Determining voltage dependence of the phase response in voltage dividers
Tobias Bergsten, SP Technical Research Institute of Sweden

P4 Determination of Phase Angle Errors of Current Shunts for Wideband Power Measurement
Karl-Erik Rydler, SP Technical Research Institute of Sweden

P5 Uncertainty characterization of a two channels digital analyzer as a wideband phase comparator
Umberto Pogliano, Instituto Nazionale di Ricerca Metrologica (INRIM)
P6 High accuracy signal parameter estimation algorithm for calibration of PMU devices
Miha Kokalj, Slovenian Institute of Quality and Metrology (SIQ)

Tu4-P2-Po5 Poster-2: Power-P5
Chair: Lucas Di Lillo, Instituto Nacional de Tecnologia Industrial (INTI)
Tuesday 4:00 - 6:00 Room: CBL-2

P7 Instrument Transformer Test Set Calibration using Digital Sampling
Ana Maria Ribeiro Franco, INMETRO - Instituto Nacional de Metrologia, Qualidade e Tecnologia

P8 An Interpolated DFT Based on Determination of A Sampling Interval Using A Virtual Synchronous Frequency
Tatsuji Yamada, National Metrology Institute of Japan (AIST)

P9 Implementation of Sampling Measurement System for new VNIIM Power Standard
Gleb Gubler, D.I. Mendeleiev Institute for Metrology (VNIIM)

P17 Wideband Power Calibration System Based on Digital Sampling Technology
Jin Haibin, Beijing Orient Institute of Measurement & Test

Vera Nováková Zachovalová, Czech Metrology Institute

Tu4-P2-Po6 Poster-2: Power-P6
Chair: Rejean Arseneau, National Research Council of Canada
Tuesday 4:00 - 6:00 Room: CBL-3

P21 The Influence of Source Impedance in Electrical Characterization of Solid State Lighting Sources
Dongsheng Zhao, VSL - Dutch Metrology Institute

P19 A Current Transformer Test Set for the Audio Frequency Range
Enrico Mohns, Physikalisch-Technische Bundesanstalt (PTB)

P20 Instrumentation Amplifiers with Improved Accuracy for the Audio Frequency Range
Enrico Mohns, Physikalisch-Technische Bundesanstalt (PTB)

P22 Low-Frequency Quantum-Based AC Power Standard at NRC Canada
Branislav Djokic, National Research Council of Canada

P23 Predictable maximum RMS-error for windowed RMS (RMWS)
Kristian Ellingsberg, Justervesenet

P24 Precision Power Measurements of Quasi-Stationary Wave Forms
Richard Timmons, Guildline Instruments, Ltd.

Tu4-P2-Mg1 Poster-2: Magnetics-P1
Chair: Michal Ulvr, Czech Metrology Institute
Tuesday 4:00 - 6:00 Room: CBL-4

P35 Calibration of Axial DC Magnetic Field up to 1 Tesla at SCL
Hoi Shan (Brenda) Lam, Standards and Calibration Laboratory

P34 Reproduction of four base magnetic units in the unified standard of VNIIM
Vladlen Shifrin, D.I. Mendeleiev Institute for Metrology (VNIIM)
P33  VNIIM/KRISS Bilateral Comparison of dc Magnetic Flux Density by Means of a Transfer Standard Coil
    Po Gyu G. Park, Korea Research Institute of Standards and Science (KRISS)

P32  The Standard Device For AC Weak Magnetic Field at NIM
    Wei Zhang, National Institute of Metrology (NIM) China

P31  A system for calibration of search coils with area turns up to 100 m2
    Michal Ulvr, Czech Metrology Institute

Tu4-P2-FC1  Poster-2: Fundamental Constants-P1
    Chair: Stephan Schlamminger, NIST
    Tuesday 4:00 - 6:00  Room: CBL-6

P27  A Novel High-Precision Current Adder Based on DC Comparator
    Zhang Yumeng, Huazhong University of Science & Technology (HUST)

P28  Observer based Magnetic Flux Estimation of Induction Motors
    Chang-Woo Park, Korea Electronics Technology Institute

P29  Uncertainty Estimate in the Evaluation of the Electric Field Induced inside Human Bodies Radiated by
    Unknown LF Sources
    Gabriella Crotti, Instituto Nazionale di Ricerca Metrologica (INRiM)

P30  Nanoscale Electrodynamic Vortex Response of Nb Superconductors
    Tamin Tai, University of Maryland-College Park

Tu4-P2-FC2  Poster-2: Fundamental Constants-P2
    Chair: Dave Inglis, National Research Council of Canada
    Tuesday 4:00 - 6:00  Room: CBL-7

P47  The 2012 North American Watt Balance Absolute Gravity Comparison
    David B. Newell, NIST

P48  Realization of the Anticipated Definition of the Kilogram
    Giovanni Mana, Instituto Nazionale di Ricerca Metrologica (INRiM)

