

## Monday, 12 April 2010

17:30 - 19:00 Pre-registration

18:00 - 19:00 Welcome Drink

## Tuesday, 13 April 2010

09:00 Welcome and Introduction

09:15 Invited Plenary Presentation

Present and future impact of GNSS spaceborne scientific applications, in particular on orbit and gravity field determination

*Beutler, Gerhard<sup>1</sup>; Hugentobler, Urs<sup>2</sup>; Jaeggi, Adrian<sup>1</sup>;*

<sup>1</sup>*Astronomical Institute, University of Bern (SWITZERLAND);*

<sup>2</sup>*Institute For Astronomical and Physical Geodesy, Technical University of Munich (GERMANY)*

10:00 Overview of Time and Frequency Applications in ESA Missions  
ESA

10:40 Coffee break

### Session 1 - Materials and Resonators

11:20 New Investigations on the LGT Crystal Intended for Frequency and Time Applications  
*Boy, Jean-Jacques<sup>1</sup>; Nguyen Thi Kim, Ngan<sup>2</sup>; Devautour-Vinot, Sabine<sup>3</sup>; Frayret, Jérôme<sup>4</sup>*

<sup>1</sup>*FEMTO-ST Institute (FRANCE);* <sup>2</sup>*Frequency and Time Dpt, Femto-st Institute, Besancon (FRANCE);* <sup>3</sup>*Charles Gerhardt Institute, University of Montpellier (FRANCE);* <sup>4</sup>*LCABIE, Université de Pau et des Pays de l'Adour (FRANCE)*

11:40 Role of Alkali Ions in the Radiation Sensitivity of the Quartz Crystal  
*Lefèvre, Jérémie<sup>1</sup>; Cambon, Olivier<sup>1</sup>; Devautour-Vinot, Sabine<sup>1</sup>; Guibert, Pierre<sup>2</sup>; Frayret, Jérôme<sup>3</sup>; Boy, Jean-Jacques<sup>4</sup>; Picchedda, Delphine<sup>5</sup>; Cibié, Gilles<sup>6</sup>*  
<sup>1</sup>*Institut Charles Gerhardt (FRANCE);* <sup>2</sup>*IRAMAT (FRANCE);* <sup>3</sup>*LCABIE (FRANCE);* <sup>4</sup>*FEMTO-ST (FRANCE);* <sup>5</sup>*GEMMA Quartz & Crystal (FRANCE);* <sup>6</sup>*CNES (FRANCE)*

12:00 Analyzes of Very High Q Quartz Crystal Aimed to High Quality 5 MHz Resonators Achievement  
*Imbaud, Joël<sup>1</sup>; Boy, Jean Jacques<sup>1</sup>; Picchedda, Delphine<sup>2</sup>; Cibié, Gilles<sup>3</sup>; Sthal, Fabrice<sup>1</sup>*  
<sup>1</sup>*FEMTO-ST Institute (FRANCE);* <sup>2</sup>*Gemma (FRANCE);* <sup>3</sup>*CNES (FRANCE)*

12:20 Compact Optoelectronic Oscillator with Minidisk Resonator  
*Salzenstein, Patrice<sup>1</sup>; Volyanskiy, Kirill<sup>2</sup>; Pogumerskiy, Maxim<sup>3</sup>; Tavernier, Hervé<sup>1</sup>; Rubiola, Enrico<sup>1</sup>; Larger, Laurent<sup>1</sup>*  
<sup>1</sup>*CNRS - FEMTO-ST (FRANCE);* <sup>2</sup>*SUAI (RUSSIAN FEDERATION);* <sup>3</sup>*ITMO (RUSSIAN FEDERATION)*

12:40 Oscillator Phase Noise Optimization and Correction  
*Goryachev, Maxim; Galliou, Serge; Abbe, Philippe*  
*FEMTO-ST Institute (FRANCE)*

## Session 2 - Cold Atom Clocks

- 11:20 Invited Presentation - Measurement of the Rb Ground State Hyperfine Splitting with Atomic Fountains  
*Ovchinnikov, Yuri ; Szymaniec, Krzysztof ; Marra, Giuseppe*  
*National Physical Laboratory (UNITED KINGDOM)*
- 12:00 Uncertainty Evaluation and Recent Improvements of the Fountain Primary Frequency Standard CSF2 at PTB  
*Gerginov, Vladislav ; Nemitz, Nils ; Griebisch, Dieter ; Kazda, Michael ; Wynands, Robert ; Weyers, Stefan*  
*Physikalisch-Technische Bundesanstalt (GERMANY)*
- 12:20 Characterization of the Distributed Cavity Phase Shift in FO2 for Improving the Accuracy of SYRTE Fountain Clocks  
*Guéna, Jocelyne<sup>1</sup> ; Abgrall, Michel<sup>1</sup> ; Rovera, Daniele<sup>1</sup> ; Rosenbusch, Peter<sup>1</sup> ; Santarelli, Giorgio<sup>1</sup> ; Tobar, Michael E.<sup>2</sup> ; Laurent, Philippe<sup>1</sup> ; Gibble, Kurt<sup>3</sup> ; Bize, Sébastien<sup>1</sup> ; Clairon, André<sup>1</sup>*  
*<sup>1</sup>SYRTE, Observatoire de Paris (FRANCE); <sup>2</sup>University of Western Australia (AUSTRALIA); <sup>3</sup>Pennstate University (UNITED STATES)*
- 12:40 Dick Effect and Long Term Stability Evaluation of HORACE Compact Cold Atom Clock  
*Rossetto, Nicolas<sup>1</sup> ; Chapelet, Frederic<sup>1</sup> ; Esnault, Francois-Xavier<sup>1</sup> ; Lambert, Raphael<sup>1</sup> ; Lours, Michel<sup>1</sup> ; Holleville, David<sup>1</sup> ; Dimarcq, Noel<sup>1</sup> ; Delporte, Jerome<sup>2</sup>*  
*<sup>1</sup>SYRTE - Observatoire de Paris - CNRS (FRANCE); <sup>2</sup>CNES (FRANCE)*
- 13:00 *Lunch break*

## Session 3 - GNSS Timing I

- 14:00 Long-term Performances of GIOVE On-board Clocks  
*Waller, Pierre<sup>1</sup> ; Gonzalez, Francisco<sup>1</sup> ; Binda, Stefano<sup>1</sup> ; Hidalgo, Irene<sup>2</sup> ; Tobias, Guillermo<sup>2</sup> ; Sesia, Ilaria<sup>3</sup> ; Cernigliaro, Alice<sup>3</sup> ; Tavella, Patrizia<sup>3</sup>*  
*<sup>1</sup>ESA (NETHERLANDS); <sup>2</sup>GMV (SPAIN); <sup>3</sup>INRiM (ITALY)*
- 14:20 Evaluation of GIOVE Satellite Clocks using the CONGO Network  
*Hugentobler, Urs<sup>1</sup> ; Steigenberger, Peter<sup>1</sup> ; Montenbruck, Oliver<sup>2</sup> ; Hauschild, Andre<sup>2</sup> ; Weber, Georg<sup>3</sup> ; Hessels, Uwe<sup>3</sup>*  
*<sup>1</sup>Technische Universitaet Muenchen (GERMANY); <sup>2</sup>German Aerospace Center (GERMANY); <sup>3</sup>Federal Agency for Cartography and Geodesy (GERMANY)*
- 14:40 Clock Prediction Experimentation with GIOVE Clocks  
*Gonzalez, Francisco<sup>1</sup> ; Cernigliaro, Alice<sup>2</sup> ; Patrizia, Tavella<sup>2</sup>*  
*<sup>1</sup>ESA (NETHERLANDS); <sup>2</sup>INRiM (ITALY)*
- 15:00 Galileo Common View: Format, Processing and Tests with GIOVE  
*Mudrak, Alexander<sup>1</sup> ; Defraigne, Pascale<sup>2</sup> ; Binda, Stefano<sup>1</sup> ; Brunet, Michel<sup>3</sup>*  
*<sup>1</sup>ESA (NETHERLANDS); <sup>2</sup>Royal Observatory of Belgium (ORB) (BELGIUM); <sup>3</sup>Timing Expert (FRANCE)*
- 15:20 European GNSS On-board Clocks: Status and Perspectives  
*Waller, Pierre*  
*ESA (NETHERLANDS)*

#### Session 4 - Optical Clocks

- 14:00 Prospects and Experiments for Pushing the Frequency Stability of Optical Lattice Clocks to the Quantum Limit  
*Westergaard, Philip*<sup>1</sup>; *Lodewyck, Jérôme*<sup>1</sup>; *Lecallier, Arnaud*<sup>1</sup>; *Lorini, Luca*<sup>2</sup>; *Lemonde, Pierre*<sup>1</sup>  
<sup>1</sup>LNE-SYRTE (FRANCE); <sup>2</sup>INRIM (ITALY)
- 14:20 New Nonlinear and Multipole Effects on Optical Lattice Clock  
*Palchikov, Vitaly*<sup>1</sup>; *Marmo, Sergey*<sup>2</sup>; *Ovsiannikov, Vitaly*<sup>2</sup>; *Taichenachev, Aleksey*<sup>3</sup>; *Yudin, Valery*<sup>3</sup>; *Katori, Hidetochi*<sup>4</sup>; *Takamoto, M.*<sup>4</sup>  
<sup>1</sup>FGUP VNIIFTRI (RUSSIAN FEDERATION); <sup>2</sup>Department of Physics, Voronezh State University (RUSSIAN FEDERATION); <sup>3</sup>Institute of Laser Physics, Novosibirsk (RUSSIAN FEDERATION); <sup>4</sup>University of Tokyo (JAPAN)
- 14:40 Toward a Mercury Optical Lattice Clock: Development of a Dipole Lattice Trap  
*Mejri, Sinda* ; *Yi, Lin* ; *McFerran, John J.* ; *Bize, Sébastien*  
SYRTE, Observatoire de Paris (FRANCE)
- 15:00 High-Resolution Laser Spectroscopy of the 467 nm S - F Electric Octupole Transition In Yb<sup>+</sup>  
*Peik, Ekkehard* ; *Huntemann, Nils* ; *Sherstov, Ivan* ; *Okhapkin, Maxim* ; *Lipphardt, Burghard* ; *Tamm, Christian*  
PTB (GERMANY)
- 15:20 Strontium Ion Optical Clocks for Space Applications  
*Barwood, Geoffrey* ; *Gill, Patrick* ; *Huang, Guilong* ; *Klein, Hugh*  
National Physical Laboratory (UNITED KINGDOM)
- 15:40 Coffee break

