### TECHNICAL PROGRAM – MONDAY 9 JUNE 2008

#### 7:30 – 8:30
**Speaker Breakfast (for Monday session chairs and oral presenters)**
- **Location:** Pine Room

#### 9:00 – 9:30
**Opening Session**
- **Location:** Ballrooms A/B

#### 9:30 – 10:30
**Keynote Address**
- **Location:** Ballrooms A/B

*Eric Cornell*
- NIST Quantum Physics Division
- Nobel Laureate, NIST Fellow

*“How symmetric is the electron? Looking for out-of-roundness of 10^{-14} femtometers”*

#### 10:30 – 11:15
**Break: Coffee**

#### 11:15 – 12:00
**Monday Plenary 1**
- **Location:** Ballrooms A/B

*Don Sullivan*
- Former Chief (retired), NIST Time and Frequency Division

*“History of Time and Frequency in Boulder”*

#### 12:00 – 12:30
**Monday Plenary 2**
- **Location:** Ballrooms A/B

*Dave Wineland*
- NIST Time and Frequency Division, NIST Fellow

*“Laser cooling and better clocks”*

#### 12:30 – 14:00
**Break: Lunch**
TECHNICAL PROGRAM – MONDAY 9 JUNE 2008

14:00 – 16:00

MA-1 Ballroom A | MB-1 Ballroom B | MC-1 Ballroom C/D

Fundamental Constants
Chair: Peter Mohr

1. MEASUREMENT OF THE GRAVITATIONAL CONSTANT WITH A MASS COMPARATOR
   Physik Institut der Universität Zürich, Switzerland

2. MEASURING THE GRAVITATIONAL CONSTANT WITH A CRYOGENIC TORSION PENDULUM
   Department of Physics and Astronomy, University of California at Irvine, Irvine, CA, USA

3. THE BIPM G EXPERIMENT – FINAL RESULTS
   T. J. Quinn1, H.V. Parks2, C.C. Speake3, R.S. Davis1
   1. BIPM, Pavilion de Breteuil, France
   2. Sandia National Laboratories, Albuquerque, NM, USA
   3. School of Physics and Astronomy, University of Birmingham, Edgbaston, Birmingham, UK

4. TOWARDS A FINAL RESULT FROM THE NPL MARK II WATT BALANCE
   I. A. Robinson and B.P. Kibble
   NPL Hampton Road, Teddington, Middlesex, UK.

5. ESTIMATING UNCERTAINTY LIMITS IN THE NIST-2008 ELECTRONIC KILOGRAM
   R. L. Steiner, E. R. Williams, R. Liu, and B. Parker
   National Institute of Standards and Technology, Gaithersburg, MD

6. REPRODUCIBILITY OF THE METAS WATT BALANCE
   A. Eichenberger, H. Baumann, B. Jeanneret, and B. Jeckelmann
   Federal Office of Metrology METAS, Bern-Wabern, Switzerland

Resistance
Chair: Francois Piquemal

1. HALL RESISTANCE PLATEAUS IN HIGH QUALITY GRAPHENE SAMPLES AT LARGE CURRENT: TOWARD QUANTIZATION TESTS (INVITED)
   K. Bennaceur1, J. Guignard2, F. Schopfer1, W. Poirier2, and D.C. Glattli1
   1. Service de Physique de l’Etat Condensé, CEA Saclay, GIF-sur-Yvette, France
   2. Laboratoire National de Métrologie et d’Essais (LNE), Trappes, France

2. PRECISION MEASUREMENT OF THE EQHE RESISTANCE AT FILLING FACTOR 1/3
   F.J. Ahlers1, E. Peso1, K. Pierz1, P. Warnecke1, and W. Wegscheider1
   1. Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

3. ASYMMETRIC DOUBLE 2DEGs AS A BASIS OF QUANTUM HALL RESISTANCE STANDARDS
   K. Pierz, G. Hein, B. Schumacher, E. Peso1, and H.W. Schumacher
   Physikalisch-Technische Bundesanstalt PTB, Bundesallee, Braunschweig, Germany

4. DEVELOPMENT OF QUANTUM HALL ARRAY RESISTANCE STANDARDS AT NMIJ
   T. Oeh1, N. Kaneko1, C. Urano1, T. Itatani2, H. Ishii1, and S. Kiryu1
   1. National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology
   2. Research Institute of Instrumentation Frontier, National Institute of Advanced Industrial Science and Technology
   AIST Tsukuba Central 1-2-13, 1-1-1 Umezono, Tsukuba, Ibaraki, Japan

5. REPRODUCIBILITY OF THE QUANTUM HALL EFFECT IN GaAs/AlGaAs TWO DIMENSIONAL ELECTRON GAS
   F. Schopfer and W. Poirier
   Laboratoire National de Métrologie et d’Essais
   29, avenue Roger Hennequin, Trappes, France

AC – DC Current
Chair: Tom Lipe

1. INTERNATIONAL COMPARISON ON AC-DC CURRENT TRANSFER STANDARDS AT FREQUENCIES UP TO 1 MHz
   I. Budovsky1, T. Funck2, M. Garcez2, G. Heine1, K.-E. Rydler4 and V. Tarasso4
   1. National Measurement Institute Australia (NMIA) Bradfield Road, Lindfield, Australia
   2. Physikalisch-Technische Bundesanstalt (PTB) Bundesallee, Braunschweig, Germany
   4. SP Technical Research Institute of Sweden

2. LOW COST HIGH-PERFORMANCE CURRENT SHUNTS – IMPROVED DESIGN FOR 30 mA – 100 mA
   K. Lind, T. Sorsdal, and H. Slinde
   Justervesenet (JV) Fetveien, Kjeller, Norway

3. EXTENDING AC-DC CURRENT TRANSFER MEASUREMENT TO 100A, 100 KHz
   Karl-Erik Rydler and Valter Tarasso
   SP Technical Research Institute of Sweden, BORÅS, Sweden

4. COAXIAL SHUNTS FOR THE AC-DC TRANSFER STANDARDS OF CURRENT
   U. Pogliano, G. C. Bosco and D. Senzio
   Istituto Nazionale di Ricerca Metrologica (INRIM) Strada delle Cacce, Torino, Italy

5. AC-DC CURRENT TRANSFER DIFFERENCE AT BEV
   M. Garcez, G. Heine
   Bundesamt für Eich- und Vermessungswesen Arltgasse, Vienna, Austria

6. A NEW METHOD ON MEASURING THE LEVEL DEPENDENCE OF AC SHUNTS
   Jiangtao Zhang1, Xianlin Pan2, Lei Wang1, Zuliang Lu1, Deshi Zhang1
   1. National Institute of Metrology, No.18, Bei San Huan Dong Road, Beijing, China
   2. China Metrology University, Xue Yuan Street, Hangzhou, China

16:00 – 16:30
Break: Coffee
### Fundamental Constants

**Chair: Barry Wood**

1. **IMPROVEMENTS IN THE NIST JOHNSON NOISE THERMOMETRY SYSTEM (INVITED)**
   S. P. Benz, H. Rogalla, D. R. White, Jifeng Qu, P. D. Dresselhaus, W. L. Tew, and S. W. Nam
   National Institute of Standards and Technology, Boulder, CO, USA

2. **DETERMINATION OF THE FINE STRUCTURE CONSTANT WITH ATOM INTERFEROMETRY AND BLOCH OSCILLATIONS ON 87Rb ATOMS**
   M. Cadoret1, E. de Mirandes1, P. Cladé1, S. Guellati-Khélifa2, C. Schwob1, F. Nez1, L. Julien1 and F. Biraben1
   1. Laboratoire Kastler Brossel, ENS, UPMC, CNRS, 4 place Jussieu, Paris, France,
   2. Institut National de Métrologie, CNAM, 292 rue Saint Martin, Paris

3. **PRECISION SPECTROSCOPY OF ATOMIC HYDROGEN FOR AN IMPROVED RYDBERG CONSTANT DETERMINATION**
   J. L. Flowers1, P. E. G. Baird2, H. A. Klein1, C. D. Langham1, H. S. Margolis1, and B. R. Walton1
   1. National Physical Laboratory - Hampton Road, Teddington, Middlesex TW11 0LW, United Kingdom
   2. Clarendon Laboratory, University of Oxford Parks Road, Oxford, United Kingdom

   D. B. Newell, P. J. Mohr, and B. N. Taylor
   National Institute of Standards and Technology, Gaithersburg, MD, USA

### Voltage

**Chair: Ilya Budovsky**

1. **IMPROVEMENTS OF THE AC QUANTUM VOLTMETER**
   R. Behr, I. Palafox, and J. Kohlmann
   Physikalisch-Technische Bundesanstalt Bundesallee 100, D-38116 Braunschweig, Germany

2. **ACJS OPERATING MARGINS USING A TERNARY ARBITRARY BITSTREAM GENERATOR**
   Ernest Houtzager1, Samuel P. Benz2, Helko E. van den Brom3
   1. NMi Van Swinden Laboratorium (NMi VSL)
   2. National Institute of Standards and Technology (NIST)

3. **PROGRESS TOWARD A 1 V PULSE-DRIVEN AC JOSEPHSON VOLTAGE STANDARD**
   S.P. Benz, P.D. Dresselhaus, N.F. Bergren, and R.P. Landim
   National Institute of Standards and Technology, Boulder, CO, USA

4. **DEVELOPMENT OF A SQUARE-WAVE BASED AC JOSEPHSON SYSTEM FOR AC VOLTAGE METROLOGY**
   Centre for Metrology and Accreditation (MIKES)
   Espoo, Finland

### Time and Frequency

**Chair: Alan Madej**

1. **HIGH RESOLUTION SPECTROSCOPY USING FIBER LASER FREQUENCY COMBS**
   I. Coddington, W. C. Swann, N. R. Newbury
   Optoelectronics Division, NIST Broadway, Boulder, CO, USA

2. **PHASE CONTROL OF MICROWAVE OSCILLATORS USING AN OPTICAL CLOCK LASER AS REFERENCE**
   H. Schnatz, G. Grosche, B. Lipphardt
   Physikalisch-Technische Bundesanstalt, Bundesallee, Braunschweig, Germany

3. **DEVELOPMENT OF A LIGHT SOURCE WITH A SUB-HERTZ LINEWIDTH FOR AN Yb OPTICAL LATTICE CLOCK**
   K. Hosaka1, M. Yasuda1, H. Inaba1, T. Kohno2, A. Onae1, and F.-L. Hong12
   1. NMIJ, AIST Tsukuba Central 3, Umezono, Tsukuba, Japan
   2. CREST, JST, 4-1-8 Honcho Kawaguchi, Saitama, Japan

4. **THERMAL-NOISE-LIMITED OPTICAL CAVITY**
   S.A. Webster1, S. Puglò2, J. Millo3, M. Oxborrow1 and P. Gill1
   1. National Physical Laboratory, Hampton Road, Teddington, Middlesex TW11 0LW, UK
   2. Blackett Laboratory, Imperial College London, South Kensington Campus, London SW7 2BZ, UK
   3. SYRTE, Observatoire de Paris, 61, Avenue de l'Observatoire, Paris, France
**TECHNICAL PROGRAM – TUESDAY 10 JUNE 2008**

7:30 – 8:30
Speaker Breakfast (for Tuesday session chairs and oral presenters)  Pine Room

8:30 – 10:10

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<th>Ballroom A</th>
<th>Ballroom B</th>
<th>Ballroom C/D</th>
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<tr>
<td><strong>Time and Frequency</strong>&lt;br&gt;Chair: Andreas Bauch</td>
<td><strong>Voltage</strong>&lt;br&gt;Chair: Mark Keller</td>
<td><strong>Power</strong>&lt;br&gt;Chair: Eddy So</td>
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<tr>
<td>1. <strong>FIRST-ORDER SIDEBAND PULLING IN ATOMIC FREQUENCY STANDARDS</strong>&lt;br&gt;J. H. Shirley, T. P. Heavner, and S. R. Jefferts&lt;br&gt;NIST – Time and Frequency Division, Broadway Boulder, CO</td>
<td>1. <strong>PRECISION DIFFERENTIAL SAMPLING MEASUREMENTS OF LOW FREQUENCY VOLTAGES SYNTHESIZED WITH AN AC PROGRAMMABLE JOSEPHSON VOLTAGE STANDARD</strong>&lt;br&gt;A. Rufénacht¹, C. J. Burroughs¹, S. P. Benz¹, P. D. Dresselhaus¹, B. Waltrip¹ and T. Nelson¹&lt;br&gt;1. National Institute of Standards and Technology, Boulder, CO, USA&lt;br&gt;2. National Institute of Standards and Technology, Gaithersburg, MD, USA</td>
<td>1. <strong>AN AUDIO FREQUENCY MULTIPLIER WITH PLANAR THERMAL CONVERTERS FOR POWER MEASUREMENTS</strong>&lt;br&gt;E. Mohns&lt;br&gt;PTB Germany</td>
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<td>2. <strong>FREQUENCY STABILITY CHARACTERISATION OF A STRONTIUM TRAPPED ION OPTICAL FREQUENCY STANDARD</strong>&lt;br&gt;G.P. Barwood, P Gill, G Huang, and H.A. Klein&lt;br&gt;National Physical Laboratory Hampton Road, Teddington, Middlesex, UK</td>
<td>2. <strong>SYSTEMATIC ERROR ANALYSIS OF STEPWISE APPROXIMATED AC WAVEFORMS GENERATED BY PROGRAMMABLE JOSEPHSON VOLTAGE STANDARD</strong>&lt;br&gt;C. J. Burroughs, A. Rufénacht, S.P. Benz, P.D. Dresselhaus&lt;br&gt;National Institute of Standards and Technology, Boulder, CO, USA</td>
<td>2. <strong>KRISS-NRC INTERCOMPARISONS OF CALIBRATION SYSTEMS FOR INSTRUMENT TRANSFORMERS WITH MANY DIFFERENT RATIOS AT POWER FREQUENCY</strong>&lt;br&gt;Kap Jung¹, Eddy So², Young Tae Park¹ and Myungsung Kim¹&lt;br&gt;1. Korea Research Institute of Standards and Science Yuseong, Daejeon, Republic of Korea&lt;br&gt;2. National Research Council of CanadaOttawa, Ontario, K1A 0R6, Canada</td>
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<td>3. <strong>PERFORMANCES AND PROGRESS OF A COMPACT PULSED CPT Cs CLOCK</strong>&lt;br&gt;S. Guérandel¹, R. Boudot¹, N. Castagna², E. De Clercq¹, N. Dimarcq¹ and A. Clairon¹&lt;br&gt;1. SYRTE, Observatoire de Paris, 61 av. de l’observatoire 75014 PARIS, France&lt;br&gt;2. Physics Dept, Friburg University, Friburg, Switzerland</td>
<td>3. <strong>JOSEPHSON VOLTAGE STANDARD LOCKED SINEWAVES SYNTHESIZER</strong>&lt;br&gt;B. Jeanneret¹, F. Overney¹, L. Callegaro², A. Mortara¹&lt;br&gt;1. Federal Office of Metrology METAS, Lindenweg 50, 3003 Bern-Wabern, Switzerland&lt;br&gt;2. Istituto Nazionale di Ricerca Metrologica INRIM, Strada delle Cacce 91, 10135 Torino, Italy</td>
<td>3. <strong>IMPROVING THE ACCURACY OF THE ON SITE CALIBRATIONS OF MULTI-FUNCTION ELECTRICAL STANDARDS</strong>&lt;br&gt;R. Arseneau, M. Frigault, J. Zelle&lt;br&gt;Institute for National Measurement Standards National Research Council of Canada Ottawa, Ontario, Canada</td>
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<td>4. <strong>CLOCK LASER SYSTEM FOR STRONTIUM LATTICE CLOCK</strong>&lt;br&gt;T. Legero, Ch. Lisdat, J.S.R. Vellore Winfred, H. Schnatz, G. Grosche, F. Riehle and U. Sterr&lt;br&gt;Physikalisch-Technische Bundesanstalt, Braunschweig, Germany</td>
<td>4. <strong>A VOLTAGE SOURCE FOR LOW FREQUENCY AC WAVEFORMS WITH QUANTUM TRACEABILITY TO A JOSEPHSON ARRAY REFERENCE USING SAMPLING AND FEEDBACK</strong>&lt;br&gt;D. Henderson¹, K. M. Marshall¹, J. M. Williams¹, J. Pickering², P. D. Patel¹&lt;br&gt;1. National Physical Laboratory, Hampton Road, Teddington, United Kingdom&lt;br&gt;2. Metron Designs, The Old Rectory, Alderford, Norwick, United Kingdom</td>
<td>4. <strong>POWER BRIDGE BASED ON CURRENT TRANSFORMER FOR ENLARGING MEASUREMENT FREQUENCY RANGE UP TO 10 kHz</strong>&lt;br&gt;K. Takahashi, K. Yagi&lt;br&gt;Japan Electric Meters Inspection Corporation (JEMIC), 15-7, Shibaura 4-Chome, Minato-ku, Tokyo, JAPAN</td>
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<td>5. <strong>ZERO COLLISIONAL FREQUENCY SHIFT OPERATION OF A CAESIUM FOUNTAIN CLOCK</strong>&lt;br&gt;K. Szymaniec, W. Chalupeczak, Y. Ovchinnikov and G. Marra&lt;br&gt;National Physical Laboratory Hampton Road, Teddington, Middlesex, UK</td>
<td>5. <strong>ERROR CONTRIBUTIONS IN STEPWISE SYNTHESIZED JOSEPHSON SINE WAVES</strong>&lt;br&gt;J. Lee¹², R. Behr³, A. Katkov³, and L. Palafox¹&lt;br&gt;1. Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Germany&lt;br&gt;2. National Metrology Centre, A*STAR, 1 Science Park Drive, Singapore 118221, Republic of Singapore&lt;br&gt;3. D. I. Mendeleyev Institute for Metrology, Moskovsky pr. 19, 190005, St. Petersburg, Russia</td>
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</table>
1. LATEST MEASUREMENTS WITH THE LNE-SYRTE FOUNTAIN CLOCKS
M. Abgrall, S. Bize, F. Chapelot, J. Guéna, P. Laurent, P. Rosenbusch, G. D. Rovera, G. Santarelli, S. Zhang, and A. Clairon
LNE-SYRTE, Observatoire de Paris, UMR CNRS 8630, 61 avenue de l’Observatoire, Paris, France