P51  A Special Apparatus for Workpieces’ Magnetic Measurement of Joule Balance at NIM
    Zhonghua Zhang, National Institute of Metrology (NIM) China
Tu4-P2-FC3  Poster-2: Fundamental Constants-P3

**Chair:** Blaise Jeanneret, Swiss Federal Office of Metrology (METAS)

Tuesday 4:00 - 6:00  
Room: CBL-8

P49  250mA High-Precision DC-Current Source for Joule Balance at NIM  
*Zhonghua Zhang*, National Institute of Metrology (NIM) China

P59  Improved performance of the ECCS experiment at PTB  
*Hansjoerg Scherer*, Physikalisch-Technische Bundesanstalt (PTB)

P60  Laser interferometry in the Si lattice-parameter measurement  
*Enrico Massa*, Instituto Nazionale di Ricerca Metrologica (INRiM)

P61  Progress on the Thompson-Lampard Capacitor Project  
*Pierre Gournay*, Laboratoire national de métrologie et d'essais (LNE)

P62  Uncertainty Reduction in the Volume Measurement of Si Spheres by an Optical Interferometer to Determine the Avogadro Constant  
*Naoki Kuramoto*, National Metrology Institute of Japan (AIST)

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Tu4-P2-R1  Poster-2: Resistance-P1

**Chair:** Alejandra Tonina, Instituto Nacional de Tecnologia Industrial (INTI)

Tuesday 4:00 - 6:00  
Room: CBL-9

P43  Improvements in High Resistance Measurements at CENAM  
*Felipe L. Hernandez Marquez*, Centro Nacional de Metrologia (CENAM)

P42  Voltage Injection Type High Ohm Resistance Bridge  
*Takehiko Oe*, National Metrology Institute of Japan (AIST)

P41  New Design of the Quantized Hall Resistance Array Device  
*Takehiko Oe*, National Metrology Institute of Japan (AIST)

P40  Antiperovskite Compound Standard Resistor  
*Takehiko Oe*, National Metrology Institute of Japan (AIST)

P44  Improvement in Digital Control Electronic for CCC Resistance Bridge with Sinusoidal Biasing Currents  
*Alexandre Satrapinski*, Centre for Metrology and Accreditation (MIKES)

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Tu4-P2-R2  Poster-2: Resistance-P2

**Chair:** Haiming Shao, National Institute of Metrology (NIM) China

Tuesday 4:00 - 6:00  
Room: CBL-10

P56  Evaluation of a Voltage Divider Based on Quantized Hall Resistance Arrays  
*Atsushi Domae*, National Metrology Institute of Japan (AIST)

P64  10×10 GΩ guarded Hamon network designed for the Wheatstone bridge for high resistors calibration  
*Flavio Galliana*, Instituto Nazionale di Ricerca Metrologica (INRiM)

P63  High Resistance Measurements with a Two-Terminal Cryogenic Current Comparator  
*Marcos Bierzychudek*, Instituto Nacional de Tecnologia Industrial (INTI)
<table>
<thead>
<tr>
<th>Poster-2: Resistance-P3</th>
<th>Chair: François Piquemal, Laboratoire national de métrologie et d'essais (LNE)</th>
<th>Tuesday 4:00 - 6:00</th>
<th>Room: CBL-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tu4-P2-R3</td>
<td>A Transportable Thermoregulated Enclosure for Standard Resistors</td>
<td>Nick Fletcher, Bureau International des Poids et Mesures (BIPM)</td>
<td></td>
</tr>
<tr>
<td>Tu4-P2-Z1</td>
<td>Poster-2: Impedance-P1</td>
<td>Chair: Nick Fletcher, Bureau International des Poids et Mesures (BIPM)</td>
<td>Tuesday 4:00 - 6:00</td>
</tr>
<tr>
<td>P79</td>
<td>Thermal Characterization of a Coaxial Calculable Resistor</td>
<td>Flavio Silveira, INMETRO - Instituto Nacional de Metrologia, Qualidade e Tecnologia</td>
<td></td>
</tr>
<tr>
<td>P78</td>
<td>Characterizing the Impedance of the Electrodes of a Calculable Cross Capacitor by Four-Terminal Measurement Techniques</td>
<td>Torsten Funck, Physikalisch-Technische Bundesanstalt (PTB)</td>
<td></td>
</tr>
<tr>
<td>P77</td>
<td>Main Electrodes Alignment for NIST Calculable Capacitor</td>
<td>Yicheng Wang, NIST</td>
<td></td>
</tr>
<tr>
<td>P76</td>
<td>Modification of End Effects in Cross Capacitors</td>
<td>Yuri Semenov, D.I. Mendeleyev Institute for Metrology (VNIIM)</td>
<td></td>
</tr>
<tr>
<td>P75</td>
<td>Cross Capacitor with Movable Main Electrodes</td>
<td>Yuri Semenov, D.I. Mendeleyev Institute for Metrology (VNIIM)</td>
<td></td>
</tr>
<tr>
<td>Tu4-P2-Z2</td>
<td>Poster-2: Impedance-P2</td>
<td>Chair: Yicheng Wang, NIST</td>
<td>Tuesday 4:00 - 6:00</td>
</tr>
<tr>
<td>P71</td>
<td>SIM.EM-K4 10 pF Capacitance Comparison Summary</td>
<td>Andrew D. Koffman, NIST</td>
<td></td>
</tr>
<tr>
<td>P72</td>
<td>Design and Construction of a Bootstrap Transformer at Inmetro</td>
<td>Gregory A. Kyriazis, INMETRO - Instituto Nacional de Metrologia, Qualidade e Tecnologia</td>
<td></td>
</tr>
</tbody>
</table>
Methods for comparison of loss angle standards at 10 kV level  
*Jari Hallstrom*, Centre for Metrology and Accreditation (MIKES)