#### Session 5 - Resonant Sensors

- 16:10 Invited Presentation - Advances in Chip-Scale Atomic Magnetometers  
*Knappe, Svenja* ; *Griffith, W. Clark* ; *Preusser, Jan* ; *Mhaskar, Rahul* ; *Jimenez-Martinez, Ricardo* ; *Kitching, John*  
NIST (UNITED STATES)
- 16:50 High-Speed High Dynamic Range Resonant SAW Torque Sensor for Kinetic Energy Recovery System  
*Kalinin, Victor* ; *Lohr, Raymond* ; *Leigh, Arthur* ; *Beckley, John* ; *Bown, George*  
Transense Technologies plc (UNITED KINGDOM)
- 17:10 BAW Pressure Sensor on LiNbO<sub>3</sub> Membrane Lapping  
*Baron, Thomas*<sup>1</sup>; *Masson, Jeremie*<sup>2</sup>; *Romand, Jean Pierre*<sup>1</sup>; *Alzuaga, Sebastien*<sup>1</sup>; *Catherinot, Lise*<sup>3</sup>; *Chatras, Matthieu*<sup>3</sup>; *Ballandras, Sylvain*<sup>1</sup>  
<sup>1</sup>FEMTO-ST (FRANCE); <sup>2</sup>SENSeOR SAS (FRANCE); <sup>3</sup>Xlim (FRANCE)

- 17:30 A High Sensitivity Open Loop Electronics for Gravimetric Acoustic Wave-Based Sensors  
*Rabus, David ; Martin, Gilles ; Carry, Emile ; Blondeau-Patissier, Virginie; Ballandras, Sylvain*  
*FEMTO-ST Besançon (FRANCE)*
- 17:50 Topology Dependence of Mass Sensitivities in Mode Localized Sensors  
*Thiruvengadanathan, Pradyumna ; Yan, Jize ; Seshia, Ashwin*  
*University of Cambridge (UNITED KINGDOM)*

## **Session 6 - T&F Transfer through Optical Fibers**

- 16:10 Multiplexed Optical Link for Ultra-Stable Frequency Dissemination  
*Amy-Klein, Anne <sup>1</sup>; Lopez, Olivier <sup>2</sup>; Jiang, Haifeng <sup>3</sup>; Chanteau, Bruno <sup>2</sup>; Haboucha, Adil <sup>3</sup>;*  
*Roncin, Vincent <sup>2</sup>; Kéfélian, Fabien <sup>2</sup>; Chardonnet, Christian <sup>2</sup>; Santarelli, Giorgio <sup>3</sup>*  
<sup>1</sup>Université Paris 13 (FRANCE); <sup>2</sup>LPL - CNRS - UP13 (FRANCE); <sup>3</sup>LNE-SYRTE - CNRS - UPMC - Obs de Paris (FRANCE)
- 16:30 Long Haul Frequency Transfer between MPQ and PTB using a Telecommunication Fiber Link of 900 km Length  
*Predehl, Katharina <sup>1</sup>; Udem, Thomas <sup>1</sup>; Alnis, Janis <sup>1</sup>; Ronald, Holzwarth <sup>1</sup>; Terra, Osama <sup>2</sup>; Grosche, Gesine <sup>2</sup>; Schnatz, Harald <sup>2</sup>; Hänsch, Theodor W. <sup>1</sup>*  
<sup>1</sup>Max-Planck-Institute of Quantum Optics (GERMANY); <sup>2</sup>Physikalisch-Technische Bundesanstalt (GERMANY)
- 16:50 Fiber Based One Way Time Transfer with Enhanced Accuracy  
*Ebenhag, Sven-Christian ; Hedekvist, Per Olof*  
*SP Technical Research Institute of Sweden (SWEDEN)*
- 17:10 Time Transfer Through Optical Fibers: Progress on Calibrated Clock Comparisons  
*Rost, Michael <sup>1</sup>; Fujieda, Miho <sup>2</sup>; Piester, Dirk <sup>1</sup>*  
<sup>1</sup>Physikalisch-Technische Bundesanstalt, Braunschweig (GERMANY);  
<sup>2</sup>National Institute of Information and Communications Technology, Tokyo (JAPAN)
- 17:30 Dissemination of Frequency References to Many Locations Along an Optical Telecommunication Fiber  
*Grosche, Gesine*  
*Physikalisch-Technische Bundesanstalt (GERMANY)*
- 17:50 Time Transfer Using Fiber Links  
*Smotlacha, Vladimir <sup>1</sup>; Kuna, Alexander <sup>2</sup>; Mache, Werner <sup>3</sup>*  
<sup>1</sup>CESNET (CZECH REPUBLIC); <sup>2</sup>Institute of Photonics and Electronics, AS CR, v.v.i., Prague (CZECH REPUBLIC); <sup>3</sup>Bundesamt für Eich - und Vermessungswesen, Vienna (AUSTRIA)

Wednesday, 14 April 2010

### Session 7 - Space-based T&F Transfer

- 09:00 Development of the European Laser Timing Instrumentation for the ACES  
Time Transfer using Laser Pulses  
*Prochazka, Ivan*<sup>1</sup>; *Kodet, Jan*<sup>1</sup>; *Blazej, Josef*<sup>1</sup>; *Schreiber, Ulrich*<sup>2</sup>; *Cacciapuoti, Luigi*<sup>3</sup>  
<sup>1</sup>Czech Technical University in Prague (CZECH REPUBLIC); <sup>2</sup>Technische Universitaet Muenchen (GERMANY); <sup>3</sup>European Space Agency, ESA (NETHERLANDS)
- 09:20 Time Transfer by Laser Link - T2L2: Current Status of the Validation Program  
*SAMAIN, Etienne*<sup>1</sup>; *GUILLEMOT, Philippe*<sup>2</sup>; *EXERTIER, Pierre*<sup>1</sup>; *PIERRON, Francis*<sup>1</sup>;  
*ALABANESE, Dominique*<sup>1</sup>; *PARIS, Jocelyn*<sup>1</sup>; *TORRE, Jean-Marie*<sup>1</sup>; *LEON, Sylvie*<sup>2</sup>  
<sup>1</sup>OCA (FRANCE); <sup>2</sup>CNES (FRANCE)
- 09:40 A Coherent Optical Link through the Turbulent Atmosphere: Context and Applications  
*Wolf, Peter*<sup>1</sup>; *Acef, Ouali*<sup>1</sup>; *Clairon, André*<sup>1</sup>; *Djerroud, Khelifa*<sup>1</sup>; *Lemonde, Pierre*<sup>1</sup>;  
*Man, Catherine*<sup>2</sup>; *Samain, Etienne*<sup>3</sup>  
<sup>1</sup>LNE-SYRTE, Observatoire de Paris, CNRS, UPMC (FRANCE); <sup>2</sup>ARTEMIS, Observatoire de la Côte d'Azur, CNRS (FRANCE); <sup>3</sup>GéoAzur, Observatoire de la Côte d'Azur, CNRS (FRANCE)
- 10:00 VLBI Time-Transfer using CONT08 Data  
*Rieck, Carsten*<sup>1</sup>; *Haas, Rüdiger*<sup>2</sup>; *Jaldehyag, Kenneth*<sup>3</sup>; *Johansson, Jan*<sup>1</sup>  
<sup>1</sup>SP / Chalmers / OSO (SWEDEN); <sup>2</sup>Chalmers University of Technology, Onsala Space Observatory (SWEDEN); <sup>3</sup>SP Technical Research Institute of Sweden (SWEDEN)
- 10:20 Millisecond Pulsars to Transfer the Accuracy of Atomic Time  
*Petit, Gérard*<sup>1</sup>; *Cognard, Ismaël*<sup>2</sup>  
<sup>1</sup>BIPM, 92312 Sèvres (FRANCE); <sup>2</sup>LCP2E/CNRS 45071 Orléans (FRANCE)

### Session 8 - RF Acousto-electronic

- 09:00 Electrostrictive thin films for RF acoustic resonators  
*Defay, E.*; *Le Rhun, G.*; *Sanchez, S.*; *Parat, G.*; *Billard, C.*; *Mercier, D.*  
CEA Leti Minatec, FRANCE
- 09:20 A 2D Transducer Structure for the Excitation of Surface Acoustic Wave  
*Daniau, William*<sup>1</sup>; *Baron, Thomas*<sup>2</sup>; *Garcia, Julien*<sup>1</sup>; *Laroche, Thierry*<sup>1</sup>; *Ballandras, Sylvain*<sup>3</sup>  
<sup>1</sup>CNRS (FRANCE); <sup>2</sup>ENSMM (FRANCE); <sup>3</sup>CNRS/SENSeOR (FRANCE)
- 09:40 Large Bandpass Filter Synthesis using Shear-Wave Lithium Niobate Piezoelectric Layers  
*Rigaudeau, Laetitia*<sup>1</sup>; *Monfraix, Philippe*<sup>2</sup>; *Ballandras, Sylvain*<sup>3</sup>; *Baron, Thomas*<sup>3</sup>;  
*Chatras, Matthieu*<sup>4</sup>; *Bila, Stéphane*<sup>4</sup>; *Cros, Dominique*<sup>4</sup>  
<sup>1</sup>CNES (FRANCE); <sup>2</sup>Thalès Alenia Space (FRANCE); <sup>3</sup>Femto ST (FRANCE); <sup>4</sup>Xlim Research Institute, University of Limoges (FRANCE)