2. STRONTIUM OPTICAL LATTICE CLOCK WITH HIGH ACCURACY AND STABILITY (INVITED)
JILA, National Institute of Standards and Technology and University of Colorado, Department of Physics, University of Colorado, Boulder, CO, USA

3. EXTENDED PRECISION MEASUREMENTS OF A STRONTIUM SINGLE ION OPTICAL FREQUENCY STANDARD AND ITS DEVELOPMENT AS AN OPTICAL ATOMIC CLOCK
A. Madje1, P. Dubé1, J.E. Bernardi, A.D. Shiner2, L. Mravenec2, J. Jiang2, D.J. Jones2
2. Department of Physics and Astronomy, University of British Columbia, Vancouver, British Columbia, Canada

4. ABSOLUTE FREQUENCY MEASUREMENT OF 40Ca+ IN A QUANTUM TRAP
M. Chwalla1, J. Benhelm2, K. Kim3, G. Kirchmair2, T. Monz2, M. Riebe1, P. Schindler1, A. Villar1, C. F. Roos2, W. Haensel1, and R. Blatt1,2
1. Institut für Experimentalphysik, Universität Innsbruck, Austria
2. College of Engineering and Applied Science, University of Colorado, Boulder, CO 80305, USA
3. Instituto Nazionale di Ricerca Metrologica Strada delle Cacce 91, Torino, Italy

5. PRECISION FREQUENCY MEASUREMENT OF THE 3S1/2 – 3P1/2 ELECTRIC OCTUPOLE TRANSITION IN A SINGLE 171Yb+ ION (INVITED)
S. A. Webster1, K. Hosaka2, B. R. Walton1, H. S. Margolis1 and P. Gill1
1. National Physical Laboratory, Hampton Road, Teddington, Middlesex, TW11 0LW, UK
2. National Metrology Institute of Japan, Tsukuba Central 3, Umezono 1-1-1, Tsukuba 305-8563, Japan

11:00 – 11:30

**STABILITY (INVITED)**
CLOCK WITH HIGH ACCURACY AND TRAP
THE LNE-SYRTE FOUNTAIN CLOCKS
LATEST MEASUREMENTS WITH
MEASUREMENT OF 40Ca+ IN PAUL
MEASUREMENT OF THE 2S1/2 – 2F7/2 PRECISION FREQUENCY IN A SINGLE 171Yb+ ION (INVITED)
ELECTRIC OCTUPOLE TRANSITION AS AN OPTICAL ATOMIC CLOCK
SINGLE ION OPTICAL FREQUENCY MEASUREMENTS OF A STRONTIUM
EXTENDED PRECISION

11:30 – 12:00

**STABILITY (INVITED)**
CALIBRATING A SAMPLING VOLTMETER USING A BINARY JOSEPHSON SYSTEM
HELKO E. VAN DEN BRON, ERNST HOUTZAGER, QUINCY E.V.N. MARTINA, AND GERT RIEVTELD
NMI VAN SWINDEL LABORATORY, AR DELFT, THE NETHERLANDS

12:30 – 14:00
Break: Lunch

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**VOLTAGE**
Chair: Ralf Behr

1. A SURVEY OF JOSEPHSON COMPARISONS (INVITED)
B. M. Wood1, S. Solvè2
1. National Research Council (NRC), Ottawa, ON K1A 0G6, Canada
2. Bureau International des Poids et Mesures (BIPM), Pavillon de Breteuil, F-92312 Sèvres Cedex, France

2. CALIBRATING A SAMPLING VOLTMETER USING A BINARY JOSEPHSON SYSTEM
Helko E. van den Brom, Ernest Houtzager, Quincy E.V.N. Martina, and Gert Rietveld
NMI Van Swineland Laboratory, AR Delft, The Netherlands

3. DESIGN OF A TURN-KEY 10 V PROGRAMMABLE JOSEPHSON VOLTAGE STANDARD SYSTEM
P.D. Dresselhaus1, M. Elsbury2, C.J. Burroughs1, D. Olaya, S.P. Benz1, N.F. Bergren1, R. Schwall1, and Z. Popovic2
1. National Institute of Standards and Technology, Boulder, CO 80305, USA
2. College of Engineering and Applied Science, University of Colorado, Boulder, CO 80305, USA

4. CONSTANT-VOLTAGE STEPS AT 0.1 VOLT FROM A SERIES ARRAY OF HIGH-TE JOSEPHSON JUNCTIONS
A. M. Klushin1, M. He1,2, and A. S. Katkov3
1. Institute of Bio- and Nanosystems and CNI-Centre of Nanoelectronic Systems for Information Technology, Forschungszentrum Jülich GmbH, Germany
2. Dept. of Electronics, Nankai Univ., Tianjin, P.R. China
3. Mendeleev Institute for Metrology, Moskovsky pr. 19, 190005 St. Petersburg, Russia

5. Nb/Al-AIOX/Nb OVERDAMPED JUNCTIONS SUITABLE FOR VOLTAGE STANDARD OPERATION ABOVE 4.2 K
Vincenzo Lacquinti, Natascia De Leo, Matteo Fretto and Andrea Sosso
Istituto Nazionale di Ricerca Metrologica (INRIM), Strada della Cacce, Torino Italy

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**IMPEDANCE**
Chair: Yicheng Wang

1. CAPACITANCE CALIBRATION BASED ON TWO AC QUANTUM HALL RESISTANCES (INVITED)
J. Schurr2, V. Bärkel1, and B. P. Kibble2
1. Physikalisch-Technische Bundesanstalt, Braunschweig, Germany
2. Guest scientist, Hampton, Middlesex, United Kingdom

2. THE PROPERTIES OF COMMERCIAL THICK FILM RESISTANCE ELEMENTS AS AC-DC TRANSFER STANDARDS
N. Fletcher and R. Goebel
Bureau International des Poids et Mesures (BIPM) Pavillon de Breteuil, Sèvres Cedex, France

3. PRECISION HADDAD-TYPE CALCULABLE RESISTORS
J. Kučera1, E. Vollmer2, J. Schurr2
1. Czech Technical University in Prague, Faculty of Electrical Engineering, Department of Measurements Technická 2, Prague 6, Czech Republic
2. Physikalisch-Technische Bundesanstalt, Bundesallee 100, Braunschweig, Germany

4. STABILIZATION STUDY OF RESISTIVE THIN FILMS FOR AC RESISTORS APPLICATION
A. M. Klushin1, M. He1,2, and A. S. Katkov3
1. Institute of Bio- and Nanosystems and CNI-Centre of Nanoelectronic Systems for Information Technology, Forschungszentrum Jülich GmbH, Germany
2. Dept. of Electronics, Nankai Univ., Tianjin, P.R. China
3. Mendeleev Institute for Metrology, Moskovsky pr. 19, 190005 St. Petersburg, Russia

5. Nb/AI-AIOX/Nb OVERDAMPED JUNCTIONS SUITABLE FOR VOLTAGE STANDARD OPERATION ABOVE 4.2 K
Vincenzo Lacquinti, Natascia De Leo, Matteo Fretto and Andrea Sosso
Istituto Nazionale di Ricerca Metrologica (INRIM), Strada della Cacce, Torino Italy

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12:30 – 14:00
Break: Lunch
# Fundamental Constants

**Chair:** Peter Mohr, Barry Wood

**TuP-1** AIR-GAP CHARACTERIZATION OF THE LNE WATT BALANCE MAGNETIC CIRCUIT  
[Authors and Details]

**TuP-2** MASS DETERMINATION WITH THE MAGNETIC LEVITATION METHOD  
H. Kajastie, K. Riski, and A. Satrapinski  
Centre for Metrology and Accreditation, ESPPO, Finland

**TuP-3** COMPARISON OF FUNDAMENTAL-CONSTANT BASED DEFINITIONS  
National Physical Laboratory, Hampton Road, Teddington Middlesex, UK

**TuP-4** PROTOTYPE OF A PENDULUM FOR DERIVING THE KILOGRAM FROM ELECTRICAL QUANTITIES  
U. Pogliano, and D. Serazio  
Istituto Nazionale di Ricerca Metrologica (I.N.RI.M.) Strada delle Cacce, 91, Torino, Italy

**TuP-5** REDUCING THE UNCERTAINTY IN A MEASURE OF THE ACCELERATION OF GRAVITY FOR THE ELECTRONIC KILOGRAM  
B. Parker and R. L. Steiner  
National Institute of Standards and Technology, Gaithersburg, MD, USA

**TuP-6** A MEASURING MACHINE FOR THE MAGNETIC CIRCUIT OF THE LNE WATT BALANCE  
F. Villar\(^1\), P. Gourray\(^1\), J. David\(^2\), G. Genevès\(^3\)  
1. Laboratoire National de Métrie et d’Essais (LNE) 29, avenue Roger Hennequin, Trappes, France  
2. École Nationale Supérieure d’Arts et Métiers (ENSAM) 8, boulevard Louis XIV, Lille, France

**TuP-7** BALANCE PAN DAMPING USING TUNED SLOSHING LIQUIDS  
E.R. Williams\(^1,2\), D. Haddad\(^1,2\), G. Genevès\(^3\), P. Gourray\(^3\), C. Hauck\(^2\), F. Villar\(^1\), R.S. Steiner\(^1\), and R. Liu\(^3\)  
1. NIST, Gaithersburg, MD 20899-8171 USA  
2. Laboratoire National de Métérie et d’Essais2 Trappes, France

**TuP-8** ACTIVE DAMPING CONTROL OF A TORSION PENDULUM BY RADIATION PRESSURE  
Sheng-Iui Chen, Sheau-Shi Pan, and Jiah-Sheng Wu  
Center for Measurement Standards, Industrial Technology Research Institute, Hsinchu, Taiwan, R.O.C.

**TuP-9** NOVEL TRANSFER STANDARD FOR TEMPERATURE MEASUREMENTS  
Horst Bettin\(^1\), Arnold Nicolaus\(^1\), Steffen Rudtsch\(^2\), Enrico Massa\(^3\), and Andrea Merlone\(^3\)  
1. Physikalisch-Technische Bundesanstalt (PTB), Abbe Str. 2-12, 10587 Berlin, Germany  
2. Physikalisch-Technische Bundesanstalt (PTB), Abbe Str. 2-12, 10587 Berlin, Germany  
3. Istituto Nazionale di Ricerca Metrologica (INRIM), Strada delle cacce 91, 10135 Torino, Italy

**TuP-10** TRACEABLE JOHNSON NOISE MEASUREMENT IN THE AUDIO FREQUENCY RANGE  
L. Callegaro\(^1\), M. Pisani\(^1\), and A. Pollarolo\(^1,2\)  
1. INRIM – Istituto Nazionale di Ricerca Metrologica Strada delle Cacce, 91 – 10135 Torino, Italy  
2. Politecnico di Torino - Corso Duca degli Abruzzi, 24 – 10129 Torino, Italy

**TuP-11** SETUP OF SHOT NOISE MEASUREMENT IN A TUNNEL JUNCTION FOR NOISE THERMOMETRY  
W. Song, Y. Chong, and K.-T. Kim  
Korea Research Institute of Standards and Technology1 Doryong-dong, Yuseong-gu, Daejeon, Korea

**TuP-12** ABSORPTION LINE PROFILE MEASUREMENT OF ROVIBRATIONAL TRANSITION OF ACETYLENE MOLECULE USING A FIBER COMB SPECTROMETER  
K.M.T. Yamada\(^1\), A. Onae\(^2\), F.-L. Hong\(^2\), H. Inaba\(^3\), Y. Nakajima\(^3\), H. Matsumoto\(^3\), F. Ito\(^3\), and T. Shimizu\(^3\)  
1. Institute for Environmental Management Technology (EMTech), AIST Onogawa 16-1, Tsukuba, Ibaraki, Japan  
2. National Metrology Institute of Japan (NMIJ), AIST Umezono 1-1-1, Tsukuba, Ibaraki, Japan

**TuP-13** CCEM-K10 KEY COMPARISON OF RESISTANCE STANDARDS AT 100 OHM  
Bernd Schumacher  
Physikalisch-Technische Bundesanstalt Bundesallee, Braunschweig, Germany

**TuP-14** ANALYSIS OF MEASUREMENT COMPARISON EUROMET. EM-K2  
B. Jeckelmann and M. Zeier  
Federal Office of Metrology METAS Lindenweg, Bern-Wabern, Switzerland

**TuP-15** SIM COMPARISON OF DC RESISTANCE AT 1Ω, 1 MΩ, AND 1 GΩ  
National Institute of Standards and Technology, Gaithersburg, MD USA

**TuP-16** TERMINAL TIGHTNESS IMPROVING THE STABILITY OF FOUR-TERMINAL STANDARD RESISTOR  
L.A. Christian and B.E. McLennan  
Measurement Standards Laboratory of New Zealand (MSL) Industrial Research Ltd, Lower Hutt, New Zealand

**TuP-17** NiCr BASED THIN FILM CRYO RESISTORS  
A. Satrapinski\(^1\), A. M. Savin\(^1\), S. Novikov\(^2\) and O. Hahtela\(^1\)  
1. MIKES, Espoo, Finland  
2. Low Temperature Laboratory, Micronova, TKK, Espoo, Finland  
3. Micro and Nanoscience Laboratory, Helsinki University of Technology, TKK, Micronova, Espoo, Finland

**TuP-18** UNCERTAINTY EVALUATION IN A TWO-TERMINAL CRYOGENIC CURRENT COMPARATOR  
M.E. Bierzychudek\(^1\) and R.E. Elmquist\(^2\)  
1. Instituto Nacional de Tecnología Industrial, San Martín, B1650KNA, República Argentina  
2. National Institute of Standards and Technology, Gaithersburg, MD, USA
TuP-19  SEMI AUTOMATED dc-SQUID BASED CCC BRIDGE FOR PRECISION RESISTANCE MEASUREMENTS AT THE SPANISH TPYCEA
A. Cerrudo, J. Sese, L. Gómez, A. Camón, F. Mendoza, E. Garrijo and C. Rillo
1. INA, c/ Pedro Cerbuna, 12, Universidad de Zaragoza, Zaragoza, Spain
2. ICMA, CSIC-Universidad de Zaragoza, c/ Pedro Cerbuna, 12, Zaragoza, Spain
3. TPYCEA, c/ Raimundo Fernández Villaverde, 50, Madrid, Spain

TuP-20  INTRINSICALLY STABLE CCC FOR ACCURATE MEASUREMENTS OF SMALL CURRENTS
Gert Rietveld, Pieter de la Court, and Helke E. van den Brom
NMi Van Swinden Laboratory, AR Delft, The Netherlands

TuP-21  THE THERMAL MODEL BUILDING AND CALCULATION OF PORTABLE AIR ENCLOSURE
B. Han, X. Li and C. Li
1. College of Precision Instrument and Opto-Electronics Engineering, Tianjin University, Tianjin, China
2. College of Quality and Supervisor Technology, Hebei University, Baoding, Hebei Province, China
3. Department of Precision Instrument and Mechatronics, Tsinghua University, Beijing, China

TuP-22  UNCERTAINTY BUDGET FOR THE NM QHR STANDARD SYSTEM
Q. He, Z. Zhang, Z. Li, J. Zhao
1. National Institute of Metrology, Tsinghua University, No.18, Bei San Huan Dong Lu, Beijing, China