Determination and Comparison of Temperature Coefficients of Standard Inductors using different methods  
*Satish Singh*, CSIR-National Physical Laboratory

An automated set-up for calibration of inductive voltage dividers  
*Erik Dierikx*, VSL - Dutch Metrology Institute

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**Wednesday, July 4**

8:30 am - 10:30 am  
**We1-ETS2**  
Emerging-Topic Session: Metrology for Smart-Grid Applications  
Co-Chairs: *Gert Rietveld*, VSL - Dutch Metrology Institute, and *Yi-hua Tang*, NIST  
Room: WW-BC  
Wednesday 8:30 - 10:30  
- Realization of a Smart Grid Metrology Infrastructure in Europe  
  *Gert Rietveld*, VSL - Dutch Metrology Institute
- Reference Grade Calibrator for the Testing of the Dynamic Behavior of Phasor Measurement Units  
  *Jean-Pierre Braun*, Swiss Federal Office of Metrology (METAS)
- Software Platform for PMU Algorithms Testing  
  *Umberto Pogliano*, Instituto Nazionale di Ricerca Metrologica (INRiM)
- Calibration of Phasor Measurement Unit at NIST  
  *Yi-hua Tang*, NIST
- The PMU Performance Evaluation  
  *Hao Liu*, North China Electric Power University
- A Current-Comparator-Based System for On-Site Calibrations of High Voltage PMU Systems  
  *Eddy So*, National Research Council of Canada
- Evaluation of Optical Instrument Transformers for On-Site Calibrations of High Voltage Measurement Systems  
  *Eddy So*, National Research Council of Canada

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**We1-FC3**  
Fundamental Constants-3: Watt Balances  
Chair: *Ian Robinson*, National Physical Laboratory  
Room: WW-D  
Wednesday 8:30 - 10:30  
- The Planck constant, watt and vacuum balances, and an evolving Mise en pratique for the kilogram in North America  
  *Jon R. Pratt*, NIST
- Status of the BIPM Watt Balance  
  *Hao Fang*, Bureau International des Poids et Mesures (BIPM)
- The METAS Watt Balance Mark II Experiment  
  *Ali Eichenberger*, Swiss Federal Office of Metrology (METAS)
- Determination and Correction of Mass Exchange Errors in the NRC Watt Balance  
  *Carlos Sanchez*, National Research Council of Canada
Towards a fixed value of the Planck constant: reproducibility and an updated NIST-3 watt balance

**Darine El Haddad**, NIST

The Joule Balance in Progress

**Zhonghua Zhang**, National Institute of Metrology (NIM) China

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**We1-V2**

**Voltage-2**

**Chair:** Ilya Budovsky, National Measurement Institute, Australia

Wednesday 8:30 - 10:30

Room: Ann-1,2

New High-Frequency MJTCs of Novel Design on Fused Silica Substrates

**Thomas E. Lipe**, NIST

A Digital-to-Analog Converter with a Voltage Standard Reference

**Alain Rufenacht**, NIST

Sampling Systems with Fractional-Delay Applied to High-Accuracy Measurements

**Renata Barros e Vasconcellos**, INMETRO - Instituto Nacional de Metrologia, Qualidade e Tecnologia


**Yasutaka Amagai**, National Metrology Institute of Japan (AIST)

The 2011 North-American Josephson Voltage Interlaboratory Comparison

**Harold Parks**, Sandia National Laboratories

Investigations on Analog Synthesis of Ultra-Pure Sine Waveforms for Dynamic ADC Characterization