- 10:00 Fabrication of a 3 GHz Oscillator based on NANO-Carbon-DIAMOND-FILM-BASED Guided Wave Resonators  
*Salut, Roland*<sup>1</sup>; *Gesset, Céline*<sup>2</sup>; *Martin, Gilles*<sup>1</sup>; *Saada, Samuel*<sup>2</sup>; *Assouar, Badreddine*<sup>3</sup>; *Bergonzo, Philippe*<sup>2</sup>;  
*Boudot, Rodolphe*<sup>1</sup>; *Bénédic, Fabien*<sup>4</sup>; *Elmazria, Omar*<sup>3</sup>; *Omnes, Franck*<sup>5</sup>;  
*Rémiens, Denis*<sup>6</sup>; *Ballandras, Sylvain*<sup>7</sup>  
<sup>1</sup>CNRS (FRANCE); <sup>2</sup>CEA-LIST (FRANCE); <sup>3</sup>CNRS-IJL (FRANCE); <sup>4</sup>CNRS-LIMHP (FRANCE); <sup>5</sup>CNRS-Inst. Néel (FRANCE); <sup>6</sup>IEMN (FRANCE);  
<sup>7</sup>CNRS/SENSeOR (FRANCE)
- 10:40 Micromachined Thin film Plate Acoustic Resonators (FPAR): Theory and Applications  
*Yantchev, Ventsislav* ; *Katardjiev, Ilia*  
*Uppsala University (SWEDEN)*
- 11:00 Coffee break

### Session 9 - Timescales and Algorithms

- 11:20 Real-Time Detection of Anomalies for Atomic Clocks in Space by Means of the GLRT  
*Emilia, Nunzi* ; *Saltanocchi, Giorgio*  
*University of Perugia (ITALY)*
- 11:40 Optimal and Unbiased FIR Estimates of Clock State for Space and Ground Applications  
*Shmaliy, Yuriy* ; *Ibarra-Manzano, Oscar*  
*Guanajuato University (MEXICO)*
- 12:00 Ongoing Improvements of the Time and Frequency References at LNE-SYRTE  
*Abgrall, Michel* ; *Uhrich, Pierre* ; *Valat, David*  
*LNE-SYRTE, Observatoire de Paris, LNE, CNRS, UPMC (FRANCE)*
- 12:20 Results from NPL's Clock Ensemble Algorithm  
*Shemar, Setnam* ; *Davis, John A.* ; *Whibberley, Peter B.*  
*National Physical Laboratory (UNITED KINGDOM)*
- 12:40 Master Clock for Real Time Realization UTC(SU) Paper Clock  
*Koshelyaevsky, N.* ; *Pentin, S.*  
*Division of Time Standard, VNIIFTRI (RUSSIAN FEDERATION)*

### Session 10 - Stable Lasers

- 11:20 An Ultra-Low Frequency Noise Agile Laser  
*Haboucha, Adil* ; *Jiang, Haifeng* ; *Kéfélian, Fabien* ; *Lemonde, Pierre* ; *Clairon, André* ; *Giorgio, Santarelli*  
*SYRTE - Observatoire de Paris (FRANCE)*
- 11:40 Development of an Ultra-Stable Monocrystalline Silicon Resonator for Optical Clocks  
*Kessler, Thomas*<sup>1</sup>; *Hagemann, Christian*<sup>1</sup>; *Sterr, Uwe*<sup>1</sup>; *Riehle, Fritz*<sup>1</sup>; *Martin, Michael J.*<sup>2</sup>; *Ye, Jun*<sup>2</sup>  
<sup>1</sup>Physikalisch Technische Bundesanstalt (GERMANY); <sup>2</sup>JILA, NIST and University of Colorado (UNITED STATES)
- 12:00 Diode Laser Systems for Precision Measurement Applications on Earth and in Space  
*Peters, Achim*<sup>1</sup>; *Wicht, Andreas*<sup>2</sup>  
<sup>1</sup>Humboldt-Universitaet Berlin + FBH (GERMANY); <sup>2</sup>Ferdinand-Braun-Institut / Leibniz Institut fuer Hoechstfrequenztechnik (FBH) (GERMANY)

- 12:20 The Space Optical Clocks (SOC) Project: Status and Perspectives  
*Tino, Guglielmo<sup>1</sup>; Sterr, U.<sup>2</sup>; Görlitz, A.<sup>3</sup>; Lemonde, P.<sup>4</sup>; Salomon, C.<sup>5</sup>; Schiller, S.<sup>3</sup>*  
<sup>1</sup>Universita' di Firenze (ITALY); <sup>2</sup>Physikalisch-Technische Bundesanstalt  
 Braunschweig (GERMANY);  
<sup>3</sup>Heinrich-Heine-Universität Düsseldorf (GERMANY); <sup>4</sup>LNE-SYRTE (FRANCE);  
<sup>5</sup>Ecole Normale Supérieure Paris (FRANCE)
- 12:40 The Space Time Asymmetry Research (STAR) Program  
*Braxmaier, Claus<sup>1</sup>; Schuldt, Thilo<sup>1</sup>; Allab, Mohammed<sup>1</sup>; von Zoest, Tim<sup>2</sup>; Theil,  
 Stephan<sup>2</sup>; Pelivan, Ivanka<sup>2</sup>;*  
*Herrmann, Sven<sup>3</sup>; Lämmerzahl, Claus<sup>3</sup>; Peters, Achim<sup>4</sup>; Möhle, Katharina<sup>4</sup>; Wicht,  
 Andreas<sup>4</sup>; Nagel, Moritz<sup>4</sup>; Kovalchuk, Evgeny<sup>4</sup>; Döringshoff, Klaus<sup>4</sup>; Dittus,  
 Hansjörg<sup>3</sup>*  
<sup>1</sup>University of Applied Sciences Konstanz (GERMANY); <sup>2</sup>DLR Bremen (GERMANY);  
<sup>3</sup>ZARM University Bremen (GERMANY); <sup>4</sup>Humboldt-University Berlin (GERMANY)
- 13:00 Lunch break

### Session 11 - Microwave Clocks

- 14:00 Invited Presentation - Giant Coherence Times in a Trapped Atom Microwave Clock  
*Rosenbusch, Peter<sup>1</sup>; Ramirez-Martinez, Fernando<sup>1</sup>; Deutsch, Christian<sup>2</sup>; Lacroute,  
 Clement<sup>1</sup>; Reinhard, Friedemann<sup>2</sup>; Schneider, Tobias<sup>2</sup>; Reichel, Jakob<sup>2</sup>*  
<sup>1</sup>LNE-SYRTE (FRANCE); <sup>2</sup>ENS, LKB (FRANCE)
- 14:40 Realisation of a Compact Laser-Pumped Rubidium Frequency Standard with  
 $< 1 \times 10^{-12}$  Stability at 1 Second  
*Affolderbach, Christoph<sup>1</sup>; Gruet, Florian<sup>2</sup>; Matthey, Renaud<sup>2</sup>; Milet, Gaetano<sup>2</sup>*  
<sup>1</sup>Université de Neuchâtel (SWITZERLAND); <sup>2</sup>Université de Neuchâtel - LTF  
 (SWITZERLAND)
- 15:00 Testing Fundamental Physics by Searching the Derivative of the Comparison  
 Frequency Between a CSO and a H-Maser  
*Tobar, Michael<sup>1</sup>; Wolf, Peter<sup>2</sup>; Bize, Sebastien<sup>2</sup>; Santarelli, Giorgio<sup>2</sup>; Flambaum,  
 Victor<sup>3</sup>*  
<sup>1</sup>University of Western Australia (AUSTRALIA); <sup>2</sup>LNE-SYRTE, Observatoire de Paris,  
 CNRS, UPMC (FRANCE); <sup>3</sup>School of Physics, The University of New South Wales  
 (AUSTRALIA)

### Session 12 - Calibration

- 14:00 Toward an Unified TWSTFT and GNSS Calibration for UTC Time Transfer  
*Jiang, Z. ; Arias, E.F. ; Lewandowski, W. ; Petit, G.*  
 Bureau International des Poids et Mesures (BIPM) (FRANCE)
- 14:20 Time Stability, Electrical Delay and Temperature Sensitivity of Dual Frequency  
 GPS Receivers  
*Proia, Amandine<sup>1</sup>; Cibiel, Gilles<sup>1</sup>; Yaigre, Leslie<sup>2</sup>*  
<sup>1</sup>CNES (FRANCE); <sup>2</sup>Sogethi High-Tech (FRANCE)
- 14:40 On Improved GPS-Based Calibration of the Time Links between METAS and PTB  
*Feldmann, Thorsten<sup>1</sup>; Bauch, Andreas<sup>1</sup>; Piester, Dirk<sup>1</sup>; Stefanov, André<sup>2</sup>; Bernier,  
 Laurent-Guy<sup>2</sup>; Schlunegger, Christian<sup>2</sup>; Liang, Kun<sup>3</sup>*  
<sup>1</sup>Physikalisch-Technische Bundesanstalt (PTB) (GERMANY); <sup>2</sup>Bundesamt für  
 Metrologie (METAS) (SWITZERLAND); <sup>3</sup>National Institute of Metrology (NIM)  
 (CHINA)

15:40 Coffee break

## Poster Session I

16:10-18:00

A 2D Model for Bulk Acoustic Wave Devices using a Dyadic Green's Function of Laminar Plates

*Ballandras, Sylvain<sup>1</sup>; Daniau, William<sup>2</sup>; Garcia, Julien<sup>2</sup>; Laroche, Thierry<sup>2</sup>; Reinhardt, Alexandre<sup>3</sup>*

<sup>1</sup>CNRS/SENSeOR (FRANCE); <sup>2</sup>CNRS (FRANCE); <sup>3</sup>CEA-LETI (FRANCE)

Dual-Mode Quartz Resonators Suitable for TCXO and OCXO

*Kosykh, Anatoly; Khomenko, Igor*

*Omsk State technical university (RUSSIAN FEDERATION)*

Modification of the Intrinsic Properties of Gaas, Gaph and Sic Samples under Light at Cryogenic Temperatures

*Mouneyrac, David<sup>1</sup>; Hartnett, John G.<sup>2</sup>; Le Floch, Jean-Michel<sup>2</sup>; Krupka, Jerzy<sup>3</sup>; Cros, Dominique<sup>1</sup>;*

*Tobar, Michael E.<sup>2</sup>*

<sup>1</sup>XLIM (FRANCE); <sup>2</sup>FSM (AUSTRALIA); <sup>3</sup>Institute of Microelectronics and Optoelectronics (POLAND)

Langasite Resonant Structures: Fabrication and Characterization

*Leblois, Therese<sup>1</sup>; Le Traon, Olivier<sup>2</sup>*

<sup>1</sup>FEMTO-ST Institute (FRANCE); <sup>2</sup>ONERA (FRANCE)

Coupled Modes in Plano-Convex Bulk Acoustic Wave Quartz Resonators

*Imbaud, Joël; Dulmet, Bernard; Bourquin, Roger*

*FEMTO-ST (FRANCE)*

Resonator Frequency Stability Contribution to the Performance of Ultrastable Oscillators Before and After Integration