TuP-23  PROPOSAL OF A NEW METHOD OF MEASUREMENT OF THE QUANTIZED HALL RESISTANCE WITH A BINARY JOSEPHSON ARRAY IN A BRIDGE CONFIGURATION
F. Raso, R. Hernandez, A. Mendez, L. Matias, M. Anguas
Centro Español de Metrología (CEM), Calle Alfar s/n, Tres Canto, Madrid, Spain

TuP-24  A CONSIDERATION FOR ELECTRICAL NONLINEAR DISTORTION VOLTAGE CAUSED BY 2D TYPE BRIDGE WITH VERY LOW FREQUENCY CURRENT
Isao Minowa
Faculty of Engineering, Tamagawa University, 6-1-1, Machida, Tokyo, Japan

Time and Frequency, continued
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TuP-27  THE QUANTUM-LIMITED COMB LINESHAPE FOR A MODE-LOCKED Ti:SAPPHIRE LASER
J. Willits, J. K. Wahlstrand, C. R. Menyuk, and S. T. Cundiff
JILA, National Institute of Standards and Technology, and the University of Colorado at Boulder 440 UCB, Boulder, CO, USA

TuP-28  SINGLE-FREQUENCY SYNTHESIS AT TELECOMMUNICATION WAVELENGTHS
V. Ahtee, M. Merima, and K. Nyholm
Centre for Metrology and Accreditation (MIKES) Espoo, Finland

TuP-29  DEVELOPMENT OF A NEUTRAL STRONTIUM LATTICE TRAP OPTICAL CLOCK AT THE NATIONAL PHYSICAL LABORATORY
E. Curris, G.P. Barwood, Y.B. Ovchinnikov, I.R. Hill, and P. Gill
1. National Physical Laboratory Hampton Road, Teddington, Middlesex, United Kingdom
2. Blackett Laboratory, Imperial College Prince Consort Road, London, United Kingdom

TuP-30  REMOTE FREQUENCY CONTROL VIA IEEE 1588
Kun-Yuan Tu, Chia-Shu Liao, and Shinn-Yan Lin
1. Dept. of CSIE, Vanung University, Chung-Li, Tao-Yuan, Taiwan
2. Telecommunication Laboratories, Chunghwa Telecom Co., Ltd., Chung-Li, Taiwan

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TuP-31  BILATERAL OPTICAL FIBER POWER METER LINEARITY COMPARISON BETWEEN NMII AND NIST
S. Mukai, K. Amemiya, M. Endo, I. Vasyshenker, X. Li, and S. Yang
1. NMII, AIST 1-1-1-Central 3, Umezono, Tsukuba, Japan
2. NIST, 325 Broadway, Boulder, Colorado, USA

TuP-32  FIBER-BASED ACETYLENE-STABILIZED LASER
V. Ahtee, M. Merima, and K. Nyholm
Centre for Metrology and Accreditation (MIKES), Espoo, Finland

TuP-33  THE CONTROL AND MEASUREMENT OF FEMTOSECOND LASER RADIATION PARAMETERS WITH FABRY-PEROT INTERFEROMETER
D. Busnak, A. Lugovoy, P. Pokasov, S. Chepurov, and A. Dmitriev
1. Institute of Laser Physics SB RAS Novosibirsk, Russia
2. Novosibirsk State Technical University Novosibirsk, Russia

TuP-34  SAMPLING PRECISION CONSIDERATION FOR HIGH RESOLUTION FOURIER TRANSFORM SPECTROSCOPY
N.N. Almoayed, Student Member, IEEE and M.N. Afsar, Fellow, IEEE
High Frequency Materials Measurement and Information Center, Tufts University College Ave., Medford, MA

TuP-35  556 nm LIGHT GENERATION BY FREQUENCY DOUBLING OF A DIODE LASER AMPLIFIED YB-DOPED FIBER AMPLIFIER FOR PRECISION SPECTROSCOPY OF YTTERBIUM ATOMS
Chang Yong Park, Dai-Hyuk Yu, Won-Kyu Lee, Sang Eon Park, and E. B. Kim
Division of Physical Metrology, Korea Research Institute of Standards and Science, Daejeon, Korea
**TECHNICAL PROGRAM – TUESDAY 10 JUNE 2008**

**14:00 – 16:00**

**TUESDAY POSTER SESSION (TuP)**

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| TuP-36       | ATMOSPHERIC PRESSURE SENSITIVITY OF THE ULTRASTABLE MONOLITHIC NONPLANAR RING LASERS | Tao Yang¹, Ye Li², Ye Peng², Jianping Cao³, Chunqing Gao¹, and Erjun Zang² | 1. School of Information Science and Technology, Beijing Institute of Technology Beijing, China  
2. Division of Electricity and Quantum Metrology, National Institute of Metrology 18 Beisanhuan East Rd, Beijing, P.R. China  
3. Department of Precision Instruments and Mechatonology, Tsinghua Univ. Beijing, China |
| TuP-37       | MORE THAN 200 mW BLUE LIGHT SOURCE FROM AN INTEGRATIVE RING CAVITY  | Ye Li¹, Yang Zhao², Yu Peng³, Tao Yang¹, Zhanjun Fang¹ and Erjun Zang²  | 1. Division of Electricity and Quantum Metrology, National Institute of Metrology 18 Beisanhuan East Rd, Beijing, P.R. China  
2. School of Sciences, Beijing JiaoTong University Beijing, China  
3. Department of Precision Instruments and Mechatonology, Tsinghua University Beijing, China  
4. Department of optical Engineering, Beijing Institute of Technology Beijing, China |
| TuP-38       | CALIBRATION OF HORIZONTALLY-PLACED PLANARITY STANDARDS             | M. Vannoni and G. Molesini                                               | CNR-Istituto Nazionale Ottica Applicata, Centro SIT 130 Largo Enrico Ferni, Firenze, Italy        |
| TuP-39       | DEVELOPMENT OF A LOW FREQUENCY QUANTUM BASED AC POWER STANDARD AT NRC CANADA | Branislav Djokie                                                        | Institute for National Measurement Standards - National Research Council of Canada, Ottawa, Ontario, Canada |
| TuP-40       | A NEW POWER CONVERTER FOR ACTIVE, REACTIVE AND APPARENT POWER AT POWER FREQUENCIES | Günther Ramm and Harald Moser                                             | Physikalisch-Technische Bundesanstalt, Bundesallee, Braunschweig, Germany                        |
| TuP-41       | CALIBRATION OF HIGH-VOLTAGE CURRENT-COMPARATOR-BASED CAPACITANCE AND DISSIPATION FACTOR BRIDGES USING NONSYNCHRONOUS DIGITAL SAMPLING | G.A. Kyriazis                                                           | Instituto Nacional de Metrologia, Normalização e Qualidade Industrial, RJ, Brazil               |
| TuP-42       | PHASE ERROR MEASUREMENT OF RESISTIVE CURRENT SHUNT USING PULSE COUNTING | Young Tae Park, Jae Kap Jung, W.M.S.Wijesinghe, Kwang Min Yu Korea Research Institute of Standards and Science Yuseong, Daejeon, Republic of Korea |
| TuP-43       | A NEW APPROACH TO DETERMINE PHASE SHIFT OF SHUNT BASED ON THE SAMPLING MEASUREMENT AND SUBSTITUTION METHOD | WANG Lei, LI Zuliang, LI Min, LIU Lijuan, ZHOU Hao                      | National Institute of Metrology, China No.18, BeiSanHuan Dong Road, Beijing, China             |
| TuP-44       | PRECISION MEASUREMENT OF HARMONIC CURRENT AND POWER AT INDUSTRIAL FREQUENCY | LU Zuliang, WANG Lei, LI Min, LIU Lijuan, ZHOU Hao                      | National Institute of Metrology, China No.18, BeiSanHuan Dong Road, Beijing, China              |
| TuP-45       | ON THE USE OF WINDOWS FOR MEASUREMENTS OF R.M.S., ACTIVE POWER AND HARMONIC PARAMETERS | G. Gubler                                                               | “D.I. Mendeleev Institute for Metrology” 19, Moskovsky Pr, St. Petersburg, Russia              |
| TuP-46       | A NEW SAMPLING TRANSFER STANDARD OF HIGHEST ACCURACY FOR AC QUANTITIES | W. G. Kürten Ihlenfeld¹, R. Iuzzolino¹, R. Otto², K. Schröder³, U. Putensen³, and H. Huettmann³ | 1. Physikalisch-Technische Bundesanstalt – PTB, Germany  
2. Zera – GmbH, Germany  
3. EMH – GmbH, Germany |
| TuP-47       | DEVELOPMENT OF MICROCONTROLLER-BASED SIGNAL SYNTHESIZERS FOR AC REFERENCE STANDARDS | T. Yamada¹ and W. G. K. Ihlenfeld²                                       | 1. National Metrology Institute of Japan (NMIJ), AIST1-1-1, Umezono, Central 3, Tsukuba, Ibaraki, Japan  
2. Physikalisch-Technische Bundesanstalt (PTB), Braunschweig, Germany |
| TuP-48       | HARMONIC POWER STANDARD AT NIM AND ITS COMPENSATION ALGORITHM       | LU Zuliang, WANG Lei, LI Min, LIU Lijuan, ZHOU Hao                      | National Institute of Metrology, China No.18, BeiSanHuan Dong Road, Beijing, China              |
| TuP-49       | DEVELOPMENT OF AC CURRENT COMPARATOR BASED ON COAXIAL CABLE FOR ENLARGING MEASUREMENT FREQUENCY RANGE UP TO 10 kHz | K. Takahashi, K. Yagi                                                   | Japan Electric Meters Inspection Corporation (JEMIC), 15-7, Shibaura 4-Chome, Minato-ku, Tokyo, Japan |
| TuP-50       | REMOTE POWER MANAGEMENT AND METER-READING SYSTEM BASED ON ARM MICROPROCESSOR | Li Kaicheng¹, Liu Jianfeng¹, Yue Congyuan², Zhang Ming³                  | 1. College of Electrical and Electronic Engineering, Huazhong University of Science and Technology, Wuhan, P.R. China  
2. Information & Network Center, The National Academy of Chinese Theatre Arts, Beijing, China |
<p>| TuP-51       | ANALYSIS OF RESULTS IN COMPLEX-VALUED INTERCOMPARISONS            | M. Rodríguez                                                            | Instituto Nacional de Técnica Aeroespacial (INTA), Centro de Metrología y Calibración – Ctra. a Ajaivir, p.k. 4.5, 28850 Torrejón de Ardoz (Madrid), SPAIN |</p>
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| TuP-58  | ELECTROSTATIC ACTUATED MEMS FOR PRECISION AC VOLTAGE REFERENCES       | A. Bounouh, H. Camorri, T. Ricart, C. Pisella, F. Ziadi, A. Polletaef,     | 1. LNE – 29 avenue Roger Hennequin, Trappes, France  
2. LAAS/CNRS – 7 avenue du colonel Roche, Toulouse, France  
3. Tronic’s Microsystems – 55 rue du Pré de l’Horne, Crolles, France |
| TuP-59  | MEASURING FLICKER WITH DISCRETE FOURIER TRANSFORM                       | P. Espel and A. Poletaef                                                   | LNE, 29 avenue Roger Hennequin, Trappes, France                               |
2. Czech Metrology Institute (CMI) Okražnì, Brno, Czech Republic          |
| TuP-61  | DEVELOPMENT AND APPLICATION OF A PROGRAMMABLE PD CALIBRATOR             | M. Chiampi, G. Crotti, Y. Hu, and A. Sardi                                  | 1. Istituto Nazionale di Ricerca Metrologica (INRiM), Torino, Italy  
2. Dip. Ing. Elettrica, Politecnico di Torino, Torino, Italy               |
| TuP-62  | DEVELOPMENT OF THIN FILM RANGE RESISTORS FOR HIGH-VOLTAGE              | H. Fujiiki and T. Chiyoda                                                   | 1. National Institute of Advanced Industrial Science and Technology,  
Central 3, 1-1-1 Umezono, Tsukuba Ibaraki, Japan  
2. Japan Electric Meters Inspection Corporation, 4-15-7, Shibaura,  
Minato-ku, Tokyo, Japan                                                    |
| TuP-63  | A SAMPLING SYSTEM BASED ON Σ−Δ ANALOG-TO-DIGITAL CONVERTERS            | R. Iuzzolino, W. G. Kürten Ihlenfeld, C. Brendel, E. Mohs                  | 1. Instituto Nacional de Tecnología Industrial - INTI, Argentina  
2. Physikalisch-Technische Bundesanstalt - PTB, Germany  
3. Institut für Elektrische Messtechnik und Grundlagen der Elektrotechnik  
EMG, TU Braunschweig, Germany                                             |
| TuP-64  | STUDY ON THE CALIBRATION OF PARTIAL DISCHARGE CALIBRATOR               | Liu Na, Li Zhi, and Qian Zheng                                              | 1. Electrical Magnetic Division, National Institute of Metrology, Beijing,  
P. R. China  
2. School of Instrument Science & Opto-electronics Engineering,  
Beihang University, Beijing, P. R. China                                 |
| TuP-65  | Withdrawn                                                              |                                                                          |                                                                              |
| TuP-66  | PRACTICAL SCANNER FOR VOLTAGE METROLOGY                                | Andrea Sosso and Roberto Cerri                                             | Istituto Nazionale di Ricerca Metrologica Strada delle Cacce, Torino Italy  |
| TuP-67  | CONFIGURABLE UNIT FOR PRECISE RMS MEASUREMENTS                          | U. Pogliano, B. Trinchera and F. Francone                                 | Istituto Nazionale di Ricerca Metrologica (I.N.R.I.M) Strada delle Cacce,  
Torino, Italy                                                              |
| TuP-68  | A NEW ERROR COMPENSATION METHOD OF INDUCTIVE VOLTAGE DIVIDER            | He XiaoBing, Zhang Xin                                                     | 1. National Institute of Metrology, Beijing, China  
2. Shenyang Zhongchuan Measurement Technology Corporation, Shenyang, China |
| TuP-69  | LOW LEAKAGE NOISE FILTER FOR DIRECT COMPARISON OF TWO JOSEPHSON JUNCTION ARRAYS IN 10⁻¹⁸ UNCERTAINTY LEVEL | Kyu-Tae Kim, Mun-Seog Kim, Woon Song, Yunuk Chong, Wan-Seop Kim  
Korea Research Institute of Standards and Science, Yuseong,  
Daejeon, KOREA                                                             |
| TuP-70  | DESIGN AND CHARACTERIZATION OF A LOW VOLTAGE DIVIDER                   | C.D. Avilés, D. Hernández, and E. Navarrete                               | Centro Nacional de Metrología (CENAM- México)                                  |
| TuP-71  | CALIBRATION OF HIGH VOLTAGE RESISTOR DIVIDERS                           | K. Draxler and R. Styblikova                                               | 1. CTU in Prague, Faculty of Electrical Engineering Technicka 2,  
Prague 6, Czech Republic  
2. Czech Metrology Institute V Botanice 4, Prague 5, Czech Republic      |
2. National Institute for Standards (NIS), Egypt                            |
| TuP-73  | 10 VOLT JOSEPHSON SERIES ARRAY VOLTAGE STANDARD AT NPL, INDIA          | V.N. Ojha, Sudhir K. Sharma and Shiv K. Jaiswal                            | National Physical Laboratory Dr. K. S. Krishnan Road, New Delhi, India       |
| TuP-74  | DEVELOPMENT OF A CALIBRATION SYSTEM OF DIGITAL RECORDERS FOR IMPULSE TESTS | Liu Na Chen Jiawei                                                        | Electrical Magnetic Division, National Institute of Metrology,  
Beijing, P. R. China                                                         |
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Lindfield, Australia                                                        |
<p>| TuP-76  | GENERIC IMPLEMENTATION OF MONTE CARLO METHOD FOR UNCERTAINTY EVALUATION. APPLICATION TO CALIBRATION OF RF POWER SENSORS | L.G.Lázaro, J.L.Quesada, A. Cerrudo, J. Ruiz and A. Alcantarilla          | TPyCEA, Raimundo Fernandez Villaverde 50, Madrid, Spain                     |</p>
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<td>1. Istituto Nazionale di Ricerca in Metrologia (INRIM) Strada delle Cacce 91, Torino, Italia</td>
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<td>2. Politecnico di Torino Corso Duca degli Abruzzi 24, Torino, Italia</td>
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<td>3. Technical University of Iasi, Faculty of Electrical Engineering Bld. Dimitrie Mangeron 53, Iasi, Romania</td>
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**Resistance Chair: Brian Pritchard**

1. **IMPROVED CRYOGENIC CURRENT COMPARATOR SETUP WITH DIGITAL DOUBLE CURRENT SOURCE**
   - M. Götz, E. Pesel, H. Scherer, B. Schumacher, D. Drung, C. Allmann, M. Peters, and Th. Schurig.
   - 1. Physikalisch-Technische Bundesanstalt, Braunschweig, Germany
   - 2. Abbestraße 2-12, Berlin-Charlottenburg, Germany
   - 3. Magnicon GbR Lemshaler Landstr. 171, Hamburg, Germany