**Waldemar Ihlenfeld**, Physikalisch-Technische Bundesanstalt (PTB)

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**We1-Ph1**

**Photonics**

**Chair:** David Humphreys, National Physical Laboratory

Wednesday 8:30 - 10:30

Room: Ann-3,4

THz Laser Power Meter Comparison

**John Lehman**, NIST

Mismatch Analysis Using Pulsed Electro-Optic Sampling at KRISS

**Dong-Joon Lee**, Korea Research Institute of Standards and Science (KRISS)

Optical Link between Two Optical Frequency Combs using Injection Locked Laser

**Sunghun Lee**, Korea Research Institute of Standards and Science (KRISS)

Fiber-coupled Electrical-substitution Picowatt Cryogenic Radiometer

**Nathan Tomlin**, NIST

Fast processing for spectral discrimination in hyperspectral imaging

**Massimo Zucco**, Instituto Nazionale di Ricerca Metrologica (INRiM)

Measuring the Thickness of Few-Layer Graphene by Laser Scanning Microscopy

**Behnood Ghamsari**, University of Maryland
Wednesday 11:00 - 12:40                  Room: WW-BC

Displacement Sensor for Detecting Sub-micrometer Motion
Saytaro Kon, National Metrology Institute of Japan (AIST)

Uncertainty Estimations of an Evaluation System for a High Accuracy and Wideband Transmission Amplifier
Mathieu Durand, NIST

Model Tests of Electrical Compensation Method for the New Calculable Capacitor
Lu Huang, National Institute of Metrology (NIM) China

Josephson impedance bridges as universal impedance comparators
Luis Palafox, Physikalisch-Technische Bundesanstalt (PTB)

Mutual inductance measurement of the superconducting coil for Joule Balance
Zhengkun Li, National Institute of Metrology (NIM) China

We2-FC4

Fundamental Constants-4: Watt Balance, $N_A$
Chair: Ali Eichenberger, Swiss Federal Office of Metrology (METAS)
Wednesday 11:00 - 12:40                  Room: WW-D

Improving the Performance of the Force Comparator in a Watt Balance based on Pressure Balances
Chris Sutton, Measurement Standards Laboratory of New Zealand

Superconducting coil system to study the behavior of superconducting coils for a cryogenic watt balance
Estefania de Mirandés, Bureau International des Poids et Mesures (BIPM)

State of the Avogadro $^{28}$Si spheres
Arnold Nicolaus, Physikalisch-Technische Bundesanstalt (PTB)

Uncertainty considerations on the new Avogadro sphere interferometer
Torsten Mai, Physikalisch-Technische Bundesanstalt (PTB)

On the Molar Mass of Silicon for a New Avogadro Constant
Axel Pramann, Physikalisch-Technische Bundesanstalt (PTB)

We2-I3

Current-3
Chair: Rene Carranza, Centro Nacional de Metrologia (CENAM)
Wednesday 11:00 - 12:40                  Room: Ann-1,2

Realization and validation of the current reference from 10 mA to 100 A and 10 Hz to 100 kHz at CEM
Javier Diaz de Aguilar, CEM

Uncertainty Estimations of an Evaluation System for a High Accuracy and Wideband Transmission Amplifier
Saytaro Kon, National Metrology Institute of Japan (AIST)

Wideband Accurate Calibration of a Current Probe
Alessandro Mortara, Swiss Federal Office of Metrology (METAS)
Research on High Accuracy Current Comparator and Self-calibration Methods

*Wei Wang*, **National Institute of Metrology (NIM)** **China**

**We2-Mg1**  
**Magnetic**  
*Chair: Po Gyu Park*, **Korea Research Institute of Standards and Science (KRISS)**  
Thursday 8:30 - 10:00  
Room: **WW-BCD**  

AC Magnetic Field Standard for Magnetometer Calibrations at NMIJ  

*Masanori Ishii*, **National Metrology Institute of Japan (AIST)**

A Self-Calibration Method for High-Precision Direct Current Comparator  

*Zhang Yumeng*, **Huazhong University of Science & Technology (HUST)**

Effects of Stray Magnetic Fields on the Iron Core of DCC  

*Haiming Shao*, **National Institute of Metrology (NIM)** **China**

A 60,000-A DC Comparator Based on Dual-Loop Control System  

*Zhang Yumeng*, **Huazhong University of Science & Technology (HUST)**

Simple Eddy Current Sensor for Small Angle Measurement  

*Zhonghua Zhang*, **National Institute of Metrology (NIM)** **China**

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**Thursday, July 5**

**8:30 - 10:00 am**

Th1-PL2  
**Plenary-2**  
Thursday 8:30 - 10:00  
Room: **WW-BCD**  

High Harmonic Interferometry  

*Prof. Paul Corkum*, **University of Ottawa-National Research Council Chair in Attosecond Photonics**

Graphene Metrology  

*Prof. Philip Kim*, **Columbia University**

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**10:30 am - 12:30 pm**

Th2-V3  
**Voltage-3**  
Thursday 10:30 - 12:30  
Room: **WW-BC**  

A Simple Build-up Method for the DC Voltage Scale of a Source  

*Murray Early*, **Measurement Standards Laboratory of New Zealand**

Calibration of 10:-1 Inductive Voltage Dividers by Thompson’s Method Using an Electronically-Enhanced Three-Stage Calibrating Transformer  

*Branslav Djokic*, **National Research Council of Canada**

Relationship between Time-domain and Frequency-domain Calibration on Resistive Voltage Divider  