*Salzenstein, Patrice<sup>1</sup>; Kuna, Alexander<sup>2</sup>; Sojdr, Ludvík<sup>2</sup>; Cemusova, Blanka<sup>2</sup>; Franquet, Nathalie<sup>1</sup>; Lefebvre, Frédéric<sup>3</sup>*

<sup>1</sup>CNRS - FEMTO-ST (FRANCE); <sup>2</sup>IPE - Czech Academy of Sciences (CZECH REPUBLIC);

<sup>3</sup>Oscilloquartz S.A. (SWITZERLAND)

Miniature High-End Space Grade Ocxo

*Canzian, Patrice; Schneller, Luc; Trialoup, Claude; Candelier, Vincent; Lamboley, Jacques Rakon (FRANCE)*

New State of the Art of Thermal Sensitivity with Space Ultra Stable Quartz Crystal Oscillator

*Schneller, Luc<sup>1</sup>; Canzian, Patrice<sup>1</sup>; Candelier, Vincent<sup>1</sup>; Galliou, Serge<sup>2</sup>; Cibiel, Gilles<sup>3</sup>*

<sup>1</sup>Rakon (FRANCE); <sup>2</sup>Femto-ST (FRANCE); <sup>3</sup>CNES (FRANCE)

A New Ultrahigh Resolution Comparison Approach between Frequency Standards

*Zhao, Jie; Zhou, Wei; Chen, Faxi; Li, Hong; Ding, Ning; Zou, Chengzhi*

*Xidian University (CHINA)*

Self-Identification of Differences between Aging Rates of Two Frequencies Excited in the Dual-Mode Crystal Oscillator

*Stofanik, Vladimir; Minarik, Marian; Balaz, Igor; Cocherova, Elena; Kozinka, Stanislav*

*FEI STU (SLOVAKIA)*



Correction of Elastic, Piezoelectric and Dielectric Constants of NdCa<sub>4</sub>O(BO<sub>3</sub>)<sub>3</sub> Crystal using Measured SAW Parameters

*Brzozowski, Ernest ; Soluch, Waldemar*

*Institute of Electronic Materials Technology (POLAND)*

Development of a Compact Yb Optical Lattice Clock

*Görlitz, Axel ; Abou-Jaoudeh, Charbel ; Bruni, Cristian ; Ernsting, Ingo ; Nevsky, Alexander ; Schiller, Stephan*

*University of Düsseldorf (GERMANY)*

Dark-Resonance in Wall-Coated Cell for Rb-Clocks

*Breschi, Evelina ; Mileti, Gaetano*

*University of Neuchâtel (SWITZERLAND)*

Fabrication and Spectroscopy of Cs Vapour Cells with Buffer Gas for Miniature Atomic Clock

*Miletic, Danijela<sup>1</sup> ; Affolderbach, Christoph<sup>1</sup> ; Breschi, Evelina<sup>1</sup> ; Schori, Christian<sup>1</sup> ; Mileti, Gaetano<sup>1</sup> ; Hasegawa, Madoka<sup>2</sup> ; Chutani, Ravinder<sup>2</sup> ; Dziuban, Piotr<sup>2</sup> ; Boudot, Rodolphe<sup>2</sup> ; Giordano, Vincent<sup>2</sup> ; Gorecki, Christophe<sup>2</sup>*

*<sup>1</sup>University of Neuchâtel (SWITZERLAND); <sup>2</sup>FEMTO-ST (FRANCE)*

Development of Passive Hydrogen Maser in Shanghai

*Xie, Yonghui ; Dai, Jiayua ; Chen, Wenxing ; Liu, Tiexin ; Zhang, Yong ; Pen, Jixing ; Lin, Chuanfu*

*Shanghai Astronomical Observatory (CHINA)*

100 MHz Line Width in a Neutral Atom Microwave Clock

*Deutsch, Christian<sup>1</sup> ; Ramirez-Martinez, Fernando<sup>2</sup> ; Lacroute, Clement<sup>2</sup> ; Reinhard, Friedemann<sup>1</sup> ;*

*Schneider, Tobias<sup>1</sup> ; Reichel, Jakob<sup>1</sup> ; Rosenbusch, Peter<sup>2</sup>*

*<sup>1</sup>ENS, LKB (FRANCE); <sup>2</sup>LNE-SYRTE (FRANCE)*

Investigating  $\Delta m = \pm 1$  Transitions in an Atomic Fountain Clock

*Nemitz, Nils ; Gerginov, Vladislav ; Wynands, Robert ; Weyers, Stefan*

*Physikalisch-Technische Bundesanstalt (GERMANY)*

Pulsed Optically Pumped Rb Clock with Optical Detection: First Results

*Micalizio, Salvatore<sup>1</sup> ; Godone, Aldo<sup>1</sup> ; Levi, Filippo<sup>1</sup> ; Calosso, Claudio<sup>1</sup> ; Bandi, Thejesh<sup>2</sup> ; Pellaton, Matthieu<sup>2</sup> ; Gruet, Florian<sup>2</sup> ; Affolderbach, Christoph<sup>2</sup> ; Mileti, Gaetano<sup>2</sup>*

*<sup>1</sup>Istituto Nazionale di Ricerca Metrologica, INRIM (ITALY); <sup>2</sup>Laboratoire Temps – Fréquence (LTF), Université de Neuchâtel (SWITZERLAND)*

Study of Rb 0-0 Hyperfine Double-Resonance Transition in a Wall-Coated Cell

*Bandi, Thejesh ; Affolderbach, Christoph ; Mileti, Gaetano*

*Laboratoire Temps-Fréquence, University of Neuchatel (SWITZERLAND)*

Stark Shift of the Cs Clock Transition Frequency: a CPT-Pump-Probe Approach

*Robyr, Jean-Luc ; Knowles, Paul ; Weis, Antoine*

*University of Fribourg (SWITZERLAND)*

Low Temperature Indium-based Sealing of Microfabricated Alkali Cells for Chip Scale Atomic Clocks

*Pétremand, Yves<sup>1</sup> ; Schori, Christian<sup>2</sup> ; Straessle, Rahel<sup>1</sup> ; Mileti, Gaetano<sup>2</sup> ; de Rooij, Nico<sup>1</sup> ; Thomann, Pierre<sup>2</sup>*

*<sup>1</sup>Ecole Polytechnique Fédérale de Lausanne (EPFL) (SWITZERLAND); <sup>2</sup>LTF, University of Neuchatel (SWITZERLAND)*

Measurements of Cs-buffer Gas Collisional Frequency Shift using CPT Interrogation

*Kozlova, Olga<sup>1</sup> ; Boudot, Rodolphe<sup>2</sup> ; Guérandel, Stéphane<sup>1</sup> ; De Clercq, Emeric<sup>1</sup>*

*<sup>1</sup>Observatoire de Paris - LNE-SYRTE (FRANCE); <sup>2</sup>FEMTO-ST, Time & Frequency Dpt (FRANCE)*

Progress on Passive H-maser for Compass System

Yang, Ren-fu ; Li, Jing ; Chen, Hai-bo ; Zhang, Ji-hong ; Gao, Lian-shan  
Beijing Institute of Radio Metrology & Measurement (CHINA)

Cs Fountain VNIIFTRI

Domnin, Yury ; Baryshev, V. ; Boyko, A. ; Elkin, G. ; Kopylov, L. ; Krasovskiy, P. ;  
Novoselov, A.  
FGUP VNIIFTRI (RUSSIAN FEDERATION)

The Compensation and Processing Techniques used for Rubidium Frequency Standards

Zhou, Wei ; Ding, Ning ; Zou, Chengzhi ; Li, Hong  
Xidian University (CHINA)

FM Spectroscopy of Nonlinear Magneto-Optical Resonances

Baryshev, Viacheslav  
FGUP VNIIFTRI (RUSSIAN FEDERATION)

CPT Atomic Clock based on Rubidium 85

Schori, C. <sup>1</sup>; Milet, G. <sup>1</sup>; Leuenberger, B. <sup>2</sup>; Rochat, P. <sup>2</sup>

<sup>1</sup>University Neuchâtel, Time- Frequency Laboratory (LTF) (SWITZERLAND); <sup>2</sup>SpectraTime  
(SWITZERLAND)

Recent Progress on Superconducting Cavity for Frequency Standard in China

Wang, Nuanrang  
Beijing Institute of Radio Metrology & Measurement (CHINA)

Study on a High Q Sapphire Loaded Microwave Cavity for Compact Hydrogen Maser

Wang, Nuanrang  
Beijing Institute of Radio Metrology & Measurement (CHINA)

Carrier Suppression of Phase Modulated Beam using Optical Cavity for CPT Clock

Choi, In Ho <sup>1</sup>; Lee, Sang-Bum <sup>2</sup>; Kwon, Taeg Yong <sup>2</sup>; Park, Sang Eon <sup>2</sup>

<sup>1</sup>KAIST, KRISS (KOREA, REPUBLIC OF); <sup>2</sup>KRISS (KOREA, REPUBLIC OF)

New Design Toward a Miniature Atomic Clock using a Sigma<sup>+</sup>-Sigma<sup>-</sup> CPT Configuration

Haesler, Jacques ; Lecomte, Steve  
Centre Suisse d'Electronique et de Microtechnique (CSEM) SA (SWITZERLAND)

Narrow Linewidth Lasers for a Strontium Optical Lattice Clock

Bridge, Elizabeth M. <sup>1</sup>; Hill, Ian R. <sup>2</sup>; Barwood, Geoffrey P. <sup>3</sup>; Curtis, E. Anne <sup>2</sup>; Gill, Patrick <sup>4</sup>

<sup>1</sup>National Physical Laboratory and University of Oxford (UNITED KINGDOM); <sup>2</sup>National  
Physical Laboratory and Imperial College London (UNITED KINGDOM); <sup>3</sup>National Physical  
Laboratory (UNITED KINGDOM); <sup>4</sup>National Physical Laboratory, University of Oxford and  
Imperial College London (UNITED KINGDOM)

Towards an Optical Frequency Standard Based on Lattice-Confined Neutral Magnesium Atoms