2. **CCC BRIDGE WITH DIGITALLY-CONTROLLED CURRENT SOURCES**
   - C.A. Sanchez, B.M. Wood, and A.D. Inglis
   - National Physical Laboratory, Hampton Road, Teddington, United Kingdom

3. **HIGH RESISTANCE SCALING FROM 10 k(ΩH)M AND QJR STANDARDS USING A CRYOGENIC CURRENT COMPARATOR**
   - R. Elmoquist, G.R. Jones, Jr., B. Pritchard, M. Bierzuchudek, and F. Hernandez
   - National Institute of Standards and Technology, Gaithersburg, MD, USA

4. **AUTOMATION OF 1 TΩ TO 100 TΩ ULTRA-HIGH RESISTANCE MEASUREMENTS AT NIST**
   - D.G. Jarrett, A.M. Muhiz-Mercado, and M.E. Kraft
   - National Institute of Standards and Technology, Gaithersburg, MD, USA

**Low Current and SET Chair: Francois Piquemal**

1. **NOVEL DIGITAL VOLTAGE RAMP GENERATOR FOR PICOAMMETER CALIBRATIONS**
   - G.-D. Willenberg, H.N. Tauscher
   - Physikalisch-Technische Bundesanstalt (PTB), Braunschweig, Germany

2. **RECENT PROGRESS IN THE SETUP OF THE ELECTRON COUNTING CAPACITANCE STANDARD AT PTB**
   - H. Scherer, S.V. Lotkhov, and G.-D. Willenberg
   - Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

3. **UNIFORMITY OF ELECTRON PUMPING REGIME IN TWO GaAs TUNABLE-BARRIER PUMPS**
   - S. P. Giblin, M. D. Blumenhal, B. Kaestner, L. Li, T. J. B. M. Janssen, M. Pepper
   - 1. National Physical Laboratory, Hampton Road, Teddington, Middx. UK, TW11 0LW
   - 2. Cavendish Laboratory, University of Cambridge, Cambridge, UK, CB3 OHE

4. **LOW NOISE SILICON CMOS SINGLE-ELECTRON TRANSISTORS AND ELECTRON PUMPS**
   - 1. DRFM, CEA-Grenoble, 17 rue des martyrs, F-38054 Grenoble cedex 9, France
   - 2. LETI, CEA-Grenoble, 17 rue des martyrs, F-38054 Grenoble cedex 9, France

**Photonics Chair: Kent Rochford**

1. **USE OF DIFFRACTED GAUSSIAN BEAMS IN POSITION SENSING**
   - D. Haddad, P. Juncar, G. Genevès
   - 1. Laboratoire National de Métrologie et d’Essais 29, avenue Roger Hennequin - Trappes Cedex - France
   - 2. Conservatoire National des Arts et des Métiers 61 rue du Landy-La Plaine-Saint-Denis - France

2. **HIGH PRECISION LINEARITY STANDARD FOR HIGH POWER OPTICAL-FIBER POWER METERS**
   - S. Mukai, K. Amemiya, and M. Endo
   - AIST, NMJ, 1-1-1-Central 3, Umezono, Tsukuba, Japan

3. **INJECTION LOCKED DFB LASER AS AN OPTICAL FREQUENCY REFERENCE IN THE INFRARED REGION BASED ON FEMTOSECOND FIBER LASER COMB**
   - Division of Physical Metrology, Korea Research Institute of Standards and Science
   - Department of Physics, Pusan National University, Korea

4. **FEMTOSECOND OPTICAL FREQUENCY COMB BASED ON CESIUM 6s-8s 822 nm HYPERFINE TRANSITION**
   - Tsung-Han Wu, Chien-Ming Wu and Wang-Yau Cheng
   - IAMS, Institute of Atomic and Molecular Science, Academia Sinica, Taiwan, R.O.C.

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5. **ATOMIC LAYER DEPOSITED ALUMINA (Al₂O₃) COATING ON THIN FILM CRYORESISTORS**

O. Hahtela¹, A. Satrapinski¹, P. Sievilä², and N. Chekurov²
1. MIKES, P.O. Box 9, FI-02151 Espoo, Finland
2. Department of Micro and Nanosciences, Helsinki University of Technology, TKK, Finland

6. **TESTING CALCULABLE RESISTORS OF QUADRIFILAR DESIGN**

J. Bohacek, J. Kucera, and R. Sedlacek
Czech Technical University, Faculty of Electrical Engineering Technicka 2, Prague 6, Czech Republic

5. **REALIZATION OF A ROBUST SINGLE-PARAMETER QUANTIZED CHARGE PUMP**

B. Kaestner¹ and V. Kashcheyevs², K. Pierz¹, U. Stieger¹, H. W. Schumacher³
1. Physikalisch-Technische Bundesanstalt, Bundesallee 100, 38116 Braunschweig, Germany
2. Institute for Solid State Physics, University of Latvia, Riga LV-1063, Latvia

6. **DEVELOPMENT OF A COMPACT 1.54 μm ACETYLENE STANDARD AT NPL**

C.S. Edwards¹,², P. Patel¹, G.P. Barwood¹, and P. Gill¹,²
1. National Physical Laboratory Hampton Road, Teddington, Middlesex, United Kingdom
2. Blackett Laboratory, Imperial College London South Kensington Campus, London, United Kingdom

5. **NIST REFERENCE SPECTRAL RESPONSIVITY SCALES FOR IMPROVING THE SI CANDELA AND KELVIN**

G.P. Eppeldauer, S.W. Brown, K.R. Lykke, C.C. Miller, Y. Ohno, and H.W. Yoon
National Institute of Standards and Technology 100 Bureau Drive, Gaithersburg, Maryland, USA
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Room</th>
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<tr>
<td>7:30 – 8:30</td>
<td>Speaker Breakfast (for Wednesday session chairs and oral presenters)</td>
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<td>8:30 – 9:30</td>
<td>Wednesday Plenary 1</td>
<td>Ballrooms A/B</td>
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<td><strong>John Clarke</strong></td>
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<td>University of California, Berkeley</td>
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<td>Professor of Physics, Condensed Matter Experiment</td>
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<td>“The Ubiquitous SQUID: Ultrasensitive Measurements”</td>
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<td>9:30 – 10:30</td>
<td>Wednesday Plenary 2</td>
<td>Ballrooms A/B</td>
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<td>Argonne National Laboratory, Center for Nanoscale Materials</td>
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<td>IEEE Magnetics Society Distinguished Lecturer for 2007</td>
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<td>“Imaging Magnetic Surfaces with Atomic Resolution”</td>
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<td>10:30 – 11:00</td>
<td>Break: Coffee</td>
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<td>11:00 – 11:30</td>
<td>Awards &amp; CPEM 2010 Preview</td>
<td>Ballrooms A/B</td>
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<td>11:30 – 12:30</td>
<td>Wednesday Plenary 3</td>
<td>Ballrooms A/B</td>
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<td><strong>Carl Williams</strong></td>
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<td></td>
<td>Chief, NIST Atomic Physics Division</td>
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<td>Coordinator, NIST Quantum Information Program</td>
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<td>“Quantum Computing”</td>
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<td>12:30 – 14:00</td>
<td>Break: Lunch</td>
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Experimental Progress Toward an SI Based on Fundamental Constants

1. THE DETERMINATIONS OF THE BOLTZMANN CONSTANT
   L. Pitre
   LNE-INM/CNAM, France 61 rue du Landy, La plaine Saint Denis, France

2. CURRENT STATUS OF THE QUANTUM METROLOGY TRIANGLE
   Mark Keller, NIST, USA

3. STATUS OF THE INTERNATIONAL EFFORT ON THE X-RAY CRYSTAL DENSITY WORK AND ITS PROGRESS TOWARDS A MEASUREMENT OF THE AVOGADRO CONSTANT
   K. Fujii1, A. Waseda1, N. Karamoto1, P. Becker2, A. Nicolaus2, M. Krumrey2, H.-U. Danzebrink2, I. Buschi1, H. Bettin1, G. Mana1, E. Massa1, S. Valkiers4, W. Giordini3, E. Kessler6, S. Downes7, A. Picard8, and H. Riemann9
   1. National Metrology Institute of Japan (NMIJ), AIST, Tsukuba, Japan
   2. Physikalisch-Technische Bundesanstalt (PTB), Bundesallee, Braunschweig, Germany
   3. Istituto Nazionale di Ricerca Metrologia (INRIM), Torino, Italy
   4. Institute for Reference Materials and Measurements (IRMM), European Commission-JRC, Geel, Belgium
   5. National Measurement Institute (NMI), Lindfield, NSW, Australia
   6. National Institute of Standards and Technology (NIST), Gaithersburg, MD, USA
   7. National Physical Laboratory (NPL), TW11 0LW Teddington, UK
   8. Bureau International des Poids et Mesures (BIPM), Pavillon de Breteuil, Sèvres, France
   9. Institut für Kristallzüchtung (IKZ), Max-Born-Strasse 2, Berlin, Germany

4. PROGRESS TOWARDS THE REDEFINITION OF THE KILOGRAM:
   MEASUREMENTS OF PLANCK'S CONSTANT USING WATT BALANCES
   I. A. Robinson
   National Physical Laboratory Hampton Road, Teddington, Middlesex, UK

Time and Frequency
Chair: Andreas Bauch

Time and Frequency, continued

WP-5  ABSOLUTE FREQUENCY MEASUREMENT OF AN IODINE STABILIZED 543-nm He-Ne LASER WITH MODULATION SYNCHRONIZED PHASE LOOP FOR IMPROVED FREQUENCY COUNTING
   M. Merimaa, V. Ahtee, and K. Nyholm
   Centre for Metrology and Accreditation (MIKES), Espoo, Finland

WP-6  NEW TWSTFT LINK BETWEEN LNE SYRTE AND NTSC IN THE Ku BAND
   G. D. Rovera1, J. Achkar1, Li Huanxin2, Zhang Hong2
   1. LNE-SYRTE, Observatoire de Paris, France
   2. National Time Service Center The Chinese Academy of Sciences, China

WP-7  DESIGN AND CONSTRUCTION OF ZEEMAN SLOWER FOR 87Sr OPTICAL CLOCK AT NIM
   National Institute of Metrology, China Bei San Huan Dong Lu 18, Beijing, China

WP-8  CESIUM 6S_{1/2}→8S_{1/2} TWO PHOTON TRANSITION-STABILIZED 822.5 nm DIODE LASER
   Chien-Ming Wu1,2, and Wang-Yau Cheng1 and Ray-Kuang Lee2
   1. Institute of Atomic and Molecular Science (IAMS), Academia Sinica, Taipei, Taiwan
   2. Institute of Photonics Technologies, National Tsing-Hua University, Hsinchu, Taiwan
WP-9  ULTRA-STABLE FREQUENCY DISSEMINATION VIA OPTICAL FIBER AT NICT
M. Fujieda, M. Kumagai, T. Gotoh and M. Hosokawa
National Institute of Information and Communications Technology, Nukui-Kitamachi, Koganei, Tokyo, Japan

WP-10  A NEW APPROACH FOR STEERING UTC (KRISS)
Seung Woo Lee, Chang Bok Lee, Sung Hoon Yang
Division of Physical Metrology, Korea Research Institute of Standards and Science (KRISS), I Doryong-dong, Yuseong-gu, Daejeon 305-340 Republic of Korea

WP-11  RECENT PROGRESS OF AN ATOMIC FOUNTAIN FREQUENCY STANDARD NMIJ-F1 (2006-2007)
S. Yanagimachi, A. Takamizawa, Y. Yoshida, A. Yanagimachi, K. Watabe, K. Hagimoto and T. Ikegami
National Metrology Institute of Japan (NMIJ), AIST, AIST Tsukuba Central 3, Ibaraki, Japan

WP-12  MEASUREMENT OF ABSOLUTE ENERGY LEVEL AND HYPERFINE STRUCTURE OF 87Rb 4D5/2 USING DOUBLE RESONANCE OPTICAL PUMPING METHOD
Won-Kyu Lee1, Han Seb Moon2, and Ho Suhng Suh1
1. Division of Physical Metrology, Korea Research Institute of Standards and Science, Daejeon, Korea
2. Department of Physics, Pusan National University, Busan, Korea

WP-13  THE AC QUANTUM HALL EFFECT: ABOUT GATES AND IMAGE CHARGES
J. Schurr 1, G. Hein 1, K. Pierz 1, and B. P. Kibble 2
1. Physikalisch-Technische Bundesanstalt, Braunschweig, Germany
2. Guest Scientist, Hampton, Middlesex, United Kingdom

WP-14  THEORETICAL MODEL OF THE FREQUENCY RESPONSE COEFFICIENT OF CALCULABLE COAXIAL RESISTANCE STANDARDS FROM DC TO 100 MHz
S. A. Awan
Imperial College London, United Kingdom

WP-15  CALIBRATION OF FOUR-TERMINAL-PAIR RESISTOR
Dai Dongxue, Ruan Yongshun, Wang Xiaochao
National Institute of Metrology, Beijing, China

WP-16  IMPROVING OF THE RELATIVE CONDUCTIVITY MEASUREMENTS TRACEABILITY TO PRIMARY STANDARDS OF RESISTANCE, LENGTH AND TEMPERATURE
M.N.Surdu, A.L.Lameko, M.J. Mukharovsky, V.G. Gavrilkin
Ukrtelmetsitstandart, Metrologichna, 4, Kiev, Ukraine

WP-17  A HIGH AUDIO-FREQUENCY INDUCTIVE VOLTAGE DIVIDER STANDARD UP TO 100 kHz
N. Sakamoto, T. Yamada, and Y. Nakamura
National Metrology Institute of Japan (NMIJ), AIST 1-1-1, Umezono, Central 3, Tsukuba, Ibaraki, Japan

WP-18  VALIDATION OF INDUCTANCE MEASUREMENT AT NMI VSL
E.F. Dierikx and J.H.N. van der Beek
NMI Van Swinden Laboratorium, Delft, The Netherlands

WP-19  SIMULTANEOUS COMPARISON OF IMPEDANCE STANDARDS BY MEANS OF COMMERCIAL DIGITAL LCR-METERS
Han Jun Kni1, Yu. P. Semenov2
1. Korea Research Institute of Standards and Science (KRISS), Korea
2. D.I. Mendeleyev Institute for Metrology (VNIM), Russia

WP-20  A NEW LCR METER RIGHT ANGLE PHASE SELF-CALIBRATION METHOD FOR USE IN RF RESISTANCE CALIBRATIONS BY USING CAPACITANCE STANDARDS
K. Suzuki
Agilent Technologies International Japan, Ltd. Measurement Standards Center, Takakura-cho, Hachioji-shi, Tokyo, Japan

WP-21  SOME APPLICATIONS OF TIMES SERIES ANALYSIS TECHNIQUES
N. Fletcher1, T.J.Witt2
1. Bureau International des Poids et Mesures (BIPM) Pavillon de Breteuil, Sèvres Cedex, France
2. BIPM, retired

WP-22  SAMPLING ERROR ANALYSIS APPLIED TO HIGH-ACCURACY MEASUREMENTS
R. T. Barros e Vasconcellos1,2 and M. L. R. Campos2
1. Inmetro - Capacitance and Inductance Laboratory, Brazil
2. Coppe – UFRJ, Brazil

WP-23  FEASIBILITY STUDY ON REMOTE CALIBRATION OF IMPEDANCE STANDARDS FOR INDUSTRIAL USE
S. Matsuzawa1, T. Shimodaira1, K. Hanaoka1, A. Shimoyama2, S. Sakagami2, A. Domae2, K. Kito3, and Y. Nakamura3
1. Nagano Prefecture General Industrial Technology Center 1-3-1 Katama-cho, Okaya, Nagano, Japan
2. Japan Electric Meters Inspection Corporation 4-15-7, Shibaura, Minato-ku, Tokyo, Japan
3. National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology, AIST Tsukuba Central 3, Tsukuba, Ibaraki, Japan

WP-24  A NEW SHORT-BAR METHOD FOR 4TP ADMITTANCE STANDARDS CALIBRATION BY USING MODIFIED Z-MATRIX EXPRESSION TO IMPROVE S/N FOR HIGHER IMPEDANCE
K. Suzuki
Agilent Technologies International Japan, Ltd. Measurement Standards Center, 9-1 Takakura-cho, Hachioji-shi, Tokyo, Japan

WP-25  SUBPICOAMPERE CURRENT SOURCE BASED ON A DIGITAL-TO-ANALOG CONVERTER
I. Isakka, K. Kalliomäki, J. Seppälä, A. Manninen
Centre for Metrology and Accreditation (MIKES), Espoo, Finland

WP-26  A SELF-CALIBRATING HIGH-PRECISION CURRENT TRANSFORMER
Daniel Slomovitz, Carlos Castet
UTE Laboratory, Montevideo, Uruguay

