

# **16th International Congress of Metrology 2015**

**EPJ Web of Conferences Volume 77 (2015)**

**Paris, France  
7-10 October 2015**

**Editors:**

**J.-R. Filtz  
P. Claudel**

**B. Larquier  
J.-O. Favreau**

**ISBN: 978-1-63439-328-7**

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

This work is licensed under a Creative Commons Attribution license:  
<http://creativecommons.org/licenses/by/2.0/>

**You are free to:**

**Share** – copy and redistribute the material in any medium or format.

**Adapt** – remix, transform, and build upon the material for any purpose, even commercial.

The licensor cannot revoke these freedoms as long as you follow the license terms.

**Under the following terms:**

You must give appropriate credit, provide a link to the license, and indicate if changes were made.

You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. The copyright is retained by the corresponding authors.

Printed by Curran Associates, Inc. (2014)

For additional information, please contact EDP Sciences – Web of Conferences  
at the address below.

EDP Sciences – Web of Conferences  
17, Avenue du Hoggar  
Parc d'Activité de Courtabœuf  
BP 112  
F-91944 Les Ulis Cedex A  
France

Phone: +33 (0) 1 69 18 75 75

Fax: +33 (0) 1 69 28 84 91

[contact@webofconferences.org](mailto:contact@webofconferences.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

<b>IT Security Standards and Legal Metrology – Transfer and Validation</b> .....	1
<i>Thiel F., Hartmann V., Grottker U., Richter D.</i>	
<b>Determination of Laser Tracker Angle Encoder Errors</b> .....	7
<i>Nasr Karim M., Hughes Ben, Forbes Alistair, Lewis Andrew</i>	
<b>Evaluation of Measurement Uncertainty for Time-Dependent Quantities</b> .....	11
<i>Eichst Sascha, Arendack Barбора, Link Alfred, Elster Clemens</i>	
<b>Introducing Joint Research Project «quantum Ampere» for the Realisation of the New SI Ampere</b> .....	19
<i>Scherer Hansjrg, Giblin Stephen P., Jehl Xavier, Manninen Antti, Piquemal Franois, Ritchie David A.</i>	
<b>Characterization of Flexure Hinges for the French Watt Balance Experiment</b> .....	23
<i>Pinot Patrick, Genevs Grard</i>	
<b>Recent Progress in High Pressure Metrology in Europe</b> .....	29
<i>Sabuga Wladimir, Prak Dominik, Rabault Thierry</i>	
<b>Metrological Approach for the Quantification of Metalloproteins (EMRP Project HLT05)</b> .....	40
<i>Swart Claudia, Zakel Sabine, Frank Claudia, Fisicaro Paola, Goenaga-Infante Heidi</i>	
<b>Dynamic Force Calibration by Impact Excitation</b> .....	44
<i>Feng Meng, Zhimin Zhang, Yue Zhang, Wei Zhang</i>	
<b>Development of a Reference Phasor Measurement Unit (PMU) for the Monitoring and Control of Grid Stability and Quality</b> .....	48
<i>Ndilimabaka Herv, Blanc Isabelle</i>	
<b>Measurement of Air Flow in Duct by Velocity Measurements</b> .....	53
<i>Car Isabelle, Bonthoux Francis, Fontaine Jean-Raymond</i>	
<b>Metrological Needs for Monitoring Aquatic Environments: From the Demonstration of Metrological Traceability to the Decision Making Process</b> .....	58
<i>Lardy-Fontan Sophie, Guigues Nathalie, Lalere Batrice, Vaslin-Reimann Sophie</i>	
<b>Primary Standard of Optical Power Operating at Room Temperature</b> .....	62
<i>Dnsberg Timo, Sildoja Meelis, Manoocheri Farshid, Merimaa Mikko, Petroff Leo, Ikonen Erkki</i>	
<b>Air Temperature Measurements Based on the Speed of Sound to Compensate Long Distance Interferometric Measurements</b> .....	67
<i>Astrua Milena, Pisani Marco, Zucco Massimo</i>	
<b>Inductive Voltage Divider Calibration with Sampling Method</b> .....	71
<i>Corminboeuf David, Overney Frdric</i>	
<b>The Effect of the Salinity Level on Conductivity Sensor Calibration</b> .....	77
<i>Le Bihan Caroline, Salvetat Florence, Lamand Nolwenn, Compre Chantal</i>	
<b>Measurement of Multiparametric Quantities at Perception of Sensory Information by Living Creatures</b> .....	84
<i>Taymanov Roald, Sapozhnikova Kseniia</i>	
<b>Compact Atomic Clock Prototype Based on Coherent Population Trapping</b> .....	91
<i>Danet Jean-Marie, Kozlova Olga, Yun Peter, Gurande Stphane, Clercq Emeric De</i>	
<b>Construction and In-situ Characterisation of High-temperature Fixed Point Cells Devoted to Industrial Applications</b> .....	98
<i>Sadli Mohamed, Bourson Frdric, Diril Ahmet, Journeau Christophe, Lowe Dave, Parga Clemente</i>	
<b>Toward New High Temperature Reference Materials for Calorimetry and Thermal Analysis</b> .....	105
<i>Razouk R., Hay B., Himbert M.</i>	
<b>Measuring Soot Particles from Automotive Exhaust Emissions</b> .....	111
<i>Andres Hanspeter, Lond Felix, Schlatter Jrg, Auderset Kevin, Jordan-Gerkens Anke, Nowak Andreas, Ebert Volker, Buhr Egbert, Klein Tobias, Tuch Thomas, Wiedensohler Alfred, Mamakos Athanasios, Riccobono Francesco, Discher Kai, Hgstrm Richard, Yli-Ojanper Jaakko, Quincey Paul</i>	
<b>Biologically Weighted Quantities in Radiotherapy: an EMRP Joint Research Project</b> .....	116
<i>Rabus Hans, Palmans Hugo, Hilgers Gerhard, Sharpe Peter, Pinto Massimo, Villagrasa Carmen, Nettelbeck Heidi, Moro Davide, Pola Andrea, Pszona Stanislaw, Teles Pedro</i>	
<b>Metrological Issues in Molecular Radiotherapy</b> .....	123
<i>D'Arienzo Marco, Capogni Marco, Smyth Vere, Cox Maurice, Johansson Lena, Solc Jaroslav, Bobin Christophe, Rabus Hans, Joulaeizadeh Leila</i>	
<b>Recent Progress on the BIPM Watt Balance</b> .....	130
<i>Fang Hao, Kiss Adrien, Robertsson Lennart, De Mirands Estefania, Solve Stphane, Lavergne Thomas, Picard Alain, Stock Michael</i>	
<b>Author Index</b>	