Pape, Andre <sup>1</sup>; Friebe, Jan <sup>1</sup>; Riedmann, Matthias <sup>1</sup>; Terra, Osama <sup>2</sup>; Wuebbena, Temmo <sup>1</sup>;  
Kulosa, Andre <sup>1</sup>; Kelkar, Hrishikesh <sup>1</sup>; Amairi, Sana <sup>1</sup>; Predehl, Katharina <sup>2</sup>; Feldmann,  
Thorsten <sup>2</sup>; Legero, Thomas <sup>2</sup>; Lipphardt, Burghard <sup>2</sup>; Grosche, Gesine <sup>2</sup>; Schnatz, Harald <sup>2</sup>;  
Ertmer, Wolfgang <sup>1</sup>; Rasel, Ernst-Maria <sup>1</sup>

<sup>1</sup>Institute of Quantum Optics (GERMANY); <sup>2</sup>Physikalisch-Technische Bundesanstalt  
(GERMANY)

#### Development of a Transportable Laser Cooled Strontium Source for Future Applications in Space

*Schioppo, Marco*<sup>1</sup>; *Tino, G.M.*<sup>1</sup>; *Poli, N.*<sup>1</sup>; *Tarallo, M.G.*<sup>1</sup>; *Sutyin, D.V.*<sup>1</sup>; *Prevedelli, M.*<sup>1</sup>; *Sorrentino, F.*<sup>1</sup>; *Lisdat, Ch.*<sup>2</sup>; *Vellore Winfred, J.S.R.*<sup>2</sup>; *Falke, S.*<sup>2</sup>; *Sterr, U.*<sup>2</sup>; *Legero, T.*<sup>2</sup>; *Riehle, F.*<sup>2</sup>; *Cacciapuoti, L.*<sup>3</sup>

<sup>1</sup>*Università di Firenze, Dipartimento di fisica, European Laboratory for Non-Linear Spectroscopy (ITALY)*; <sup>2</sup>*Physikalisch-Technische Bundesanstalt Braunschweig (GERMANY)*; <sup>3</sup>*ESA (NETHERLANDS)*

#### The ACES GNSS Subsystem and its Applications

*Hess, Marc Peter*<sup>1</sup>; *Helm, Achim*<sup>1</sup>; *Cacciapuoti, Luigi*<sup>2</sup>; *Feltham, Stephen*<sup>2</sup>; *Much, Rudolf*<sup>2</sup>; *Nasca, Rosario*<sup>2</sup>; *Montenbruck, Oliver*<sup>3</sup>; *Gribkov, Alexander*<sup>4</sup>

<sup>1</sup>*Astrium Space Transportation (GERMANY)*; <sup>2</sup>*European Space Agency (NETHERLANDS)*; <sup>3</sup>*DLR/GSOC (GERMANY)*; <sup>4</sup>*JAVAD GNSS (RUSSIAN FEDERATION)*

#### GGTO and UTC Dissemination Results in GIOVE-Mission

*Mudrak, Alexander*<sup>1</sup>; *Gaetano, Galluzzo*<sup>2</sup>

<sup>1</sup>*ESA (NETHERLANDS)*; <sup>2</sup>*VEGA (NETHERLANDS)*

#### On Site Activities of the Galileo Precise Timing Facility

*Zanello, Renzo*<sup>1</sup>; *Piras, Chiara*<sup>2</sup>; *Samperi, Andrea*<sup>2</sup>; *Detoma, Edoardo*<sup>3</sup>; *Capetti, Paola*<sup>3</sup>; *Ferrato, Andrea*<sup>4</sup>; *Villabruna, Diego*<sup>4</sup>; *Mudrak, Alexander*<sup>5</sup>

<sup>1</sup>*ThalesAleniaSpace Italia (ITALY)*; <sup>2</sup>*SSE (ITALY)*; <sup>3</sup>*SEPA (ITALY)*; <sup>4</sup>*AleniaSIA (ITALY)*; <sup>5</sup>*ESA (NETHERLANDS)*

#### Aircraft High Dynamic Two-Way Time Synchronization Technique Research

*Ma, Hong-Jiao*<sup>1</sup>; *He, Zai-Min*<sup>2</sup>; *Wu, Jian-Feng*<sup>1</sup>; *Wang, Ji-Gang*<sup>1</sup>; *Wang, Kang*<sup>1</sup>

<sup>1</sup>*National Time Service Center, Chinese Academy of Sciences (CHINA)*; <sup>2</sup>*Graduate University of Chinese Academy of Sciences (CHINA)*

#### Improvement of Asia-Pacific TWSTFT Results Utilizing Full Time Transfer Network Data

*Lin, Huang-Tien*; *Liao, Chia-Shu*; *Chu, Fang-Dar*; *Tseng, Wen-Hung*

*National Time and Frequency Standard Laboratory (TAIWAN)*

#### Timing Accuracy Analysis using Height as Virtual Satellite

*Shan, Qingxiao*; *Yueke, Wang*; *Jun, Yang*; *Jiayun, Chen*

*National University of Defense Technology (CHINA)*

#### Improvement Method of the Timing Accuracy by using Legacy Loran Signal

*Yang, Sung-Hoon*<sup>1</sup>; *Lee, Chang Bok*<sup>1</sup>; *Lee, Sang Jeong*<sup>2</sup>; *Kim, Young Jae*<sup>1</sup>; *Lee, Jong Ku*<sup>1</sup>

<sup>1</sup>*KRISS (KOREA, REPUBLIC OF)*; <sup>2</sup>*CNU (KOREA, REPUBLIC OF)*

#### Monitoring and Prediction of GNSS System Time Difference

*Zhang, Huijun*; *Li, Xiaohui*

*National Time Service Center (CHINA)*

#### Report on Progress of Multi-System Time Transfer at the AOS

*Nawrocki, Jerzy*; *Nogas, Pawel*

*Space Research Centre (POLAND)*

#### GEOSTAR: a Proposal for Global Earth and In-Orbit Synchronisation of Time Atomic References

*Dimarcq, Noel*<sup>1</sup>; *Samain, Etienne*<sup>2</sup>; *Léger, Benoît*<sup>3</sup>

<sup>1</sup>*CNRS-Paris Observatory (FRANCE)*; <sup>2</sup>*Observatoire de la Cote d'Azur - Geosciences Azur (FRANCE)*; <sup>3</sup>*CNES (FRANCE)*

Simulation of Servo Loops in Atomic Clock Ensemble in Space (ACES)

Dam, Joydeep Kumar <sup>1</sup>; Schaefer, Wolfgang <sup>1</sup>; Hejc, Gerhard <sup>1</sup>; Hess, Marc-Peter <sup>2</sup>; Stringhetti, Luca <sup>2</sup>; Kehr, Johannes <sup>2</sup>; Cacciapuoti, Luigi <sup>3</sup>

<sup>1</sup>TimeTech GmbH (GERMANY); <sup>2</sup>EADS Astrium (GERMANY); <sup>3</sup>ESA (NETHERLANDS)

Satellite Navigation Augmentation Technology Based on Digital Video Broadcasting Signal

Song, Kexin ; Wu, Haitao ; Hua, Yu ; Guo, Wei

National Time Service Center, Chinese Academy of Science (CHINA)

The Research and Application of Measuring Pseudo Distance with DTV Signal in Navigation

Song, Kexin ; Hua, Yu ; Xiang, Yu ; Li, Shifeng

National Time Service Center, Chinese Academy of Science (CHINA)

Optical Frequency Dissemination over a German Wide-Area Telecommunication Network

Terra, Osama <sup>1</sup>; Grosche, Gesine <sup>1</sup>; Predehl, Katharina <sup>2</sup>; Holzwarth, Ronald <sup>3</sup>; Schnatz, Harald <sup>1</sup>

<sup>1</sup>Physikalisch-Technische Bundesanstalt, Braunschweig (GERMANY); <sup>2</sup>Max Planck Institute for Quantum Optics (GERMANY); <sup>3</sup>Max Planck Institute for Quantum Optics, Garching (GERMANY)

An Ultra Stable Event Timer Designed for T2L2

Samain, Etienne <sup>1</sup>; Fridelance, Patricia <sup>2</sup>; Guillemot, Philippe <sup>3</sup>

<sup>1</sup>OCA (FRANCE); <sup>2</sup>Phisipus Integration (FRANCE); <sup>3</sup>CNES (FRANCE)

A Novel Synchronization Method by Simulated Gps Radio Signal

Shan, qingxiao ; wang, yueke ; yang, jun ; chen, jianyun

National University of Defense Technology (CHINA)

Restore the TWSTFT Calibration with a GPS Bridge - A Standard Procedure for UTC Time Transfer

Jiang, Zhiheng <sup>1</sup>; Piester, D. <sup>2</sup>; Liang, K. <sup>3</sup>

<sup>1</sup>Bureau International des Poids et Mesures (BIPM) (FRANCE); <sup>2</sup>Physikalisch-Technische Bundesanstalt (GERMANY); <sup>3</sup>National Institute of Metrology (CHINA)

Performance Evaluation of NIM GPS Receivers in use for Time Transfer with PTB

Liang, Kun <sup>1</sup>; Feldmann, Thorsten <sup>2</sup>; Bauch, Andreas <sup>2</sup>; Piester, Dirk <sup>2</sup>; Zhang, Aimin <sup>1</sup>; Gao, Xiaoxun <sup>1</sup>

<sup>1</sup>National Institute of Metrology (NIM) (CHINA); <sup>2</sup>Physikalisch-Technische Bundesanstalt (PTB) (GERMANY)

A Model of Joint Time Keeping with Hydrogen Masers and Cesium Clocks

Yuan, Haibo ; Dong, Shaowu ; Qu, Lili

National Time Service Center, Chinese Academy of Sciences (CHINA)