WP-27  STEPPING UP AC-DC CURRENT UP TO 20 A
T. Jing, S.W. Chua, J. Sim, and C.H. Ma
National Metrology Centre, A*STAR, Republic of Singapore
TECHNICAL PROGRAM – WEDNESDAY 11 JUNE 2008

16:00 – 18:00 WEDNESDAY POSTER SESSION (WP)

Current, continued

WP-28
A HIGH PRECISION CALIBRATION SETUP FOR LOW-CURRENT METERS IN THE RANGE OF 10 pA to 1 FA
Wan-Seop Kim, Mun-Seog Kim, Kyu-Tae Kim, Youn Chong, Han-Jun Kim, Myungsung Kim, and H. Norbert Taucher
1. Korea Research Institute of Standards and Science, Doryong-Dong, Yuseong-Gu, Daejeon, Rep. of Korea
2. Physikalisch-Technische Bundesanstalt, Bundesallee, Braunschweig, Germany

WP-29
STUDY ON THE PROBLEM OF CHANNEL-CLOSING OF MULTI-CHANNEL COMPARATOR
Shiyian Ren, Xi Zhou, Huayun Yang
College of Electrical and Electronics Engineering, Huazhong University of Science & Technology Wuhan, P. R. China

WP-30
AC-DC CURRENT TRANSFER DIFFERENCE IN CMI
V. Novákova Zachovalová
Department of DC and LF electrical quantities, CMI, Czech Republic

Voltage, continued

WP-31
A COMPACT HIGH-PRECISION VOLTAGE STANDARD BASED ON PROGRAMMABLE JOSEPHSON ARRAY
Y. Gao, H. Li
National Institute of Metrology No.18, Bei San Huang Dong Lu, Beijing, China

WP-32
SECONDARY STANDARD OF AC VOLTAGE SCALE TRANSFORMATION COEFFICIENT UNIT AT PRIMARY RATED VOLTAGES OF 400/ AND 500/ KV
V.N. Kikalov, V.V. Kopyshin, M.J. Mukhharovsky, V.K. Kilevoy and A.P. Krivohvost
1. The State Enterprise All-Ukrainian State Research and Production Centre for Standardization, Metrology, Certification and Consumers’ Rights Protection (Ukrmetrteststandard)4, Metrologichna str., Kyiv, Ukraine
2. Open-Stock “Ukrainian Research, Design and Technological Transformer Institute” (OSC “VT”), 11 Dnipropetrovskoe chooshe, Zaporizhzhya, Ukraine

WP-33
A DIRECT COMPARISON OF JOSEPHSON ARRAY VOLTAGE STANDARDS
L. X. Liu, S. W. Chuai, J. Lee, and Y. Zhou, C. A. Hamilton
1. National Metrology Centre, A*STAR, 1 Science Park Drive, Singapore 118221, Rep. of Singapore
2. VMetrix, LLC, Boulder, CO, USA

WP-34
AUTOMATED 10 VOLT JOSEPHSON VOLTAGE STANDARD SYSTEM OPERATING WITH LIQUID HELIUM AND WITH A CRYOCOOLER
1. Supracon AG, Wildenbruchstr. 15, Jena, Germany
2. Institute of Photonic Technologies (IPHT), Jena, Germany

WP-35
AN ACCURATE ASYNCHRONOUS CALCULATION METHOD FOR EVALUATING PEAK AND RMS VALUES FROM SAMPLED DATA
E.-P. Suomalainen, J. Hällström
Helsinki University of Technology (MIKES-TKK), TKK, Finland

WP-36
A SETUP FOR AC VOLTAGE SYNTHESIS USING A SINIS JOSEPHSON ARRAY
G. Eklund
SP Technical Research Institute of Sweden - Borås, Sweden

WP-37
IMPROVED HIGH INPUT IMPEDANCE mV-AMPLIFIERS WITH GAIN FACTORS FROM 10 TO 900
T. Funck, M. Stojanovic, and M. Klonz
1. Physikalisch-Technische Bundesanstalt Bundesallee, Braunschweig, Germany
2. Guest-scientist from ENIGMA INSTRUMENT D.O.O.
BEOGRAD Studentski trg 19/III, Beograd, Serbia

WP-38
OPERATION OF 10-V PROGRAMMABLE JOSEPHSON VOLTAGE STANDARD SYSTEM WITH A 10-K COMPACT CRYOCOOLER
T. Yamada, Y. Murayama, H. Yamamori, H. Sasaki, A. Shoji, A. Iwasa, H. Nishinaka, and Y. Nakamura
1. Nanoelectronics Research Institute, AIST Tsukuba Central 2, 1-1-1, Umezono, Tsukuba, Ibaraki, JAPAN
2. National Metrology Institute of Japan, AIST Tsukuba Central 2, 1-1-1, Umezono, Tsukuba, Ibaraki, JAPAN

WP-39
MODEL FOR TRANSIENT VARIATION IN STEPWISE SYNTHESIZED JOSEPHSON SINEWAVES
A. Katkov, R. Behr, and J. Lee
1. Mendeleyev Institute for Metrology, Moskovsky pr, Petersburg, Russia
2. Physikalisch-Technische Bundesanstalt, Bundesallee, Braunschweig, Germany

WP-40
STEPWISE WAVEFORM SYNTHESIS USING A PROGRAMMABLE JOSEPHSON JUNCTION ARRAY
Mun-Seog Kim, Youn Chong, Kyu-Tae Kim, Wan-Seop Kim, and Sung-Won Kwon
Korea Research Institute of Standards and Science, 1 Doryong-Dong, Yuseong-Gu, Daejeon, Republic of Korea

WP-41
LOW VOLTAGE AC-DC TRANSFER STANDARDS AT LNE
A. Poletaeff and D. Leprat
LNE, 29 Avenue Roger Hennequin, Trappes – France

WP-42
POSSIBLE CHANGING IN VOLTAGE KEY COMPARISON PROCEDURE
A. Katkov
Institute for Metrology (VNIIM), Moskovsky pr. 19, St. Petersburg, Russia

WP-43
STUDIES ON AC VOLTAGE MEASUREMENT BY SAMPLING METHOD
Liu Yue, Zhang Xiuzeng, Zhao Honggang, and Zou Bengxia
Division of Electricity and Quantum Metrology, National Institute of Metrology, No.18, Bei San Huang Dong Road, Beijing, China

WP-44
METROLOGICAL CHARACTERIZATIONS OF WIDEBAND DIGITIZERS
P. Espel, A. Bounouh, and A. Poletaeff
LNE, 29 avenue Roger Hennequin, Trappes, France

Resistance

WP-45
CHARACTERIZATION OF LOADING EFFECTS IN PRECISION 1 OHM RESISTORS
G. R. Jones and R. E. Elmquist
National Institute of Standards and Technology - Gaithersburg, MD, USA

Chair: Sam Benz

WP-37
Chair: Nick Fletcher

Private Dining Room
1st Floor
WP-46  TRANSPORTABILITY OF THE NML 1 Ω RESISTOR  
B. J. Pritchard  
National Measurement Institute Bradfield Road, West Lindfield, NSW, Australia

WP-47  DESIGN AND FABRICATION OF HIGH VALUE STANDARD RESISTORS AT INTI  
M. Bierzychudek, R. Garcia, M. Real and A. Tonina  
Instituto Nacional de Tecnologia Industrial, INTI, Buenos Aires, ARGENTINA

WP-48  PROBING MOBILITY GAPS AT RESISTIVITY MINIMA IN THE INTEGER QUANTUM HALL EFFECT  
C.-T. Liang¹, K. Y. Chen¹, Jau-Yang Wu², S. D. Lin³, Li-Hung Lin¹, Yru Li³, Yen Shung Tseng², Chun-Kai Yang¹, Po-Tsun Lin³, K. A. Cheng¹, and C. F. Huang¹  
1. Department of Physics, National Taiwan University, Taipei, Taiwan, R. O. C.  
2. Department of Electronic Engineering, National Chiao Tung University, Hsin Chu, Taiwan, R.O.C.  
3. Department of Applied Physics, National Chiayi University, Chiayi, Taiwan, R.O.C.  
4. Department of Electronic Engineering, lung Hwa University of Science and Technology, Taoyuan County, Taiwan, R.O.C.  
5. National Measurement Laboratory, Center for Measurement Standards, Industrial Technology Research Institute, Hsinchu, Taiwan, R. O. C.

WP-49  RESEARCH OF TRANSFER QUANTUM HALL RESISTANCE WITH DIRECT CURRENT COMPARATOR BRIDGE  
X.D. Huang, J.Z. Cai, Y. Sun and J.D. Li  
Beijing Orient Institute of Measurement & Test, Beijing, China

WP-50  MAGNETIC FIELD OF THE CALCULABLE AC/DC RESISTANCE STANDARD OF TORIOD TYPE  
H. Li¹, X. Li¹, C. Li² and B. Han¹,²  
1. College of Quality and Supervisor Technology, Hebei University, Baoding, Hebei Province, China  
2. Department of Precision Instrument and Mechnanology, Tshinghua University, Beijing, China  
3. College of Precision Instrument and Opto-Electronics Engineering, Tianjin University, Tianjin, China

WP-51  DEVELOPMENT OF SIMULANT HIGH-POWER RESISTOR  
Hao WANG, Haiming SHAO, Zhibin LI, Bo LIANG, Feipeng, LIN  
National Institute of Metrology No.18,Bei San Huan Dong Road,Beijing, China

WP-52  REALIZATION OF AC-DC CURRENT TRANSFER DIFFERENCE TO 1 MHz AT SP  
Karl-Erik Rydler and Valter Tarasso  
SP Technical Research Institute of Sweden, Box 857, SE-501 15 BORÁS, Sweden

WP-54  OXIDE LAYER MASS DETERMINATION AT THE SILICON SPHERE OF THE AVOGADRO PROJECT  
I. Busch, H.-U. Danzebrink, M. Krumrey and H. Bettin  
Physikalisch-Technische Bundesanstalt Bundesallee, Braunschweig, Germany

WP-55  SILICON LATTICE-PARAMETER MEASUREMENTS WITH CENTIMETER X-RAY INTERFEROMETRY  
Luca Ferroglio, Giovanni Mana, and Enrico Massa  
INRiM – Istituto Nazionale di Ricerca Metrologica str. delle caccie, Torino, Italy

WP-56  INFLUENCE OF THE OPTICAL QUALITY OF THE INTERFEROMETER OPTICS ON THE DIAMETER OF THE AVOGADRO SILICON SPHERE  
R. Arnold Nicolaus and Guido Bartl  
Physikalisch-Technische Bundesanstalt (PTB), Bundesallee, Braunschweig, Germany

WP-57  THE SI BETWEEN EVOLUTION AND REVOLUTION  
F. Cabiai  
National Institute of Metrological Research, Italy

WP-58  TOWARD A DETERMINATION OF R₀ AT LNE WITH A NEW THOMPSON LAMPARD CALCULABLE CAPACITOR  
C. Consejo¹, O. Thévenot¹, L. Lahousse¹, J.M. David²  
1. LNE, 29 avenue Roger Hennequin, Trappes Cedex - France  
2. ENSAM, 8 boulevard Louis XIV, Lille Cedex – France

Radio Frequency  
Chair: Mitch Wallis

WP-59  A SIMPLE IMPEDANCE CORRECTION FOR ON-WAVER TAN CALIBRATION TECHNIQUES  
M. Bahouche¹,², D. Allal³, and E. Bergeault²  
1. Laboratoire National de Métrologie et d'Essais (LNE) 29 avenue Roger Hennequin, Trappes Cedex, France  
2. Dept. Comelec, GET Telecom-Paris 46 rue Barrault, Paris , France

WP-60  DESIGN AND EVALUATION OF A WR-15 (50 TO 75 GHz) MICROCALORIMETER  
T.P. Crowley¹ and Xiaohai Cui²  
1. National Institute of Standards and Technology MC, 325 Broadway, CO, USA  
2. National Institute of Metrology, China

WP-61  A DESIGN AND IMPLEMENTATION OF 3.5 MM COAXIAL MICROCALORIMETER FOR RF AND MICROWAVE POWER STANDARDS AT KRIS  
Jae-Yong Kwon, Tae-Weon Kang, and Jeong-Hwan Kim  
Electromagnetic Metrology Center, Korea Research Institute of Standards and Science (KRISs), Yuseong, Daejeon, Korea

WP-62  AN UN-INTRUSIVE OPTICALLY MODULATED SCATTERER TECHNIQUE FOR UNWIRED SMALL ANTENNA MEASUREMENT  
R.R. Lao¹,², M.J. Huang¹, W.T. Shay¹,², and J.H. Tang¹  
1. Center for Measurement Standards, Industrial Technology Research Institute, Kuang Fu Rd., Hsinchu, Taiwan, R.O.C.  
2. Department of Communication Engineering, National Chiao Tung University, 1001 Ta Hsueh Rd., Hsinchu, Taiwan, R.O.C.
WP-63 RF-DC DIFFERENCE MEASUREMENT SYSTEM AT NMC  
Y. Shan, S.W. Chua, and I. Teo  
National Metrology Centre, A*STAR Science Park Drive, Singapore, Republic of Singapore

WP-64 UNCERTAINTY PROPAGATION THROUGH NETWORK PARAMETER COVERSIONS  
J. Stenarson, and K. Yhland  
SP Technical Research Institute of Sweden MTK, Borås, Sweden

WP-65 RESEARCH ON SVM-BASED LARGE SIGNAL BEHAVIOR MODEL METHOD FOR RF POWER AMPLIFIER  
Lin Maoliu and Hua Xiaojie  
Dept. of Electronic and Communication Engineering, Harbin Institute of Technology, Harbin, China

WP-66 A SIMPLE TECHNIQUE FOR PRECISION RF ATTENUATION MEASUREMENT  
A. Widarta and T. Kawakami  
National Metrology Institute of Japan, NMIJ/AIST Umezono 1-1-1, Tsukuba, Japan

WP-67 FEASIBILITY OF A WIDEBAND CALCULABLE STANDARD ANTENNA FOR EMC MEASUREMENTS  
A. Kazemipour1, X. Begaud2 and S.H. Kim1  
1. Laboratoire National de Métrologie et d’Essais LNE 29 avenue Roger Hennequin, 78197 Trappes, France  
2. Dept. Comelec, TELECOM Paris Tech., Paris – France  
3. College of Engineering, Chung-Ang University, Seoul – Korea

WP-68 THE CAPABILITY OF THE NATIONAL INSTITUTE OF STANDARDS IN THE ELECTROMAGNETIC COMPATIBILITY MEASUREMENTS  
Prof. Dr. Eng. Sohair Fahmy  
National Institute of Standards- (NIS) – Egypt

WP-69 UNCERTAINTIES OF VNA S-PARAMETER MEASUREMENTS APPLYING THE SHORT-OPEN-LOAD-RECIROCAL (SOLR) CALIBRATION METHOD  
Ulrich Stumper  
Physikalisch-Technische Bundesanstalt Bundesallee, Braunschweig, Germany

WP-70 CHARACTERIZATION METHOD OF ELECTRIC FIELD STRENGTH SENSOR BY USING TRANSFER STANDARD IN GTM CELL  
N. Kang, J. Kang, D. Kim , J. Kim and G. Lee  
Electromagnetic Metrology Center, Korea Research Institute of Standards and Science (KRISS), 1 Doryong-Dong, Yuseong-Gu, Daejeon, Korea

WP-71 METHOD FOR COMPUTING THE EFFECTIVE APERTURE TIME IN THE HP3458  
Kristian B. Ellingsberg, Tore Sørsdal  
Justervesenet - the Norwegian Metrology Service Fetveien 99, Kjeller, Norway

WP-72 UNCERTAINTY ESTIMATION OF PHASE SHIFT OF VOLTAGE DIVIDERS AND SHUNTS MEASURED BY SAMPLING APPROACH  
LU Zuliang, WANG Lei, LI Min, LIU Lijuan, ZHOU Hao  
National Institute of Metrology, China No.18, BeiSanHuan Dong Road, Beijing, China

WP-73 A PROPOSAL OF DEFINITION FOR UNCERTAINTY OF HARMONIC VOLTAGE AND ITS EXPERIMENTAL DETERMINATION  
LU Zuliang, WANG Lei, LI Min, LIU Lijuan, ZHOU Hao  
National Institute of Metrology, China No.18, BeiSanHuan Dong Road, Beijing, China

WP-74 PHASE EXTRACTION METHOD BASED ON REAL WAVELET TRANSFORM  
Chen Xiangxun  
China Electric Power Research InstituteNo.15 Xiaoying Donglu, Qinghe, Beijing, China

WP-75 RESEARCH ON DIGITAL OPTICAL FIBER CURRENT TRANSFORMER WITH CT POWER SUPPLY  
Li Kaicheng, Hu Weibing, Liu Jianfeng and Zhang Ming  
College of Electrical and Electronic Engineering, Huazhong University of Science and Technology Wuhan, P.R.China