*Haiming Shao*, **National Institute of Metrology (NIM)** **China**

Wideband guarded inductive divider for linearity test in synchronized generators  

*Umberto Pogliano*, **Istituto Nazionale di Ricerca Metrologica (INRiM)**

Determination of the phase error of 8:1 Inductive Voltage Divider  

*Jiangtao Zhang*, **National Institute of Metrology (NIM)** **China**
AC Voltage Reference Using the Fundamental of DAC Stepwise Wave

Yan Yang, National Institute of Metrology (NIM) China

Thursday 10:30 - 12:30

Special Session on Graphene Based Electrical Metrology

Chair: Wilfrid Poirier, Laboratoire national de métrologie et d’essais (LNE)

Thursday 10:30 - 12:30

Room: Ann-1,2

Breakdown of the quantum Hall effect in graphene

Jan-Theodoor Janssen, National Physical Laboratory

Precision measurements of the quantum Hall effect in exfoliated graphene

Mirosław Woszczyna, Physikalisch-Technische Bundesanstalt (PTB)

Characteristics of Graphene for Quantized Hall Effect Measurements

Randolph E. Elmquist, NIST

What Can Limit the Quantum Hall Effect Quantization in Graphene?

Félicien Schopfer, Laboratoire national de métrologie et d’essais (LNE)

Native Graphene Oxides at Graphene Edges

Shinsuke Shimamoto, NMIJ and Tokyo City University

RF/MW: Waveforms and Other

Chair: Tom Crowley, NIST

Thursday 10:30 - 12:30

Room: Ann-3,4

Channel Timebase Errors for Digital Sampling Oscilloscopes

David A. Humphreys, National Physical Laboratory

Traceability of High-Speed Electrical Waveforms at NIST, NPL, and PTB

Paul D. Hale, NIST

Impedance of Active Devices using a Real Time Digital Oscilloscope and Quarter-Wave Technique

James Miall, National Physical Laboratory (NPL)

Waveform metrology for error vector magnitude measurements in a 300 GHz transmission system

Martin Hudlicka, Czech Metrology Institute

Calibration Techniques for Scanning Microwave Microscopy

Thomas M. Wallis, NIST

Field Exposition and Dosimetry with (sub)mm Waves

Thomas Kleine-Ostmann, Physikalisch-Technische Bundesanstalt (PTB)

2:00 pm - 4:00 pm

Poster-3: Voltage-P4

Chair: Regis Landim, INMETRO - Instituto Nacional de Metrologia, Qualidade e Tecnologia

Thursday 2:00 - 4:00

Room: CBL-1

P1 Four-terminal mutual inductor for calibration of the lock-in amplifier at mV ranges

Xianlin Pan, Harbin Institute of Technology

P2 Precision ac-dc difference measurements of a thermal transfer standard based on a Josephson sampling voltmeter

Mun-Seog Kim, Korea Research Institute of Standards and Science (KRISS)
P3  Modeling of a Sampling System based on Sigma-Delta ADC for Data Acquisition in Metrology  
    **Ricardo Iuzzolino**, Instituto Nacional de Tecnología Industrial (INTI)

P4  Characterization of a 2-Channel Digitizer with Differential Inputs  
    **Tobias Möhring**, Physikalisch-Technische Bundesanstalt (PTB)

P5  Comparison of the Reference Step Method with a MI 8000/8001 Potentiometer  
    **Martin Šíra**, Czech Metrology Institute

P6  The Effect of DAC Clock Jitter on the RMS Value of Digitally Synthesized AC Voltage  
    **Marian Kampik**, Silesian University of Technology

P7  Comparison of Non-Quantum Methods for Calibration of Digital Sources of Very-Low-Frequency AC Voltage  
    **Marian Kampik**, Silesian University of Technology

**Th3-P3-V5**  
**Poster-3: Voltage-P5**  
**Chair: Alexander Katkov**, VNIIM - D.I. Mendeleyev Institute for Metrology  
  Thursday 2:00 - 4:00  
  Room: CBL-2

P8  Influence of Liquid Helium Level on Dip Probe Wiring  
    **Joseph R. Kinard**, NIST

P9  A Very Low Thermal EMFs Computer-Controlled Scanner  
    **Stephane P. Solve**, Bureau International des Poids et Mesures (BIPM)

P10 Fabrication and Characterization of Single Nb/NbxSi1-x/Nb Josephson Junction for Voltage Standard  
    **Qing Zhong**, National Institute of Metrology (NIM) China

P11 MEMS based AC voltage references with very high stability  
    **Alexandre Bounouh**, Laboratoire national de métrologie et d'essais (LNE)

P12 Quantum - Based AC-DC Transfer Using a Transconductance Amplifier  
    **Ilya Budovsky**, National Measurement Institute, Australia

**Th3-P3-V6**  
**Poster-3: Voltage-P6**  
**Chair: Kyu-Tae Kim**, Korea Research Institute of Standards and Science (KRISS)  
  Thursday 2:00 - 4:00  
  Room: CBL-3