19:00-22:00 Conference Dinner

Thursday, 15 April 2010

### Session 13 - T&F Transfer

- 09:00 Invited Presentation - Use of GPS Precise Point Positioning for TAI  
*Petit, Gérard*  
*BIPM (FRANCE)*
- 09:40 On the Correlation of Tropospheric Zenith Path Delay and Station Clock Estimates in Geodetic GNSS Frequency Transfer  
*Weinbach, Ulrich ; Schön, Steffen*  
*Leibniz Universität Hannover (GERMANY)*
- 10:00 Long-term Inconsistency of TWSTFT and GPS Time Transfers Results In PTB-TL and NICT-TL Time Links  
*Lin, Calvin. S.Y.<sup>1</sup>; Feng, Kai-Ming<sup>2</sup>; Lin, Huang-Tien<sup>1</sup>; Huang, Yi-Jiung<sup>1</sup>*  
*<sup>1</sup>Telecommunication Labs (TAIWAN); <sup>2</sup>National Tsing Hua University (TAIWAN)*
- 10:20 Near-Real Time Synchronization through a Network of GNSS Receivers Located in Timing Laboratories  
*Cerretto, Giancarlo<sup>1</sup>; Perucca, Andrea<sup>2</sup>; Tavella, Patrizia<sup>2</sup>; Píriz, Ricardo<sup>3</sup>*  
*<sup>1</sup>INRIM - Politecnico di Torino (DISPEA) (ITALY); <sup>2</sup>INRIM (ITALY); <sup>3</sup>GMV (SPAIN)*

### Session 14 - Oscillators and Noise

- 09:00 A Cryogenic Sapphire Oscillator Based on an Ultra-Low Vibration Custom-Designed Cryostat and a Pulse-Tube Cryocooler  
*Hartnett, John<sup>1</sup>; Nand, Nitin<sup>1</sup>; Wang, Chao<sup>2</sup>; Le Floch, Jean-Michel<sup>1</sup>*  
*<sup>1</sup>University of Western Australia (AUSTRALIA); <sup>2</sup>Cryomech, Inc. (UNITED STATES)*
- 09:20 Demonstration of a Cryocooled 10 GHz Oscillator with 1e-15 Frequency Stability  
*Grop, Serge<sup>1</sup>; Bourgeois, Pierre Yves<sup>1</sup>; Bazin, Nicolas<sup>1</sup>; Kersalé, Yann<sup>1</sup>; Rubiola, Enrico<sup>1</sup>; Langham, Conway<sup>2</sup>; Oxborrow, Mark<sup>2</sup>; De Vicente, Javier<sup>3</sup>; Giordano, Vincent<sup>1</sup>*  
*<sup>1</sup>Institut FEMTO-ST (FRANCE); <sup>2</sup>National Physical Laboratory (UNITED KINGDOM); <sup>3</sup>European Space Agency (GERMANY)*
- 09:40 D.C.-Powered Fe<sup>3+</sup>: Sapphire Maser Oscillator  
*Oxborrow, Mark<sup>1</sup>; Bourgeois, Pierre-Yves<sup>2</sup>; Kersalé, Yann<sup>2</sup>; Giordano, Vincent<sup>2</sup>*  
*<sup>1</sup>NPL (UNITED KINGDOM); <sup>2</sup>Institut FEMTO-ST (FRANCE)*
- 10:00 Cross Correlation Residual Phase Noise Measurements using Two HP3048-A Systems and a PC Based dual channel FFT Spectrum Analyser  
*Bale, Simon<sup>1</sup>; Adamson, David<sup>2</sup>; Wakley, Brett<sup>1</sup>; Everard Jeremy<sup>1</sup>*  
*<sup>1</sup>University of York (UNITED KINGDOM); <sup>2</sup>National Physical Laboratory (UNITED KINGDOM)*
- 10:20 The Phase Noise Spectrum and Structure of Photons?  
*Underhill, Mike*  
*Underhill Research (UNITED KINGDOM)*
- 10:40 Coffee break

### Session 15 - GNSS Timing II

- 11:20 Performance Overview of Space Rubidium Standards

*Droz, Fabien ; Rochat, Pascal ; Wang, Qinghua*  
*SpectraTime (SWITZERLAND)*

- 11:40 Space Passive Hydrogen Maser - Performances, Lifetime Data and GIOVE-B Related Telemetries  
*Belloni, Marco <sup>1</sup>; Droz, Fabien <sup>2</sup>; Resti, Alberto <sup>3</sup>; Mosset, Pierre <sup>2</sup>; Ostillio, Alessandra <sup>3</sup>; Beretta, Simone <sup>1</sup>; Gioia, Marina <sup>1</sup>; Waller, Pierre <sup>3</sup>; Qinghua, Wang <sup>2</sup>; Rochat, Pascal <sup>2</sup>*  
*<sup>1</sup>Selex Galileo (ITALY); <sup>2</sup>SpectraTime (SWITZERLAND); <sup>3</sup>ESA (NETHERLANDS)*
- 12:00 A Simulation of the Effect of Improved Ground Clocks on GPS Timing Performance  
*Suess, Matthias <sup>1</sup>; Matsakis, Demetrios <sup>2</sup>*  
*<sup>1</sup>German Aerospace Center (GERMANY); <sup>2</sup>U.S. Naval Observatory (UNITED STATES)*
- 12:20 Future Concepts for On-Board Timing Subsystems for Navigation Satellites  
*Felbach, Dirk ; Soualle, Francis ; Stopfkuchen, Lars ; Zenzinger, Alexander*  
*Astrium GmbH (GERMANY)*
- 12:40 Optical Clock Technology for Optimized Satellite Navigation  
*Plattner, Markus P. <sup>1</sup>; Hugentobler, Urs <sup>2</sup>; Voithenleitner, Dominik <sup>2</sup>; Markus, Heinze <sup>2</sup>; Klein, Volker <sup>1</sup>; Kemmerle, Kurt <sup>1</sup>; Bedrich, Stefan <sup>1</sup>*  
*<sup>1</sup>Kayser-Threde GmbH (GERMANY); <sup>2</sup>Technische Universitaet Muenchen (GERMANY)*

## **Session 16 - Frequency Combs**

- 11:20 Invited Presentation - First Fully Stabilized Frequency Comb from a SESAM - Modelocked 1.5-  $\mu$ m Solid-State Oscillator  
*Stumpf, Max C. <sup>1</sup>; Pekarek, Selina <sup>1</sup>; Oehler, Andreas E. H. <sup>1</sup>; Südmeyer, Thomas <sup>1</sup>; Dudley, John M. <sup>2</sup>; Keller, Ursula <sup>1</sup>*  
*<sup>1</sup>ETH Zurich (SWITZERLAND); <sup>2</sup>Université de Franche-Comté (FRANCE)*
- 12:00 Ultra-Low Noise Microwave Extraction from Fiber-Based Optical Frequency Comb  
*Zhang, Wei <sup>1</sup>; Xu, Z. <sup>2</sup>; Millo, J. <sup>1</sup>; Boudot, R. <sup>2</sup>; Lours, M. <sup>1</sup>; Bourgeois, P. Y. <sup>2</sup>; Luiten, A. N. <sup>3</sup>; Le Coq, Y. <sup>1</sup>; Kersalé, Y. <sup>2</sup>; Santarelli, G. <sup>1</sup>*  
*<sup>1</sup>LNE-SYRTE, Observatoire de Paris, CNRS, UPMC (FRANCE); <sup>2</sup>FEMTO-ST Institute, CNRS and ENSMM, Besançon (FRANCE); <sup>3</sup>School of Physics, University of Western Australia (AUSTRALIA)*
- 12:20 Optical Frequency Combs and Applications at NPL  
*Margolis, Helen <sup>1</sup>; Marra, Giuseppe <sup>1</sup>; Tsaturian, Veronika <sup>1</sup>; Walton, Barney <sup>1</sup>; Lea, Stephen <sup>1</sup>; Reid, Derryck <sup>2</sup>; Gill, Patrick <sup>1</sup>*  
*<sup>1</sup>National Physical Laboratory (UNITED KINGDOM); <sup>2</sup>Heriot-Watt University (UNITED KINGDOM)*
- 12:40 Octave-Spanning Tunable Frequency Combs on a Chip  
*Holzwarth, Ronald <sup>1</sup>; Del'Haye, P. <sup>1</sup>; Herr, T. <sup>1</sup>; Gavartin, E. <sup>2</sup>; Kippenberg, T.J. <sup>2</sup>*  
*<sup>1</sup>Menlo Systems GmbH (GERMANY); <sup>2</sup>Ecole Polytechnique Fédérale de Lausanne (EPFL) (SWITZERLAND)*
- 13:00 Lunch break

## **Poster Session II**

14:00-15:40

Multi-channel Real-time Computation of ADEV and TDEV

*Kasznia, Michal*

*Poznan University of Technology (POLAND)*

Joint Real-Time Computation of Allan Deviation, Time Deviation, and Hadamard Deviation

*Dobrogowski, Andrzej ; Kasznia, Michal*

*Poznan University of Technology (POLAND)*

Hardware and Software Realization of Time Error Measurement with Real-Time Assessment of ADEV, TDEV, and MTIE

*Dobrogowski, Andrzej ; Jessa, Mieczyslaw ; Kasznia, Michal ; Lange, Krzysztof ; Jaworski, Michal*  
*Poznan University of Technology (POLAND)*

From Allan Variance to Phase Noise: A New Conversion Approach

*Zhang, Shengkang ; Wang, Hongbo ; Wang, Xueyun ; Yang, Jun*

*Beijing Institute of Radio Metrology and Measurement (CHINA)*

Thermal Sensitivity of a DMTD used in a Composite Clock

*Plantard, Cédric ; Vernotte, François ; Meyer, Eric*

*Observatoire de Besançon (FRANCE)*

A Time Interval Measurement for Satellite Time Standard Assembly

*Shi, Shao-hua<sup>1</sup> ; Li, Xiao-Hui<sup>2</sup> ; Zhang, Hui-Jun<sup>2</sup> ; Zhao, Zhi-Xiong<sup>2</sup>*

*<sup>1</sup>Graduate University of the Chinese Academy of Sciences (CHINA); <sup>2</sup>National Time Service Center (CHINA)*

An Algorithm for Automating Fast and Accurate Measurements of the Resonance Frequencies

*Droit, Christophe<sup>1</sup> ; Friedt, Jean-Michel<sup>1</sup> ; Ballandras, Sylvain<sup>2</sup> ; Martin, Gilles<sup>2</sup>*

*<sup>1</sup>SENSeOR (FRANCE); <sup>2</sup>Femto-st (FRANCE)*

Heatproof Microwave Sensors. Flame Parameters Diagnostics in Combustion Chambers of the Different Engine Types