WP-76 THE RESEARCH OF INTERNET-ENABLED CALIBRATING EQUIPMENT FOR AC ELECTRICAL ENERGY METERS  
Liu Lijuan, Wang Lei, Zhou Hao, Li Min and Lu Zuliang  
National Institute of Metrology, No.18, Bei San Huan Dong Lu, Chaoyang District, Beijing, China

WP-77 DEVELOPMENT OF A CALCULABLE POTENTIAL TRANSFORMER WITH A WIDE RATIO ERROR OF -10% TO +10% AND ITS APPLICATION  
Sung-Won Kwon, Jae Kap Jung, Sang Hwa Lee, Jeon Hong Kang, Mun-Seog Kim and Munyungsoo Kim  
Korea Research Institute of Standards and Science (KRISS) 1 Doryong-dong, Yuseong-gu, Daejeon, Republic of Korea

WP-78 AC MAGNETIC FLUX DENSITY STANDARDS IN THE LOW FREQUENCY RANGE  
Po Gyu Park1, Y. G. Kim1, V. N. Kalabin2, V. Ya. Shifrin2  
1. Korea Research Institute of Standards and Science (KRISS), 1 Doryong-Dong, Yuseong-Gu, Daejeon, Rep. of Korea  
2. D.I. Mendeleyev Institute for Metrology (VNIIM), 19 Moskovsky pr., St. Petersburg, Russia

WP-79 METROLOGICAL RESEARCHES OF PROTON AND OPTICAL PUMPING GEOMAGNETOMETERS  
V. Shifrin1, V. N. Khorev1, V. N. Kalabin1 and P. G. Park2  
1. D.I. Mendeleyev Institute for Metrology (VNIIM), 19, Moskovsky pr, St. Petersburg, Russia  
2. Korea Research Institute of Standards and Science (KRISS), 1 Doryong-Dong, Yuseong-Gu, Daejeon, Rep. of Korea

WP-80 APPLICATION OF COUNTER-HELMHOLTZ’S COILS IN THE MAGNETO OPTICAL TRAP  
SU Duo-wu and Ji Wang-xi  
National Institute of Metrology , No.18, Bei San Huan Dong Lu, Chaoyang Dist, Beijing, P.R.China
7:30 – 8:30
Speaker Breakfast (for Thursday session chairs and oral presenters)  Fir Room

8:30 – 10:10
ThA-1 Ballroom A ThB-1 Ballroom B ThC-1 Ballroom C/D

High Current
Chair: Terry McComb

1. CALIBRATION OF ROGOWSKI COILS AT POWER FREQUENCIES USING DIGITAL SAMPLING
   Branislav Djokic
   Institute for National Measurement Standards
   National Research Council of Canada
   Ottawa, Ontario, Canada

2. A MULTISTAGE TECHNIQUE FOR CURRENT TRANSFORMERS WITH CURRENT RATIOS OF LESS THAN UNITY
   E. So and D. Bennet
   Institute for National Measurement Standards,
   National Research Council of Canada
   Ottawa, Ontario, Canada

3. ON-LINE CALIBRATION OF HIGH VOLTAGE CURRENT TRANSFORMERS
   Daniel Slomovitz, Alejandro Santos
   UTE Laboratory, Montevideo, Uruguay

4. ON-SITE CALIBRATION OF A CURRENT TRANSFORMER USING A ROGOWSKI COIL
   E.-P. Suomalainen, J. Hällström
   Helsinki University of Technology (MIKES-TKK), Finland

Radio Frequency
Chair: Mitch Wallis

1. EFFECT OF MATERIAL PROPERTIES ON BROADBAND ELECTRICAL BEHAVIOR OF COPLANAR WAVEGUIDES
   Uwe Arz1, Jens Leinhol1, and Michael D. Janezic
   1. Physikalisch-Technische Bundesanstalt (PTB), Bundesallee, Braunschweig, Germany
   2. National Institute of Standards and Technology (NIST), Broadway, Boulder, CO, USA

2. HIGH CONFINED BRAGG MODES FOR VERY LOW PHASE NOISE OSCILLATOR AND NARROW BAND FILTERING APPLICATIONS
   J.M. Le Floch1, D. Mouneyrac1/2, M.E. Tobar1, D. Cros1, J. Krupka3
   1. School of Physics, University of Western Australia, Crawley, Western Australia,
   2. XLIM - UMR CNRS n° 6172 - 123, avenue A. Thomas, Limoges Cedex, France,
   3. Institute of Microelectronics and Optoelectronics, University of Technology, Warsaw, Poland

3. A BILATERAL COMPARISON OF MEASUREMENTS OF DIAMETERS AND CHARACTERISTIC IMPEDANCE OF PRECISION 3.5 mm COAXIAL AIR LINES
   Masahiro Horibe1 and Nick Ridler2
   1. National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology, Tsukuba, Ibaragi, Japan
   2. National Physical Laboratory, Hampton Road, Teddington, United Kingdom

4. DETERMINATION OF THE CORRECTION FACTOR OF A WAVEGUIDE MICROCALORIMETER
   Rolf Judaschke
   Physikalisch-Technische Bundesanstalt, Bundesallee, Braunschweig, Germany

5. A CALIBRATION FOR PRECISION COAXIAL AIR LINES IN THE FREQUENCY RANGE UP TO 110 GHz
   Masahiro Horibe, Masaaki Shida and Koji Komiyama
   National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology, Tsukuba, Ibaraki, Japan

10:00 – 10:30
Break: Coffee

Power Standards
Chair: Hector Laiz

1. AC POWER STANDARD USING A PROGRAMMABLE JOSEPHSON VOLTAGE STANDARD
   B.C. Waltrip, L. Palafox, R. Behr, W.G. Kürten Ihlenfeld, and F. Müller
   National Institute of Standards and Technology, Gaithersburg, MD, USA

2. THE JOSEPHSON EFFECT BASED PRIMARY AC POWER STANDARD AT PTB: PROGRESS REPORT
   L. Palafox, R. Behr, W.G. Kürten Ihlenfeld, and F. Müller
   Physikalisch-Technische Bundesanstalt – PTB, Germany

3. AC POWER STANDARD AT FREQUENCIES UP TO 200 kHz
   Ilya Budovsky
   National Measurement Institute, Australia, Lindfield, Australia

4. THREE-PHASE PRIMARY AC POWER SAMPLING STANDARD WITH IMPROVED FREQUENCY RESOLUTION
   W. G. Kürten Ihlenfeld, K. Dauke, A. Suchy, and P. Räther
   Physikalisch-Technische Bundesanstalt – PTB, Germany
TECHNICAL PROGRAM – THURSDAY 12 JUNE 2008

10:30 – 12:30

Special Session 2
Chairs: Blaise Jeanneret, Barry Wood

Quantum Hall Effect: Present Status

1. QUANTUM HALL EFFECT IN GRAPHENE
   Konstantin Novoselov
   University of Manchester, UK

2. UNIVERSALITY OF THE QUANTIZED HALL RESISTANCE
   Beat Jeckelmann
   Federal Office of Metrology METAS, Switzerland

3. COMPREHEND FOR PRECISE AC MEASUREMENTS OF THE QUANTIZED HALL RESISTANCE
   Franz Ahlers
   Physikalisch-Technische Bundesanstalt, Germany

12:30 – 14:00

Break: Lunch

14:00 – 16:00

THURSDAY POSTER SESSION (ThP)

Radio Frequency
Chair: Kate Remley

ThP-1 UNCERTAINTY ANALYSIS FOR NOISE PARAMETER MEASUREMENTS
James Randa
Electromagnetics Division, National Institute of Standards and Technology Boulder, CO U.S.A.

ThP-2 RABI MICROWAVE POWER STANDARDS
David C. Paulusse, Chantal Prévost, and Alain Michaud
National Research Council, Canada, Ottawa, Ontario, Canada

ThP-3 ANTENNA TEST RANGE IMAGING USING SPHERICAL NEAR-FIELD SCANNING
M. H. Francis, R. C. Wittmann, and R. H. Direen
National Institute of Standards and Technology 325 Broadway, Boulder, CO, USA

ThP-4 CALIBRATION METHODS FOR ELECTROSTATIC DISCHARGE GENERATORS
M. Borsero, A. Sardi, G. Vizio
Istituto Nazionale di Ricerca Metrologica (INRIM) – Strada delle Cacce, Torino (Italy)

ThP-5 APMP KEY COMPARISON OF KA-BAND ANTENNA GAIN (APMP.EM.RF-K3.F)
J. Kang1, N. Kang1, J. Kim1, M. Hirose2, and K. Komiyama2
1. Electromagnetic Metrology Center, Korea Research Institute of Standards and Science (KRISS) 1 Doryong-Dong, Yuseong-Gu, Daejeon, Korea
2. Electromagnetic Waves Division, Metrology Institute of Japan (NMIJ) Tsukuba Central 3, Umezono 1-1-1, Tsukuba-shi, Ibaraki, Japan

14:00 – 16:00

Radio Frequency, continued

ThP-6 COMPACT EXTENDED PORT CAPABLE OF FULL 2-PORT CALIBRATIONS USING OPTICAL TECHNIQUES
M. Hirose and S. Kurokawa
National Institute of Advanced Industrial Science and Technology AIST Central3, Umezono, Tsukuba-shi, Ibaraki, Japan

ThP-7 ESTABLISHMENT OF THE OPEN AREA ANTENNA CALIBRATION SITE AT CENAM
Victoria Molina-Lopez, Mariano Botello-Perez, Israel Garcia-Ruiz
Centro Nacional de Metrologia, CENAM, Mexico

ThP-8 A DIRECT COMPARISON TRANSFER MICROWAVE POWER SENSOR CALIBRATION SYSTEM
Y. Shan, S.W. Chua, H. Neo and T. Wu
National Metrology Centre, A*STAR, Republic of Singapore

ThP-9 RF POWER MEASUREMENT CALIBULRE PRIMARY STANDARD
F. Ziadé1,2, A. Kazemipour3, E. Bergeault2, D. Allal1 and M. Bourghes1
1. Laboratoire National de Métrologie et d’Essais LNE 29 avenue Roger Hennequin, 78197 Trappes, France
2. Dept. Comelec, TELECOM Paris Tech 46 rue Barrault, 75634 Paris cedex 13, France

ThP-10 REFERENCE METHOD FOR SMALL CIRCULAR LOOP ANTENNAS IN THE MF AND HF BANDS
Masanori Ishii1, Yozo Shimada1, and Daisuke Nakajima2
1. National Institute of Advanced Industrial Science and Technology, National Metrology Institute of Japan, Japan
2. Japan Quality Assurance Organization, Japan

Nanoscale Electromagnetic Metrology

1. RF MEASUREMENTS OF NANOSCALE DEVICES: CHALLENGES AND OPPORTUNITIES
   Peter Burke
   University of California, Irvine, Irvine, CA

2. TOWARD QUANTITAVE NEAR-FIELD MICROWAVE MICROSCOPY AT THE NANOSCALE
   Steve Anlage
   University of Maryland, College Park, USA

3. PLASMONICS WITH DESIGNED METAL NANOSTRUCTURES: FUNDAMENTALS AND APPLICATIONS
   Stefan Maier
   Imperial College, United Kingdom

4. MAGNETO-RESISTANCE OSCILLATIONS AND ZERO-RESISTANCE STATES INDUCED BY PHOTO-EXCITATION IN THE QUASI TWO-DIMENSIONAL GaAs/AlGaAs SYSTEM
   Ramesh Mani
   Georgia State University, USA
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<td>ThP-11</td>
<td>IMPROVING THE PRIMARY POWER STANDARD BELOW 10 MHz WITH THERMOELECTRIC SENSORS</td>
<td>L. Brunetti, L. Oberto, and M. Sellone. 1. Istituto Nazionale di Ricerca in Metrologia (INRIM) Strada delle Cacce 91, 10135 Torino, Italy. 2. Politecnico di Torino Corso Duca degli Abruzzi 24, Torino, Italy.</td>
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<td>ThP-13</td>
<td>PERMITIVITY AND PERMEABILITY AND THE BASIS OF EFFECTIVE PARAMETERS</td>
<td>J. Baker-Jarvis, M. Janezic, B. Riddle, and R. Wittmann. NIST, Boulder, Colorado, USA.</td>
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<td>ThP-14</td>
<td>MAGNETIC PERMEABILITY, LOSSES AND FERROMAGNETIC RESONANCE IN FERRITES UNDER MAGNETIC FIELD BIAS FROM DC TO THE MICROWAVE REGIME</td>
<td>M. Pasquale, F. Fiorillo, M. Coïsson, and C. Beatrice. Istituto Nazionale di Ricerca Metrologica INRIM, Divisione Elettromagnetismo, Strada delle Cacce 91, 10135, Torino, Italy.</td>
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<td>ThP-15</td>
<td>IMPROVED MONTE CARLO UNCERTAINTY MODELLING WITH CROSS-FREQUENCY CORRELATION FOR MICROWAVE DIELECTRIC REFERENCE LIQUID DATA</td>
<td>A P Gregory, M G Cox, and R N Clarke. National Physical Laboratory, Hampton Road, Teddington, TW11 0LW, UK.</td>
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<td>ThP-16</td>
<td>PERMEABILITY AND PERMITTIVITY MEASUREMENTS USING PROPAGATION AND IMPEDANCE OF TRL CALIBRATED MICROSTRIPINES</td>
<td>M.N. Afsar, S McCooey, N. Al-Moyaed, and M. Obol. High Frequency Materials Measurement and Information Center, Department of Electrical and Computer Engineering, Tufts University, Medford, MA 02155, USA.</td>
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<tr>
<td>ThP-17</td>
<td>DIRECT BROADBAND MICROWAVE CHARACTERIZATION OF BIOLOGICAL TISSUES USING THE COAXIAL PROBE TECHNIQUE</td>
<td>Mohammed N. Afsar, Stephen P. Naber, Nawaf Al-Moayed, and Mahmut Obol. 1. High Frequency Materials Measurement and Information Center, Department of Electrical and Computer Engineering, Tufts University, Medford, MA 02155, USA. 2. Department of Pathology, Tufts – New England Medical Center, Boston, MA 02111, USA.</td>
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<tr>
<td>ThP-18</td>
<td>PRECISION HIGH RESOLUTION FOURIER TRANSFORM SPECTROSCOPY OF GREEN HOUSE GASES AT MILLIMETER AND SUBMILLIMETER WAVELENGTHS</td>
<td>N. N. Almoayed, G. R. Khan, and M. N. Afsar. High Frequency Materials Measurement and Information Center, Tufts University, Medford, MA 02155, USA.</td>
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<td>ThP-19</td>
<td>MICROWAVE PERMITTIVITY AND PERMEABILITY PROPERTIES AND MICROWAVE REFLECTIONS OF FERRITE POWDERS</td>
<td>Mohammed N. Afsar, Ana Medina Ayala, Nawaf Al-Moayed, and Mahmut Obol. High Frequency Materials Measurement and Information Center, Department of Electrical and Computer Engineering, Tufts University, Medford, MA 02155, USA.</td>
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<tr>
<td>ThP-20</td>
<td>PRECISION TRANSMITTANCE MEASUREMENTS ON FERRITES IN MILLIMETER WAVES</td>
<td>K. A. Korolev, S. Chen, and M. N. Afsar. 1. Department of Electrical and Computer Engineering, Tufts University, 161 College Avenue, Medford, Massachusetts 02155, USA. 2. Extremely High Frequency Medical and Technical Association, 11-7 Mokhovaya Street, Moscow 125009, Russian Federation.</td>
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<tr>
<td>AC &amp; DC Current</td>
<td></td>
<td>Bostjan Voljc, Mag. Matjaz Lindic. SIQ - Slovenian Institute of Quality and Metrology, Slovenia.</td>
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<td>ThP-31</td>
<td>THE SERIAL AND PARALLEL SELF-CALIBRATION OF DC COMPARATOR UP TO 5 kA</td>
<td>Haiming Shao, Bo Liang, Feipeng Lin, Hao Wang, Zhibin Li. 1 Tianjin University, Weijin Road, Tianjin, China. 2 National Institute of Metrology, No.18, Bei San Huan Dong Road, Beijing, China.</td>
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<td>ThP-32</td>
<td>MEASUREMENT OF AC CURRENT WITH COAXIAL CURRENT SHUNTS</td>
<td>Y. Chekurov, J. Hällström. Helsinki University of Technology (MIKES-TKK), Finland.</td>
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<td>ThP-33</td>
<td>INFLUENCE OF BUSBAR GEOMETRY ON AC CURRENT MEASUREMENT USING ROGOWSKI COIL</td>
<td>Poli Teo, J. A. J. van den Brink. National Measurement Institute (NMI), NL.</td>
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<td>ThP-34</td>
<td>RESEARCH OF A NOVEL ROGOWSKI COIL WITH SPECIAL MAGNETIC CORE</td>
<td>Shuyan Ren, Jiang Cao, Huayun Yang. College of Electrical and Electronics Engineering Huazhong University of Science Technology Wuhan, P.R. China.</td>
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<td>Impedance</td>
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<td>Gregory Hudson, Beat Jeckelmann, and Jean-Daniel Baumgartner. 1. CERN, Geneva, Switzerland. 2. Federal Office of Metrology Bern-Wabern, Switzerland.</td>
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<td>ThP-37</td>
<td>COMPARISON OF CERN AND METAS HIGH CURRENT STANDARDS UP TO 10kA</td>
<td>Gregory Hudson, Beat Jeckelmann, and Jean-Daniel Baumgartner. 1. CERN, Geneva, Switzerland. 2. Federal Office of Metrology Bern-Wabern, Switzerland.</td>
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<td>ThP-38</td>
<td>DIRECT COMPARISONS OF AC RESISTANCE STANDARDS OF VARIOUS TECHNOLOGY DESIGNS</td>
<td>A. Bounouch, A. Sarapinski, F. Ziadé, A. Morilhat, and D. Leprat. 1. LNE – 29 avenue Roger Hennequin, Trappes, France. 2. MIKES – Otakaari, Espoo, Finland.</td>
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<td>Technical Program – Thursday 12 June 2008</td>
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<td>14:00 – 16:00 THURSDAY POSTER SESSION (ThP)</td>
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**ThP-39**  THE EQUIVALENT CIRCUIT OF THE AC RESISTOR AND THE EQUI-POTENTIAL SHIELDING WITH 1/2 VOLTAGE  
Z. Zhang, Z. Qu, Z. Li, and J. Zhao  
1. National Institute of Metrology, No.18, Bei San Huan Dong Lu, Beijing, China  
2. Tsinghua University, Qing Hua Yuan, Beijing, China  
3. Yanshan University, No.438, He Bei Street, Qinhuangdao, China