P13 Supplementary comparisons of AC voltage ratio standards  
    **Yuriy Anokhin**, Ukrmetrteststandard

P14 Calibration of non-conventional instrument transformers  
    **Gabriella Crotti**, Instituto Nazionale di Ricerca Metrologica (INRiM)

P15 Numerical Simulation of the Influence of Shield Ring on the Unit Step Response of a 300kV Standard Impulse Resistive Divider  
    **Yang Pan**, Shanghai Institute of Measurement and Testing Technology

P16 Coaxial Attenuators for Standard Lightning Impulse Measurements  
    **Liu Na**, National Institute of Metrology (NIM) China

P17 Approach to Evaluation of the Comparison Results of Inductive Voltage Divider  
    **Liu Na**, National Institute of Metrology (NIM) China
P18 SIM.EM-S5 Voltage Current and Resistance Comparison
Harold Sanchez, Grupo ICE

P19 Dynamic Bridge Standard for Strain Gauge Bridge Amplifier Calibration
M. Florian Beug, Physikalisch-Technische Bundesanstalt (PTB)

P20 Dynamic calibration of bridge amplifiers used for periodical force measurement
Christian Schlegel, Physikalisch-Technische Bundesanstalt (PTB)

P21 Measurement Uncertainty Bounds of DSM Method
Vladimir Vujicic, University of Novi Sad

P22 Implementation of Monte Carlo Method (MCM) for Evaluation of Measurement Uncertainties at SCL
Hoi Shan (Brenda) Lam, Standards and Calibration Laboratory

P35 Characterization of 100-Ohm Metal-Foil Resistor for AC Measurements
Atsushi Domae, National Metrology Institute of Japan (AIST)

P34 Characterization of a Digitizer for a Low Value Resistor Calibration System in the Audio-Frequency Band
Ryszard Rybski, University of Zielona Gora

P33 Long-Term Calibration Results of 10 mH and 100 mH Standard Inductors Using a Reactance Compensation Method
Norihiko Sakamoto, National Metrology Institute of Japan (AIST)

P32 Improvement of High-value Capacitance Measurement
DongXue Dai, National Institute of Metrology (NIM) China

P31 Digital Lock-in Amplifier for Precision Audio Frequency Bridge
Ze Liu, Beijing Jiaotong University

P27 Sampling Ratio Bridge for Impedance Measurements Down to 1 m?
Helko van den Brom, VSL - Dutch Metrology Institute

P28 Bridges Balanced by Variable Voltages From Multichannel Generators
Jaroslav Bohacek, Czech Technical University

P29 All-around Dual Source Impedance Bridge
Dan Bee Kim, Korea Research Institute of Standards and Science (KRISS)
P30 A Low Noise Preamplifier for AC Bridges

*Jianting Zhao*, *National Institute of Metrology (NIM) China*

P26 Automated capacitance bridge for calibration of capacitors with nominal value from 10 nF up to 10 mF

*Jan Kucera*, *Czech Metrology Institute*

**Th3-P3-G**

**Poster-3: Graphene-P**

*Chair: Rand Elmquist*, *NIST*

Thursday 2:00 - 4:00

Room: *CBL-7*

P39 Material Preparation and Fabrication of Graphene-based Quantum Hall Resistance Devices

*Xueshen Wang*, *National Institute of Metrology (NIM) China*

P38 Graphene Epitaxial Growth on SiC(0001) for Resistance Standards

*Mariano Real*, *Instituto Nacional de Tecnologia Industrial (INTI)*

P37 Sensitivity Optimization of Epitaxial Graphene Based Gas Sensors

*Aлександр Сатрапински*, *Centre for Metrology and Accreditation (MIKES)*

**Th3-P3-TF1**

**Poster-3: Time & Frequency-P1**

*Chair: Feng-Lei Hong*, *National Metrology Institute of Japan (AIST)*

Thursday 2:00 - 4:00

Room: *CBL-8*

P46 Optical Frequency Metrology with Optical Lattice Clocks and Optical Frequency Combs

*Feng-Lei Hong*, *National Metrology Institute of Japan (AIST)*

P47 Laser Source at 578 nm for an Yb Optical Lattice Clock Using Second Harmonic Generation of a Diode Laser

*Won-Kyu Lee*, *Korea Research Institute of Standards and Science (KRISS)*

P48 KRISS Atomic Fountain Clock: Current Status

*Sang Eon Park*, *Korea Research Institute of Standards and Science (KRISS)*

P51 Development and Evaluation of Compact Acetylene Frequency Standards

*Christopher Edwards*, *National Physical Laboratory*

P49 Current Status of an Atomic Gravimeter Developing at KRISS

*Sang-Bum Lee*, *Korea Research Institute of Standards and Science (KRISS)*

P58 Development of $^{171}$Yb optical lattice clock at KRISS

*Chang Yong Park*, *Korea Research Institute of Standards and Science (KRISS)*

P59 Measurement of the differential polarizability of the 698 nm clock transition of strontium for evaluation of optical lattice clocks