*Safonova, Ekaterina ; Boloznev, Victor*

*Kazan State Technical University (RUSSIAN FEDERATION)*

Phase Errors in Surface Acoustic Wave Devices under Rotation

*Nikolaevtsev, Victor ; Suchkov, Sergey*

*Saratov State University (RUSSIAN FEDERATION)*

The Progress of Strontium Optical Lattice Clock at NIM

*Wang, Shao-Kai ; Wang, Qiang ; Li, Ye ; Lin, Yi-Ge ; Wang, Min-Ming ; Lin, Bai-Ke ; Zhao, Yang ; Zang, Er-Jun ; Li, Tian-Chu ; Fang, Zhan-Jun*

*National Institute of Metrology of China (CHINA)*

Quantum Sensors with Cold Ions

*Mehlstäubler, Tanja ; Pyka, Karsten ; Herschbach, Norbert*

*PTB (GERMANY)*

High Performance Iodine Frequency Reference for Tests of the LISA Laser System

*Doeringshoff, Klaus ; Moehle, Katharina ; Nagel, Moritz ; Kovalchuk, Evgeny V. ; Peters, Achim*

*Institut fuer Physik, AG Optische Metrologie, Humboldt Universitaet zu Berlin (GERMANY)*

Piezo-Tunable High Finesse Cavity for LISA

*Moehle, Katharina ; Doeringshoff, Klaus ; Nagel, Moritz ; Kovalchuk, Evgeny V. ; Peters,*

*Achim Humboldt Universitaet zu Berlin, Institut für Physik (GERMANY)*

**Tackling the Black Body Shift in a Strontium Optical Lattice Clock**

*Falke, Stephan ; Middelman, Thomas ; Lisdat, Christian ; Vellore Winfred, Joseph Sundar Raaj ; Riehle, Fritz ; Sterr, Uwe  
Physikalisch-Technische Bundesanstalt (GERMANY)*

**Towards a Portable Aluminum Optical Clock**

*Schmidt, Piet ; Mandel, Olaf ; Sherstov, Ivan  
PTB Braunschweig and Leibniz University of Hannover (GERMANY)*

**A Clock Laser with High Frequency Stability and Highly Precise Transfer**

*Li, Ying ; Nagano, Shigeo ; Matsubara, Kensuke ; Ito, Hiroyuki ; Kajita, masatoshi ; Hosokawa, Mizuhiko  
National Institute of Information and Communication Technology (JAPAN)*

**Determining a Limit on the Variation of the Fine Structure Constant through Optical Frequency Measurements in  $^{171}\text{Yb}^+$**

*Godun, Rachel ; Webster, S.A. ; King, S.A. ; Huang, G. ; Walton, B.R. ; Tsaturian, V. ; Margolis, H.S. ; Lea, S.N. ; Gill, P.  
National Physical Laboratory (UNITED KINGDOM)*

**Transportable Cavity-Stabilized Fiber Laser**

*Legero, Thomas <sup>1</sup>; Kessler, Thomas <sup>2</sup>; Grosche, Gesine <sup>1</sup>; Sterr, Uwe <sup>2</sup>; Schnatz, Harald <sup>1</sup>  
<sup>1</sup>Physikalisch-Technische Bundesanstalt (GERMANY); <sup>2</sup>Physikalisch-Technische Bundesanstalt and Centre for Quantum Engineering and Space-Time Research (GERMANY)*

**Low Noise Optical Link Development at INRIM**

*Mura, Alberto <sup>1</sup>; Bastida, Karina <sup>2</sup>; Levi, Filippo <sup>1</sup>; Calonico, Davide <sup>1</sup>; Lorini, Luca <sup>1</sup>; Costanzo, Giovanni Antonio <sup>3</sup>; Godone, Aldo <sup>1</sup>  
<sup>1</sup>INRIM (ITALY); <sup>2</sup>INTI (ARGENTINA); <sup>3</sup>Politecnico di Torino (ITALY)*

**Development of an Yb Optical Lattice Clock at KRISS**

*Yu, Dai-Hyuk ; Park, Chang Yong ; Lee, Won-Kyu ; Kim, Eok Bong ; Mun, Jongchul  
Korea Research Institute of Standards and Science (KOREA, REPUBLIC OF)*

**Stable Narrow Linewidth 689nm ECDL for the Second Stage Cooling of Strontium Atoms**

*LI, Ye <sup>1</sup>; LIN, YiGe <sup>1</sup>; YANG, Tao <sup>2</sup>; CAO, JianPing <sup>1</sup>; FANG, ZhanJun <sup>1</sup>; ZANG, ErJun <sup>1</sup>  
<sup>1</sup>National Institute of Metrology (CHINA); <sup>2</sup>Beijing Institute of Technology (CHINA)*

**Thermal Design of a High-Finesse Cavity Enclosure for an Ultra-Stable Laser**

*Dolgovskiy, Vladimir ; Schilt, Stephane ; Di Domenico, Gianni ; Hofstetter, Daniel ; Thomann, Pierre  
University of Neuchâtel, Time and Frequency Laboratory (SWITZERLAND)*

**Demonstration of an Optical Frequency Synthesizer with Zero Offset Frequency Stabilization by the Direct Locking Method**

*Eok Bong, Kim <sup>1</sup>; Jae-hwan, Lee <sup>2</sup>; Luu Tran, Trung <sup>2</sup>; Won-Kyu, Lee <sup>1</sup>; Dai-Hyuk, Yu <sup>1</sup>; Han Young, Ryu <sup>1</sup>; Chang Hee, Nam <sup>2</sup>; Chang Yong, Park <sup>1</sup>  
<sup>1</sup>Korea Research Institute of Standards and Science (REPUBLIC OF KOREA); <sup>2</sup>Korea Advanced Institute of Science and Technology (REPUBLIC OF KOREA)*

**Frequency Dissemination with Free-Space Optical Links**

*Mata Calvo, Ramon ; Moll, Florian ; Knapek, Markus ; Giggenbach, Dirk  
DLR - Deutsches Zentrum für Luft- und Raumfahrt (GERMANY)*



Development of an Ultrastable Laser in the 1.5  $\mu\text{m}$  Band for CW Optical Frequency Transfer over Optical Fibre

*Parker, Benjamin<sup>1</sup>; Webster, Stephen<sup>1</sup>; Lea, Stephen<sup>1</sup>; Gill, Patrick<sup>1</sup>; Bayvel, Polina<sup>2</sup>*  
<sup>1</sup>National Physical Laboratory (UNITED KINGDOM); <sup>2</sup>Department of Electronic and Electrical Engineering, University College London (UNITED KINGDOM)

Millimeter Atomic Clock Based on the Laser Induced Line Narrowing Effect

*Litvinov, Andrey; Kazakov, George; Matisov, Boris*  
Saint-Petersburg State Polytechnic University (RUSSIAN FEDERATION)

Yb Lattice Clock at INRIM

*Calonico, Davide<sup>1</sup>; Levi, Filippo<sup>1</sup>; Lorini, Luca<sup>1</sup>; Costanzo, Giovanni Antonio<sup>2</sup>; Bertacco, Elio Keith<sup>1</sup>;*  
*Zoppi, Marco<sup>2</sup>; Godone, Aldo<sup>1</sup>*  
<sup>1</sup>Istituto Nazionale di Ricerca Metrologica INRIM (ITALY); <sup>2</sup>Politecnico di Torino (ITALY)

The Statistical Uncertainty Associated with the Weighted Mean Frequency in Optical Frequency Comb Comparison

*Lee, Won-Kyu; Yu, Dai-Hyuk; Park, Chang Yong; Mun, Jongchul*  
Korea Research Institute of Standards and Science (KOREA, REPUBLIC OF)

Simple Method for Measuring Frequency Noise of Optical Frequency Comb in Optical Domain

*Park, Sang Eon; Lee, Sang-Bum; Kim, Eok Bong; Kwon, Taeg Yong*  
KRISS (KOREA, REPUBLIC OF)

Characteristics of Microwave Signals Generated with Two Diode Lasers Injection-Locked to an Optical Frequency Comb

*Lee, Sang-Bum; Park, Sang Eon; Kwon, Taeg Yong*  
Korea Research Institute of Standard and Science (KOREA, REPUBLIC OF)

Progress on the Development of Nd: YAG Laser Frequency Stabilized on Iodine Transition for Space Applications

*Turazza, Oscar<sup>1</sup>; Lours, Michel<sup>2</sup>; Holleville, David<sup>3</sup>; Du Burck, Frederic<sup>4</sup>; Auger, Gérard<sup>5</sup>;*  
*Brillet, Alain<sup>6</sup>; Clairon, André<sup>2</sup>; Acef, Ouali<sup>2</sup>*  
<sup>1</sup>SYRTE/APC/Observatoire de Paris (FRANCE); <sup>2</sup>LNE-SYRTE / Observatoire de Paris/CNRS-UMR8630/UPMC-Paris 6 (FRANCE); <sup>3</sup>LNE-SYRTE-Observatoire de Paris-CNRS (FRANCE); <sup>4</sup>LPL / CNRS-UMR 7538 / Université Paris XIII (FRANCE); <sup>5</sup>APC/ Observatoire de Paris/Univ-Paris 7 (FRANCE); <sup>6</sup>ARTEMIS / CNRS-UMR 6162/ Observatoire de la côte d'Azur (FRANCE)

A Simple Approach to Evaluate the Linewidth of a Laser from its Frequency Noise Spectral Density

*Di Domenico, Gianni; Dolgovskiy, Vladimir; Schilt, Stéphane; Thomann, Pierre*  
LTF, Université de Neuchâtel (SWITZERLAND)

Interactions Blackbody Radiation with Alkaline-Earth Atoms: Applications to Optical Frequency Standards on Sr Atoms

*Palchikov, Vitaly<sup>1</sup>; Ovsiannikov, Vitaly<sup>2</sup>; Sluysarev, Sergey<sup>1</sup>; Kostin, Aleksey<sup>1</sup>*  
<sup>1</sup>FGUP VNIIFTRI (RUSSIAN FEDERATION); <sup>2</sup>Department of Physics, Voronezh State University (RUSSIAN FEDERATION)

Development of a Dipole Lattice Trap for a Mercury Optical Lattice Clock

*Yi, Lin; Mejri, Sinda; McFerran, John J.; Bize, Sébastien*  
SYRTE, Observatoire de Paris (FRANCE)