**ThP-40**  A KELVIN RESISTANCE BRIDGE WITH THE FREQUENCY RANGE FROM DC TO 100 kHz  
L. Huang, Z. Li, Z. Zhang, H. Wang, and B. Han  
1. National Institute of Metrology, Bei San Huan Dong Lu, Beijing, China  
2. Tsinghua University, Qing Hua Yuan, Beijing, China

**ThP-41**  A NEW METHOD TO MEASURE THE DIELECTIC LOSS OF TEFILON SPECIMEN OF CYLINDRICAL TUBE SHAPE  
Z. Li, Lu Huang, Z. Zhang, Q. He, J. Zhao, and B. Han  
1. National Institute of Metrology, Bei San Huan Dong Lu, Beijing, China  
2. Tsinghua University, Qing Hua Yuan, Beijing, China  
3. Hebei University, Wu Si Dong Lu, Baoding, China

**ThP-42**  VNIM-NRC INTERCOMPARISON OF CALIBRATION SYSTEMS FOR LARGE VALUE CAPACITORS UP TO 10 µF AT FREQUENCIES UP TO 1 kHz  
Yu.P. Semenov and E. So  
1. D.I. Mendeleev Institute for Metrology (VNIM) 19 Moskovsky pr., St. Petersburg, Russia  
2. Institute for National Measurement Standards - National Research Council of Canada (NRC) Ottawa, Ontario, Canada

**ThP-43**  THERMALLY CONTROLLED GAS-DIELECTRIC STANDARD CAPACITORS CONSTRUCTED AT INMETRO  
G.A. Kyriazis and J. Melcher  
1. Instituto Nacional de Metrologia, Normalizacao e Qualidade Industrial Duque de Caxias - RJ - Brazil  
2. Physikalisch-Technische Bundesanstalt, Braunschweig – Germany

**ThP-44**  3-D FIELD SIMULATION TO DESIGN A CALCULABLE CAPACITOR  
Rae Duk Lee, Yicheng Wang, and Gerald J. FitzPatrick  
1. National Institute of Standards and Technology 100 Bureau Drive, Gaithersburg MD, USA  
2. Korea Research Institute of Standards and Science, Daejeon, Korea

**ThP-45**  A CAPACITANCE SENSOR SUITE EVALUATION  
Svetlana Avramov-Zamurovic, Rae Duk Lee  
1. United States Naval Academy, Annapolis, Maryland, USA  
2. Korea Research Institute of Standards and Science, Daejeon, Korea

**ThP-46**  THE EQUIVALENT CIRCUIT OF AIR CAPACITOR IN HIGH FREQUENCY RANGE  
Zhao Jiating  
1. Tsinghua University, Qing Hua Yuan, Beijing, China  
2. National Institute of Metrology, No.18, Bei San Huan Dong Lu, Beijing, China

**ThP-47**  MODIFIED MAXWELL-WIEN BRIDGE WITH AUTO SOURCE BALANCE  
Ding Cheng, Lu Wenjun  
National Institute of Metrology No. 18, Bei San Huan Dong Road, Beijing, China

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**ThP-48**  A PC BASED SETUP TO DETERMINE TEMPERATURE COEFFICIENT OF STANDARD INDUCTORS USING DIFFERENCE VOLTAGE MEASUREMENT TECHNIQUE  
Shally Sharma, A.K.Saxena, and Mohd. Saleem  
1. National Board of Accreditation for Testing and Calibration Laboratories New Delhi, India  
2. LF and HF Impedance Standards National Physical Laboratory New Delhi, India

**ThP-49**  PRECISION INDUCTANCE MEASUREMENT ON HIGH PRECISION CAPACITANCE BRIDGE  
Jana Horska, Jiri Horsky  
Czech Metrology Institute, Okružni, Brno, Czech Republic

**ThP-50**  RESEARCH ON SIMULATION IMPEDANCE  
Liu Min, Li Yalu, Wei Qiang  
Beijing Orient Institute of Measurement and Test, Chinese Academy of Space Technology, China

**ThP-51**  A NEW TEST METHOD FOR ELECTRICAL CONDUCTIVITY OF AVIATION FUEL  
Lianying ZHENG and Chaolai HE  
National Institute of Metrology of P.R.China No.18, Bei San Huan Dong Lu, Chaoyang District, Beijing, P.R.CHINA

**ThP-52**  A MEASUREMENT SETUP TO CALIBRATE PICOAMETERS IN DC CURRENT IN THE RANGE 10 pA – 100 nA  
P.P. Capra, F. Galliana, M. Astra  
National Institute of Metrological Research (INRIM) Str. delle Cacce, TURIN (Italy)

**Voltage Chair:** Kyu Tae Kim  
Garden Level Foyer A

**ThP-53**  A THIN-FILM AC-DC THERMAL CONVERTER WITH VO2 RESISTIVE SENSING  
Lucas Di Lillo, Ricardo Garcia, Liliana Fraigi, Héctor Laiz  
Instituto Nacional de Tecnologia Industrial (INTI) CC, San Martin, Argentina

**ThP-54**  DIRECT 10 V JOSEPHSON VOLTAGE STANDARD COMPARISON BETWEEN A PROGRAMMABLE SINUS ARRAY AND A CONVENTIONAL SIS ARRAY  
S. Djordjevic, O. Sérét, S. Solve, and R. Chayramy  
1. Laboratoire National de Métrologie et d’Essais (LNE); 29 Avenue Hennecquin, Trappes Cedex, France  
2. Bureau international des poids et mesures (BIPM), Pavillon de Breteuil, Sèvres Cedex, France

**ThP-55**  SNS JOSEPHSON JUNCTION SERIES ARRAYS FOR THE JOSEPHSON ARBITRARY WAVEFORM SYNTHESIZER  
J. Kohlmann, O. Kieler, R. Iuzzolino, B. Egeling, L. Palafox, and F. Müller  
Physikalisch-Technische Bundesanstalt (PTB) Bundesallee, Braunschweig, Germany

**ThP-56**  CRYOGEN-FREE OPERATION OF PROGRAMMABLE JOSEPHSON VOLTAGE STANDARD WITH A CLOSED-CYCLE REFRIGERATOR  
Younk Chong, Mun-Seog Kim, Wan-Seop Kim, Kyu-Tae Kim  
Korea Research Institute of Standards and Science 1 Doryong-dong, Yuseong-gu, Daejeon, Korea

**ThP-57**  PRECISE CALIBRATION ON DC VOLTAGE  
Zhang Xuexun, Zhang Lili, Zhao Honggang, Liu Yue, Zou Benxia, and Zhang Jiangtao  
Division of Electricity and Quantum Metrology, National Institute of Metrology, China No.18, Bei San Huan Dong Road, Beijing, China
ThP-65
DEVELOPMENT OF AN AUTOMATED AC-DC TRANSFER MEASUREMENT SYSTEM FOR VOLTAGE AND CURRENT AT LOW FREQUENCIES
A.K. Govil, Saeed Ahmad, Bijendra Pal, V.K. Rustagi, and P.C. Kothari
LP & HF Voltage, Current & RF Power Standards, National Physical Laboratory, New Delhi-12, India

ThP-59
MONITORING SYSTEM OF ISOLATION TRANSFORMER POWER SUPPLY
Zhao Honggang, Zhang Xiuzeng, Liu Yue, and Zou Benxia
National Institute of Metrology, No.18, Bei San Huan Dong Road, Beijing, China

ThP-60
SETTING UP A BINARY SYSTEM FOR SYNTHESIZATION OF ARBITRARY WAVEFORMS
M. Manzano, R. Zorzano
Instituto Nacional de Técnica Aeroespacial (INTA) Centro de Metrología y Calibración – Ctra. a Ajañar, p.k. Torrejón de Ardoz (Madrid) Spain

ThP-61
A SYNCHRONOUS SAMPLING SYSTEM FOR HIGH PRECISION AC MEASUREMENTS
F. Overney, B. Jeanneret, A. Mortara
Federal Office of Metrology METAS, Lindenweg 50, Bern-Wabern, Switzerland

ThP-62
CORRECTION OF SYSTEMATIC ERRORS DUE TO THE VOLTAGE LEADS IN AC JOSEPHSON VOLTAGE STANDARD
P.S. Filipski1, J.R. Kinard2, T.E. Lipe2, Y. Tang2, and S.P. Benz2
1. National Research Council Canada 1200 Montreal Rd. Bldg. M36, Ottawa, Ontario K1A 0R6 Canada
2. National Institute of Standards and Technology USA

ThP-63
A TWO-WAY JOSEPHSON VOLTAGE STANDARD COMPARISON BETWEEN NIST AND NRC
Y. Tang1, B. Wood1 and C.A. Hamilton1
1. National Institute of Standards and Technology, Gaithersburg, MD, USA
2. National Research Council, Ottawa, Canada
3. VMetrix LLC, Boulder, CO, USA

ThP-64
UNCORRELATED GAUSSIAN NOISE ASSUMPTION IN HARMONIC ANALYSIS WITH INTEGRATING DIGITAL SAMPLING VOLTMETERS
G.A. Kyriazis
Instituto Nacional de Metrologia, Normalización e Calidad Industrial Duque de Caxias - RJ – Brazil

ThP-65
AN IMPROVED AUTOMATED CALIBRATION SYSTEM FOR 10V DC REFERENCE
H. Li, Y. Gao
National Institute of Metrology No.18, Bei San Huan Dong Lu, Beijing, China

ThP-66
COMPARIIONS OF UKRAINIAN NATIONAL STANDARDS OF ELECTRICAL UNITS OF THE NATIONAL METROLOGICAL INSTITUTE "UKRMETRTESTSTANDARD"
O. Velychko
State Enterprise “All-Ukrainian State Scientific and Production Centre for Standardization, Metrology, Certification and Protection of Consumer” (Ukrmetrteststandard), Kyiv, Ukraine

ThP-67
PULSED OPTICALLY PUMPED RUBIDIUM ATOMIC CLOCK WITH OPTICAL DETECTION
I.H. Choi1, Y.-H. Park1, S.H. Lee1, J.K. Lee1, T.Y. Kwon1, and S.E. Park1
1. Division of Physical Metrology, Korea Research Institute of Standards and Science, Daejeon, Korea
2. Department of Physics Korea Advanced Institute of Science and Technology, Daejeon, Korea

ThP-68
MAGNETO-OPTICAL TRAPPING OF Yb ATOMS USING AN INTERCOMBINATION TRANSITION WITH AN OPTICAL FREQUENCY COMB; FOR REALIZING AN Yb OPTICAL LATICE CLOCK
M. Yasuda1, T. Kobno1, F. -L. Hong1, H. Inaba1, K. Hosaka1, C. Willis1, A. Onea1, S. Ohshima1, and H. Katori1
1. NMIJ, AIST, Tsukuba Central 3, 1-1-1 Umezono, Tsukuba, Ibaraki, Japan
2. The University of Tokyo, Bunkyo-ku, Tokyo, Japan
3. CREST/JST, 4-1-8 Honcho Kawaguchi, Saitama, Japan

ThP-69
ON THE ACCURACY OF TWO-WAY SATELLITE TIME AND FREQUENCY TRANSFER: A STUDY OF TRIPLET CLOSURES
A. Bauch1, L. Breazakron2, D. Matsakis2, D. Piester3
1. Physikalisch-Technische Bundesanstalt, Braunschweig, Germany
2. United States Naval Observatory (USNO), Washington, DC, USA

ThP-70
LABORATORY EXPERIMENT OF 9.2 GHz FREQUENCY TRANSFER THROUGH A FIBER
CHEN Weiliang1,2, LI Tianchu1, LIN Pingwei2, LIN Yige2
1. Beijing Institute of Technology (BIT), ZhongGuancun South Street, Haidian District, Beijing, China
2. National Institute of Metrology (NIM), BeiSanHuan Dong Road, Beijing, China

ThP-71
FREQUENCY CALIBRATION BASED ON ADAPTIVE NEURAL-FUZZY INFERENCE SYSTEM
Kun-Yuan Tu1, Wang-Hsin Wu2,3 and Chia-Shu Liao4
1. Beijing Institute of Technology, Chung-Li, Tao-Yuan, Taiwan.
2. Dept. of EE, National Central University, Chung-Li, Tao-Yuan, Taiwan.
3. National Institute of Metrology (NIM), BeiSanHuan Dong Road, Beijing, China
4. Department of Physics, ChungHwa Telecom Co., Ltd. Chung-Li, Taiwan

ThP-72
DEVELOPMENT OF AN YTTERBIUM OPTICAL LATTICE CLOCK AT KRISS
1. Division of Physical Metrology, Korea Research Institute of Standards and Science 1 Doryong, Yuseong, Daejeon, Rep. of Korea

ThP-73
GENERATION OF TWO COHERENT LASER SOURCES SELECTED FROM FEMTOSECOND LASER FREQUENCY COMB AND RESONANT TWO PHOTON SPECTROSCOPY OF CESIUM ATOM
Division of Physical Metrology, Korea Research Institute of Standards and Science, Daejeon, Korea

ThP-74
OPTICAL FREQUENCY MEASUREMENT USING AN OPTICAL FREQUENCY COMB GENERATOR BASED ON FREQUENCY SHIFTED FEEDBACK FIBER RING LASER
H. Y. Ryu1, H. S. Moon1, H. S. Suh1
1. Division of Physical Metrology, Korea Research Institute of Standards and Science, Korea
2. Department of Physics, Pusan National University, Korea
TECHNICAL PROGRAM – THURSDAY 12 JUNE 2008

14:00 – 16:00
THURSDAY POSTER SESSION (ThP)

Fundamental Constants
Chair: Dave Newell

ThP-75  AN ELECTROCHEMICAL CELL FOR THE FARADAY CONSTANT DETERMINATION
F. Duribano, U. Pogliano, and D. Serazio
Istituto Nazionale di Ricerca Metrologica (I.N.R.I.M.) Strada delle Cacce, Torino, Italy

ThP-76  EXPERIMENTAL REALISATION OF THE QUANTUM METROLOGICAL TRIANGLE EXPERIMENT AT LNE: SET-UP AND FIRST RESULTS
B. Steck1, B. Chenaud1, N. Feltin1, L. Devoille1, A. Gonzalez-Cano1, W. Poirier1, F. Schopfer1, G. Spengler1, S. Djordjevic1, O. Seron1, F. Piquemal1, S. Lotkhov1
1. LNE, 29 avenue R. Henequin Trappes, France
2. PTB, Bundesallee, Braunschweig, Germany

ThP-77  A QUANTUM CURRENT STANDARD BASED ON PHASE SLIP
C. H. Webster1, S. P. Giblin1, D. Cox1,2, T. J. B. M. Janssen1, A. B. Zorin1
1. National Physical Laboratory Queens Road, Teddington, Middx. UK
2. University of Surrey, Guildford, Surrey, UK
3. Physikalisch-Technische Bundesanstalt Bundesallee, Braunschweig, Germany