*Stephan Falke*, *Physikalisch-Technische Bundesanstalt (PTB)*

**Th3-P3-TF2**

**Poster-3: Time & Frequency-P2**

*Chair: J. Mauricio López R.*, *Centro Nacional de Metrologia (CENAM)*

Thursday 2:00 - 4:00

Room: *CBL-9*

P60 –100 dBc/Hz Flat Phase Noise Signal at 10 MHz for Phase Noise Standards

*Ken-ichi Watabe*, *National Metrology Institute of Japan (AIST)*
P61 Evaluation of Synchronization Performance with PTP  
*Young Kyu Lee*, Korea Research Institute of Standards and Science (KRISS)

P67 Design and Implementation of a High Resolution Phase Comparator  
*Chia-Shu Liao*, National Time and Frequency Standard Laboratory, TL, CHT. Co. Ltd.

P68 A Study of Ionospheric Effects on Next-Generation Two-Way Satellite Time and Frequency Transfer  
*Fang-Dar Chu*, Telecommunication laboratories, Chunghwa Telecom Co., Ltd.

Th3-P3-RF4  
**Poster-3: RF/MW-P4**  
*Chair: Djamel Allal*, Laboratoire national de métrologie et d'essais (LNE)  
Thursday 2:00 - 4:00  
Room: CBL-10

P69 Determine Antenna Factors at Different Heights by Standard Site Method with Calculable Dipole Antenna  
*Ray-rong Lao*, Industrial Technology Research Institute (ITRI)

P42 Antenna Factors of an Off-resonant Dipole Antenna  
*Takehiro Morioka*, National Metrology Institute of Japan (AIST)

P43 Three Antenna Method for a Hybrid Broadband Antenna Using Time Domain and Pulse Compression Technique  
*Satoru Kurokawa*, National Metrology Institute of Japan (AIST)

P44 Base-station Antenna Characterization by using Cylindrical Near-field Scanning  
*No-Weon Kang*, Korea Research Institute of Standards and Science (KRISS)

P45 Antenna Pattern Measurement Using Nested Mach-Zehnder Optical Modulator and Uni-traveling Carrier Photodiode in Millimeter Wave  
*Michitaka Ameya*, National Metrology Institute of Japan (AIST)

Th3-P3-RF5  
**Poster-3: RF/MW-P5**  
*Chair: James Miall*, National Physical Laboratory (NPL)  
Thursday 2:00 - 4:00  
Room: CBL-11

P44 Electromagnetic Properties of Iron Oxide Corrosion Product Powders at Radio Frequencies  
*Sung Kim*, NIST

P45 EMI Shielding Effectiveness of Carbon Nanotubes Based Composites  
*Ping Li*, National Institute of Metrology (NIM) China

P53 Design and Construction of Tapered Cells  
*Wen-Tron Shay*, CMS Services, Inc.

P52 Time-Domain Characterization of the EFT/Burst and ESD Measuring Systems  
*Michele Borsero*, Instituto Nazionale di Ricerca Metrologica (INRIM)
Th3-P3-Ph

Thursday 2:00 - 4:00

**Poster-3: Photonics-P**

**Chair: Paul Hale, NIST**

**Room: CBL-13**

- **P55** Standardizing Rectangular Metallic Waveguides for Terahertz Applications  
  *Nick M. Ridler, National Physical Laboratory*

- **P56** A Microwave System for Humidity Measurements  
  *Yakup Gulmez, Tubitak UME*

- **P57** Development of an Electro-Optic Sampling System at LNE  
  *Djamel Allal, Laboratoire national de métrologie et d'essais (LNE)*

- **P64** Using Tapped Delay Line to Improve the Precision of an Ensemble of Classifiers in Device-free Localization  
  *Yi-Yuan Chiang, Vanung University*

- **P63** Antenna Measurement Using S-parameters  
  *Jin-Seob Kang, Korea Research Institute of Standards and Science (KRISS)*

4:00 pm - 6:00 pm

**Th4-V4**

**Voltage-4: Josephson Voltage Standards**

**Chair: Sam Benz, NIST**

**Room: WW-BC**

- Calibration System for AC Measurement Standards using Pulse–Driven Josephson Voltage Standard and Inductive Voltage Divider  
  *Ilya Budovsky, National Measurement Institute, Australia*

- A High Voltage Josephson-Voltage-Standard-Locked Synthesizer  
  *Blaise Jeanneret, Swiss Federal Office of Metrology (METAS)*

- Sampling Measurement Using a Programmable Josephson Voltage Standard System toward Low-Frequency AC Voltage Standard  
  *Yasutaka Amagai, National Metrology Institute of Japan (AIST)*
Thursday 4:00 - 6:00                          Room: Ann-3,4

Th4-Z2

Impedance-2

Chair: Felipe L. Hernandez Marquez, Centro Nacional de Metrologia (CENAM)
Thursday 4:00 - 6:00                          Room: Ann-1,2

Development of an in-line calibration system of a flow-through cell for low electrolytic conductivity values
Elena Orru, Instituto Nazionale di Ricerca Metrologica (INRiM)

A digitally-assisted current comparator for audio frequency impedance scaling
Bruno Trinchera, Instituto Nazionale di Ricerca Metrologica (INRiM)

An Active Coaxial Choke for Precision Impedance Measurements
Ernst Louis Marais, National Measurement Institute, Australia

A Two Terminal-Pair Coaxial AC Bridge with Auto Source Balance at NIM
Yan Yang, National Institute of Metrology (NIM) China

S-parameter Resonance Method for the Calibration of Standard Capacitors
Turgay Ozkan, Tubitak UME

Th4-TF2

Time and Frequency-2

Chair: David Howe, NIST
Thursday 4:00 - 6:00                          Room: Ann-3,4

International time and frequency comparisons in real time: recent results
J. Mauricio Lopez R., Centro Nacional de Metrologia (CENAM)

Dissemination of UTC(NICT) by means of QZSS
Thomas Hobiger, NICT

Realize a software measurement system with Precision Time synchronization Protocol
Derek Wang, MCUT

A microwave cavity designed to minimize distributed cavity phase errors in a primary cesium frequency standard
Stephen Lea, National Physical Laboratory

Dual-comb techniques for precision measurement
Ian Coddington, NIST
Friday, July 6
8:30 am - 10:30 am

Fr1-I4  Current-4: Single-Electron Devices
Chair: Hansjörg Scherer, Physikalisch-Technische Bundesanstalt (PTB)
Friday 8:30 - 10:30
Room: WW-BC

Double-shielded sample stage for single-electron devices
Antti J. Manninen, Centre for Metrology and Accreditation (MIKES)

Characterization of a GHz non-adiabatic Single-Electron Pump using a Cryogenic Current Comparator
Bernd Kaestner, Physikalisch-Technische Bundesanstalt (PTB)

First Experimental Results of the Frequency Dependence of a Vacuum-Gap Capacitor between 1 kHz and 0.01 Hz
Gert Rietveld, VSL - Dutch Metrology Institute

Part-per-million current accuracy in the tunable-barrier electron pump
Stephen Giblin, National Physical Laboratory

Gate-Defined Quantum Dot Single Electron Pump
Nam Kim, Korea Research Institute of Standards and Science (KRISS)

Fr1-Z3  Impedance-3
Chair: Andrew Koffman, NIST
Friday 8:30 - 10:30
Room: Ann-1,2

An impedance spectrometer for the metrology of electrolytic conductivity
Luca Callegaro, Instituto Nazionale di Ricerca Metrologica (INRiM)

A Simple Double-Balance Impedance Bridge for Routine Calibrations
Mohammed Helmy Abd El-Raouf, National Institute of Standards (NIS), Egypt

Calibrations of Inductive Voltage Dividers by Four-Terminal-Pair Bridge with Automated Permuting Capacitors
Jimmy C. Hsu, Center for Measurement Standards

Inductance Measurements at CENAM
Angel Moreno Hernandez, Centro Nacional de Metrologia (CENAM)

An Improved Bootstrap Method for the Calibration of Inductive Voltage Dividers
Jianting Zhao, National Institute of Metrology (NIM) China

Electromagnetic Rail Inspection Using AC Bridge Measurements
Ze Liu, Beijing Jiaotong University

Fr1-RF3  RF/MW-3: Power
Chair: Yueyan Shan, National Metrology Centre A*Star (NMC)
Friday 8:30 - 10:30
Room: Ann-3,4

A Direct Comparison System for Power Calibration up to 67 GHz
Thomas M. Wallis, NIST

Direct Comparison Technique Using a Transfer Power Standard With an Adapter and Its Uncertainty
Tae-Weon Kang, Korea Research Institute of Standards and Science (KRISS)
Development of a Direct Comparison System for Radiofrequency Power Calibration Transfer from 10 MHz to 18 GHz

Mariano Botello-Perez, Centro Nacional de Metrologia (CENAM)

Thermoelectric against Bolometric Microwave Power Standard

Luciano Brunetti, Instituto Nazionale di Ricerca Metrologica (INRiM)

Development of a 2.4-mm Coaxial Microcalorimeter for RF and Microwave Power Standards at KRISS

Jae-Yong Kwon, Korea Research Institute of Standards and Science (KRISS)

A New Design and Evaluation Technique of a Microcalorimeter

Xiaohai Cui, National Institute of Metrology (NIM) China

11:00 - 11:30 am

Closing Session

Friday 11:00 - 11:30 am

Gregory Kyriazis, INMETRO, and Héctor Laiz, INTI

Close

Dean Jarrett, CPEM 2012 Chairman, NIST

DEPARTURE FOR TOUR OF NIST