Fundamental Constants, continued

ThP-78  TOWARD DIRECT CLOSURE OF THE QUANTUM METROLOGICAL TRIANGLE
A. Männinen1, O. Hahtela1, P. Hakonen1, J. Hassel1, P. Helistö1, A. Kemppinen1, M. Möttönen1, M. Paalanen1, P. Pekola1, A. Satrapinski1, and H. Seppälä1
1. Centre for Metrology and Accreditation (MIKES), Espoo, Finland
2. Low Temperature Laboratory, Helsinki University of Technology, TKK, Finland
3. VTT, Sensors, VTT, Finland
4. Laboratory of Physics, Helsinki University of Technology, TKK, Finland

ThP-79  MEASUREMENT OF THE NEUTRON BINDING ENERGY OF 36Cl FOR A DETERMINATION N\_h
M. Jentschel1, P. Becker2, J. Krempel1,2, B. Lauss1, G. Mana1, P. Mutti1
1. Institut Laue-Langevin, 6 rue Jules Horowitz, Grenoble, France
2. Physikalisch-Technische Bundesanstalt, Bundesallee, Braunschweig, Germany
3. Istituto Nazionale di Ricerca Metrologica, str. delle caccie, Torino, Italy
4. Paul Scherrer Institut, Villigen, Switzerland

ThP-80  PROGRESS ON THE GAMS-6 DOUBLE CRYSTAL GAMMA-SPECTROMETER
J. Krempel1,2, M. Jentschel1, P. Mutti1, G. Mana1, B. Lauss1, P. Becker2
1. Institut Laue-Langevin, 6 rue Jules Horowitz, Grenoble, France
2. Physikalisch-Technische Bundesanstalt, Bundesallee, Braunschweig, Germany
3. Istituto Nazionale di Ricerca Metrologica, str. delle caccie, Torino, Italy
4. Paul Scherrer Institut, Villigen, Switzerland

16:00 – 18:00

Radio Frequency
Chair: Kate Remley

1. CORRECTING FOR NONIDEAL PROBE LOCATIONS IN NEAR-FIELD SCANNING MEASUREMENTS OF ANTENNA PARAMETERS
R. C. Wittmann, M. H. Francis, and B. K. Alpert
National Institute of Standards and Technology Broadway, Boulder, CO

2. FREE SPACE ANTENNA FACTOR EVALUATION OF LOGPERIODIC ANTENNA USING TIME-DOMAIN AND PULSE COMPRESSION TECHNIQUES
Satoro Kurokawa, Masanobu Hirose, Koji Komiyama
National Institute of Advanced Industrial Science and Technology AIST, Umezono, Tsukuba, Ibaraki, Japan

3. A SIMPLIFIED METHOD FOR THE MEASUREMENT OF MAGNETIC LOOP ANTENNA
Desmond C. Arthur, Yu Ji and Michael P.J. Daly
National Measurement Institute, Australia (NMIA), Lindfield, Australia

Continued, next page

AC-DC Voltage
Chair: Kyu Tae Kim

1. DESIGN AND FABRICATION OF MJTCS ON QUARTZ SUBSTRATES AT NIST
I. Scarioni1, T. E. Lipe1, J. R. Kinard2
2. National Institute of Standards and Technology 100 Bureau Drive, Gaithersburg MD, USA

2. DEVELOPMENT OF AN AC-DC TRANSFER STANDARD BASED ON NbN/TiN/NbN PROGRAMMABLE JOSEPHSON JUNCTION ARRAY (INVITED)
I. Budovsky, D. Georgakopoulos, G. M. Hammond and T. Hagen
National Measurement Institute, Lindfield, Australia

3. SINGLE-JUNCTION THERMAL VOLTAGE CONVERTERS WITH REDUCED UNCERTAINTIES AT FREQUENCIES UP TO 1 MHz
T. Hagen and I. Budovsky
National Measurement Institute, Australia, Lindfield, Australia

Continued, next page

Fundamental Constants
Chair: Terry Quinn

1. PROGRESS ON THE LNE WATT BALANCE PROJECT
G. Genevès1, P. Gourlay1, F. Villar1, D. Haddad1, C. Hauck1, M. Wakim1, P.A. Meury2, T. Madec2, P. Pinot1, P. Juncar3, S. Merlet1, F. Pereira dos Santos4, J. David4, L. Chassagne4, S. Topçu4
1. LNE, 29 avenue Roger Henequin, Trappes Cedex, France
2. LNE ; 1 rue Gaston Boissier, Paris, France
3. LNE-INM/Cnam ; 61 rue du Landy, La Plaine St Denis, France
4. LNE-SYRTE, Observatoire de Paris, 61 Avenue de l’Observatoire, 75 Paris, France
5. ENSAM, 8 Boulevard Louis XIV, Lille Cedex, France
6. Laboratoire d’Ingénierie des Systèmes de Versailles - 45, avenue des Etats-Unis - Versailles – France

2. PROGRESS ON THE BIPM WATT BALANCE
A. Picard1, H. Fang1, M. Stoik1 and C. Urano2
2. National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology, AIST, Tsukuba Central, Umezono Tsukuba, Ibaraki, Japan, on secondment at BIPM
### Radio Frequency, continued

4. **TIME DOMAIN ANTENNA RANGE AT KRISS**  
   Joo-Gwang Lee, Jin-Seob Kang, Jeong-Hwan Kim and Tae-Weon Kang  
   Electromagnetic Metrology Center, Korea Research Institute of Standards and Science, 1, Doryong-Dong, Yusong, Daejon, Korea

5. **FREE SPACE ANTENNA FACTOR OF A DIPOLE ANTENNA AND UNCERTAINTY FROM 1 TO 2 GHz**  
   T. Morioka  
   Electromagnetic Fields Lab., National Institute of Advanced Industrial Science and Technology (AIST), Japan

6. **BI-LATERAL COMPARISON OF V-BAND ANTENNA GAIN BETWEEN KRISS AND NIST**  
   J. Kang¹, N. Kang, M. Francis², and K. MacReynolds³  
   1. Electromagnetic Metrology Center, Korea Research Institute of Standards and Science (KRISS) 1 Doryong-Dong, Yuseong-Gu, Daejeon, Korea  
   2. RF Fields Group, National Institute of Standards and Technology (NIST), 325 Broadway, Boulder, CO, USA

### AC-DC Voltage, continued

4. **EVALUATION OF LOW FREQUENCY CHARACTERISTIC OF A THERMAL CONVERTER USING A PROGRAMMABLE JOSEPHON VOLTAGE STANDARD**  
   H. Sasaki, H. Yamamori, T. Yamada, H. Fujiki and A. Shoji  
   National Institute of Advanced Industrial Science and Technology (AIST) AIST Tsukuba Central 2, Umezono, Tsukuba, Ibaraki, Japan

5. **PRECISION AC-DC TRANSFER MEASUREMENT SYSTEM BASED ON A 1000-VOLT INDUCTIVE VOLTAGE DIVIDER**  
   I. Budovsky and T. Hagen  
   National Measurement Institute, Australia, Lindfield, Australia

### Fundamental Constants, continued

3. **A MAGNETIC LEVITATION TECHNIQUE FOR THE SIMULTANEOUS COMPARISON OF MASS ARTIFACTS IN AIR AND VACUUM**  
   Z. Jabbour, P. J. Abbott, J. Chalfoun, R. Liu, E. Williams  
   National Institute of Standards and Technology, 100 Bureau Drive, Gaithersburg, MD, USA

4. **IMPROVEMENT IN THE VOLUME DETERMINATION FOR Si SHERES WITH AN OPTICAL INTERFEROMETER**  
   N. Kuramoto and K. Fujii  
   National Metrology Institute of Japan (NMIJ), National Institute of Advanced Industrial Science and Technology, AIST Tsukuba central 3, 1-1-1 Umezono, Tsukuba, Ibaraki, Japan

5. **DENSITY MEASUREMENT OF A SMALL ²⁸Si SINGLE CRYSTAL**  
   A. Waseda and K. Fujii  
   National Metrology Institute of Japan (NMIJ), AIST, Tsukuba, Ibaraki, Japan

6. **DENSITY OF A SINGLE CRYSTAL NATURAL SILICON SPHERE**  
   W. Giardini¹, P. Manson¹, M. Wouters¹, B. Warrington¹, B. Ward¹, C. Walsh¹, E. Jaatinen³, M. Kenny⁴  
   1. National Measurement Institute, Bradfield Rd. West Lindfield, Australia  
   2. CUDOS, University of Sydney, New South Wales, Australia  
   3. Queensland University of Technology, Brisbane, Australia  
   4. NMI, Australia (retired)
<table>
<thead>
<tr>
<th>Time</th>
<th>Room 1</th>
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<tr>
<td>7:30 – 8:30</td>
<td>Fir Room</td>
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<td>Speaker Breakfast (for Friday session chairs and oral presenters)</td>
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<td>8:30 – 9:50</td>
<td>FA-1 Ballroom A</td>
<td>FB-1 Ballroom B</td>
<td>FC-1 Ballroom C/D</td>
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<td>Power</td>
<td>Tom Nelson</td>
<td>Dennis Friday</td>
<td>Nick Fletcher</td>
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<td>1.</td>
<td>THE CALIBRATION OF IEC STANDARD FLICKERMETERS USING COMPLEX MODULED SIGNALS</td>
<td>CALIBRATION OF THE STEP RESPONSE OF A 70 GHz SAMPLING OSCILLOSCOPE USING A NOVEL OPTOELECTRONIC TECHNIQUE</td>
<td>NEXT-GENERATION CALCULABLE CAPACITOR USING A TUNABLE-LASER INTERFEROMETER</td>
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<td>P. Clarkson and P.S. Wright</td>
<td>M. Bieler, M. Spitzer, G. Hein, K. Pierz, and U. Siegner</td>
<td>Yicheng Wang1, Rae Duk Lee2, Liang Lu', John Lawall1 and Akobuije Chijioke1</td>
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<td>National Physical Laboratory, Teddington, Middlesex, UK</td>
<td>Physikalisch-Technische Bundesanstalt, Bundesallee, Braunschweig, Germany</td>
<td>1. National Institute of Standards and Technology, 100 Bureau Drive, Gaithersburg, MD, USA</td>
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<td>2. Korea Research Institute of Standards and Science, Daedeon, Korea</td>
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<td>2.</td>
<td>TECHNIQUES FOR THE CALIBRATION OF INTERHARMONIC GENERATORS IN SUPPORT OF LOW FREQUENCY IMMUNITY COMPLIANCE TESTING (IEC61000-4-13)</td>
<td>COMPLETE WAVEFORM CHARACTERIZATION AT NIST</td>
<td>DC AND LOW FREQUENCY HUMIDITY DEPENDENCE OF AN AIR-GAP CAPACITOR</td>
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<td>P.S.Wright and P.Clarkson</td>
<td>P. D. Hale, D. F. Williams, A. Dienstfrey, C. M. Wang, A. Lewandowski, T. S. Clement, and D. Keenan</td>
<td>Gert Rietveld and Helko E. van den Brom</td>
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<td>National Physical Laboratory, Hampton Road, Teddington, UK.</td>
<td>National Institute of Standards and Technology, Boulder, CO, USA</td>
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<td>3.</td>
<td>CALIBRATION OF THE THD FUNCTIONS OF ELECTRICAL STANDARDS</td>
<td>MINIMUM-PHASE RESPONSE RECONSTRUCTION OF SAMPLING OSCILLOSCOPE BASED ON THE NTN CALIBRATION</td>
<td>TRACEABILITY OF CAPACITANCE MEASUREMENTS AT NMI VSL</td>
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<td>R. Arseneau, M. Frigault, J. Zelle</td>
<td>Xu Qinghua, Lin Maoliu, Zhang Zhe</td>
<td>E.F. Dierikx</td>
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<td>Institute for National Measurement Standards, National Research Council of Canada</td>
<td>Department of Information Engineering, Harbin Institute of Technology, Heilongjiang, P.R.China</td>
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<td>4.</td>
<td>SIMPLE ALGORITHM FOR SAMPLING SYNCHRONIZATION OF ADCs</td>
<td>CALIBRATED BROADBAND ELECTRICAL CHARACTERIZATION OF NANOWIRES</td>
<td>REALIZATION OF THE HENRY AT METAS</td>
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<td>Physikalisch-Technische Bundesanstalt – PTB, Germany</td>
<td>National Institute of Standards and Technology, Boulder, CO, USA</td>
<td>Federal Office of Metrology METAS, Lindenweg Bern-Wabern, Switzerland</td>
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<td>Voltage</td>
<td>Blaise Jeanneret</td>
<td>Dennis Friday</td>
<td>Jurgen Schurr</td>
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<td>1.</td>
<td>RABI FREQUENCY MEASUREMENT FOR MICROWAVE POWER STANDARD USING DOUBLE RESONANCE SPECTRUM</td>
<td>REALIZATION OF THE HENRY AT METAS</td>
<td>A CURRENT-COMPARATOR-BASED HIGH-VOLTAGE INDUCTANCE BRIDGE</td>
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<td>M. Kinoshita, K. Shimaoka, and K. Komiyama</td>
<td>F. Overney</td>
<td>E. So</td>
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<td>National Metrology Institute of Japan (NMIJ), National Institute of Advanced Industrial Science and Technology (AIST), 1-1-1, Umezono, Tsukuba, Ibaraki, Japan</td>
<td>Federal Office of Metrology METAS, Lindenweg Bern-Wabern, Switzerland</td>
<td>Institute for National Measurement Standards, National Research Council of Canada Ottawa, Ontario, Canada</td>
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<td><strong>Voltage, continued</strong></td>
<td><strong>RF Noise and Power, continued</strong></td>
<td><strong>Impedance, continued</strong></td>
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</table>

### 1. DEVELOPMENT OF A VOLTAGE DIVIDER BASED ON QUANTIZED HALL RESISTANCE ARRAYS FOR A HIGH DC VOLTAGE STANDARD II

N. Kaneko¹, T. Oe¹, A. Domae¹, C. Urano¹, T. Itatani², H. Ishii², and S. Kiryu³

1. National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology, AIST Tsukuba Central 3-1, 1-1-1 Umezono, Tsukuba, Ibaraki, Japan
2. Research Institute of Instrumentation Frontier, National Institute of Advanced Industrial Science and Technology, AIST Tsukuba Central 2-10, 1-1-1 Umezono, Tsukuba, Ibaraki, Japan
3. Nanoelectronics Research Institute, National Institute of Advanced Industrial Science and Technology, AIST Tsukuba Central 2-10, 1-1-1 Umezono, Tsukuba, Ibaraki, Japan
4. Faculty of Engineering, Musashi Institute of Technology 1-28-1, Tamazutsumi, Setagaya-ku, Tokyo, Japan

### 2. JOSEPHSON JUNCTION ARRAY DRIVEN BY MODULATED OPTICAL COMBS

C. Urano¹, N. Kaneko¹, M. Maczawa², T. Itatani¹ and S. Kiryu¹

1. National Metrology Institute of Japan, National Institute of Advanced Industry Science and Technology, 1-1-1 Umezono, Tsukuba, Ibaraki, Japan
2. National Institute of Advanced Industry Science and Technology 1-1-1 Umezono, Tsukuba, Ibaraki, Japan
3. Nanoelectronics Research Institute, National Institute of Advanced Industrial Science and Technology, AIST Tsukuba Central 2-10, 1-1-1 Umezono, Tsukuba, Ibaraki, Japan

### 3. SOURCES OF NORMAL MODE OFFSET IN PRECISION DMM’S

B. Moore, M.D. Early and L.A. Christian
Measurement Standards Laboratory of New Zealand (MSL) Industrial Research Ltd, Lower Hutt, New Zealand

### 2. AN EXPERIMENTAL EVALUATION OF A CRYOGENIC NOISE SOURCE BY A SLIDING SHORT METHOD IN THE FREQUENCY RANGE OF 8 GHz TO 12 GHz

H. Iida, Y. Shimada and K. Komiyama
National Metrology Institute of Japan - National Institute of Advanced Industrial Science and Technology, AIST Tsukuba Central 3, 1-1-1 Umezono, Tsukuba, Ibaraki, Japan

### 3. SYSTEMATIC ERRORS IN SHOT NOISE THERMOMETER MEASUREMENTS

Lafe Spietz¹, W. Tew¹, and R. J. Schoelkopf²

1. National Institute of Standards and Technology, USA
2. Departments of Applied Physics and Physics, Yale University, USA

### 4. CALIBRATION OF A 3.5 mm COAXIAL POWER SENSOR USING A TRANSFER STANDARD

Tae-Weon Kang, Jeong-Hwan Kim, Jae-Yong Kwon, Jeong-II Park, and Joo-Gwang Lee
Electromagnetic Metrology Center, Division of Physical Metrology, Korea Research Institute of Standards and Science, Yusong, Daejeon, Republic of Korea

### 5. NOISE-PARAMETER MEASUREMENT WITH AUTOMATED VARIABLE TERMINATIONS

Dazhen Gu, David K. Walker, and James Randa
National Institute of Standards and Technology, 325 Broadway, Boulder, CO, USA

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*End of Technical Program*