Mini-DOLL (Deep Space Optical Laser Link): Experimental Setup and First Results  
*Djerroud, Khelifa<sup>1</sup>; Acef, Ouali<sup>1</sup>; Clairon, André<sup>1</sup>; Lemonde, Pierre<sup>1</sup>; Man, Catherine<sup>2</sup>; Samain, Etienne<sup>3</sup>; Wolf, Peter<sup>1</sup>*  
<sup>1</sup>LNE-SYRTE, Observatoire de Paris, CNRS, UPMC (FRANCE); <sup>2</sup>ARTEMIS, Observatoire de la Côte d'Azur, CNRS (FRANCE); <sup>3</sup>GéoAzur, Observatoire de la Côte d'Azur, CNRS (FRANCE)

Precise Determination of the Refractive Index of Air in Fabry-Perot Cavity by Means of the Optical Frequency Comb  
*Smid, Radek ; Cip, Ondrej ; Mikel, Bretislav ; Buchta, Zdenek ; Cizek, Martin ; Lazar, Josef*  
*Institute of Scientific Instruments of AS CR (CZECH REPUBLIC)*

Phase-Locking of A 2.7 Terahertz Quantum Cascade Laser to a Mode-Locked Er-Fiber Laser  
*Santarelli, Giorgio<sup>1</sup>; Barbieri, Stefano<sup>2</sup>; Gellie, Pierre<sup>2</sup>; Ding, Lu<sup>2</sup>; Maineult, Wilfried<sup>2</sup>; Sirtori, Carlo<sup>2</sup>; Colombelli, Raffaele<sup>3</sup>; Beere, Harvey<sup>4</sup>; Ritchie, David<sup>4</sup>*  
<sup>1</sup>LNE-SYRTE, Observatoire de Paris (FRANCE); <sup>2</sup>MPQ, Université Paris 7 (FRANCE); <sup>3</sup>IEF, Université Paris Sud (FRANCE); <sup>4</sup>Cavendish Laboratory (UNITED KINGDOM)

Cold Atom Rotation Sensor  
*Berg, Peter ; Gilowski, Michael ; Schubert, Christian ; Tackmann, Gunnar ; Wendrich, Thijs ; Ertmer, Wolfgang ; Rasel, Ernst Maria*  
*Institut für Quantenoptik, Leibniz Universität Hannover (GERMANY)*

Interpolation of TW Time Transfer from Measured Points onto Standard MJD for UTC Generation  
*Jiang, Zhiheng*  
*Bureau International des Poids et Mesures (BIPM) (FRANCE)*

New Time Scale at the Royal Observatory of Belgium  
*Sharma, Suman ; Defraigne, Pascale*  
*Royal Observatory of Belgium (BELGIUM)*

Precise Point Positioning: Implementation of the Constrained Clock Model and Analysis of its Effects in T/F Transfer  
*Cerretto, Giancarlo<sup>1</sup>; Lahaye, François<sup>2</sup>; Tavella, Patrizia<sup>3</sup>; Vitrano, Sergio<sup>4</sup>*  
<sup>1</sup>INRIM - Politecnico di Torino (DISPEA) (ITALY); <sup>2</sup>NRCAN (CANADA); <sup>3</sup>INRIM (ITALY); <sup>4</sup>Politecnico di Torino (ITALY)

Study on the Precision of Long Baseline TWSTFT Links via Two Separated Transponder on One Telecommunication Satellite  
*Zhang, Hong<sup>1</sup>; Li, Huanxin<sup>1</sup>; Jiang, Zhiheng<sup>2</sup>*  
<sup>1</sup>National Time Service Center, Chinese Academy of Sciences (CHINA); <sup>2</sup>Bureau International des Poids et Mesures (FRANCE)

Requirements on GNSS Receivers from the Perspective of Timing Applications  
*Defraigne, Pascale<sup>1</sup>; Urich, Pierre<sup>2</sup>; Petit, Gérard<sup>3</sup>; Aerts, Wim<sup>1</sup>*  
<sup>1</sup>Royal Observatory of Belgium (BELGIUM); <sup>2</sup>LNE-SYRTE, LNE, CNRS, UPMC, Observatoire de Paris (FRANCE); <sup>3</sup>Bureau International des Poids et Mesures (FRANCE)

Maintenance of UTC(MIKE) in Finland by using a Delay Generator as a Micro Stepper  
*Mansten, Tapio ; Kalliomaki, Kalevi ; Iisakka, Ilkka ; Merimaa, Mikko*  
*MIKES (FINLAND)*

Experimental Analysis of the Time Transfer Capability of Compass I  
*Yang, Zhiqiang*  
*Beijing Institute of Radio Metrology and Measurement (CHINA)*

GPS Receiver Relative Calibration Campaign Preparation for Galileo In-Orbit Validation  
*Uhrich, Pierre ; Valat, David*  
*LNE-SYRTE, LNE, CNRS, UPMC, Observatoire de Paris (FRANCE)*

Two Methods of Linear Combination Model for Atomic Clock Prediction  
*Wang, Jigang ; Hu, Yonghui*  
*National Time Service Center (CHINA)*

New Technologies for Laser Time Transfer and their Possible Application in the Galileo Program  
*Prochazka, Ivan<sup>1</sup>; Schreiber, Ulrich<sup>2</sup>; Schäfer, Wolfgang<sup>3</sup>; Cacciapuoti, Luigi<sup>4</sup>*  
*<sup>1</sup>Czech Technical University in Prague (CZECH REPUBLIC); <sup>2</sup>BKG & Technical University Munich (GERMANY); <sup>3</sup>Time Tech GmbH (GERMANY); <sup>4</sup>European Space Agency, ESA (NETHERLANDS)*

Development Status and Experimental Plan of Time Management System of Satellite Positioning System using QZSS  
*Takahashi, Yasuhiro<sup>1</sup>; Amagai, Jun<sup>1</sup>; Fujieda, Miho<sup>1</sup>; Nakamura, Maho<sup>1</sup>; Aida, Masanori<sup>1</sup>; Nakazawa, Isao<sup>1</sup>; Hama, Shin'ichi<sup>1</sup>; Noda, Hiroyuki<sup>2</sup>; Kishimoto, Motohisa<sup>2</sup>; Yahagi, Yukihiro<sup>3</sup>; Horiuchi, Satoshi<sup>4</sup>; Takahashi, Tamaki<sup>4</sup>*  
*<sup>1</sup>NICT (JAPAN); <sup>2</sup>JAXA (JAPAN); <sup>3</sup>NEC Engineering (JAPAN); <sup>4</sup>NEC (JAPAN)*

Results of Evaluation of Time Signals Receiving from NTP Servers in Poland  
*Dobrogowski, Andrzej ; Jessa, Mieczyslaw ; Kasznia, Michal ; Lange, Krzysztof*  
*Poznan University of Technology (POLAND)*

Research on the Technology of Common-View Based on the Chinese Area Positioning System  
*Wu, Jianfeng ; Hu, Yonghui ; Ma, Hongjiao ; Jing, Wenfang*  
*National Time Service Center, Chinese Academy of Sciences (CHINA)*

Characterization of GNSS frequency transfer by comparison to optical fiber links  
*T. Wübbena<sup>1</sup>; T. Feldmann<sup>3</sup>; O. Terra<sup>3</sup>; U. Weinbach<sup>2</sup>; A. Bauch<sup>3</sup>; W. Ertmer<sup>1</sup>; J. Friebe<sup>1</sup>; G. Grosche<sup>3</sup>; H. Kelka<sup>1</sup>; A. Kulosa<sup>1</sup>; K. Liang<sup>4</sup>; A. Pape<sup>1</sup>; D. Piester<sup>3</sup>; E. Rasel<sup>1</sup>; M. Riedmann<sup>1</sup>; H. Schnatz<sup>3</sup>; S. Schön<sup>2</sup>*  
*<sup>1</sup>Institute of Quantum Optics (IQ), Leibniz Universität Hannover, Germany; <sup>2</sup>Institut für Erdmessung (IFE), Leibniz Universität Hannover, Germany; <sup>3</sup>Physikalisch-Technische Bundesanstalt (PTB), Braunschweig, Germany; <sup>4</sup>National Institute of Metrology (NIM), Beijing, P.R.China*

15:40 Coffee break

## **Session 17 - ACES**

16:10 ACES Status at Completion of the Engineering Models Phase  
*Cacciapuoti, L.<sup>1</sup>; Much, R.<sup>1</sup>; Feltham, S.<sup>1</sup>; Nasca, R.<sup>1</sup>; Vudali, T.<sup>1</sup>; Hess, M.P.<sup>2</sup>; Stringhetti, L.<sup>2</sup>; Salomon, C.<sup>3</sup>*  
*<sup>1</sup>ESA (NETHERLANDS); <sup>2</sup>Astrium Space Transportation (GERMANY); <sup>3</sup>Laboratoire Kastler Brossel, ENS (FRANCE)*

16:30 Development of the Space Active Hydrogen Maser for the Aces Mission  
*GOUJON, Didier<sup>1</sup>; Rochat, Pascal<sup>1</sup>; Mosset, Pierre<sup>1</sup>; Boving, Daniel<sup>1</sup>; Perri, Antonio<sup>1</sup>; Rochat, Julien<sup>1</sup>; Ramanan, Neetha<sup>1</sup>; Simonet, Didier<sup>1</sup>; Vernez, Xavier<sup>2</sup>; Perruchoud, Gérald<sup>3</sup>*  
*<sup>1</sup>Spectratime SA (SWITZERLAND); <sup>2</sup>T4Science (SWITZERLAND); <sup>3</sup>CSEM (SWITZERLAND)*

- 16:50 Frequency Accuracy Evaluation of the Pharao Space Clock on Ground  
*Laurent, Philippe*<sup>1</sup>; *Abgrall, Michel*<sup>1</sup>; *Clairon, André*<sup>1</sup>; *Léger, Benoît*<sup>2</sup>; *Picard, Frédéric*<sup>2</sup>  
<sup>1</sup>*LNE-SYRTE, Observatoire de Paris (FRANCE)*; <sup>2</sup>*CNES (FRANCE)*
- 17:10 Results of the ACES EM System Test  
*Hess, Marc Peter*<sup>1</sup>; *Stringhetti, Luca*<sup>1</sup>; *Cacciapuoti, Luigi*<sup>2</sup>; *Feltham, Steve*<sup>2</sup>; *Much, Rudolf*<sup>2</sup>; *Vudali, Tahsin*<sup>2</sup>; *Salomon, Christophe*<sup>3</sup>; *Laurent, Phillippe*<sup>4</sup>; *Benoit, Leger*<sup>5</sup>; *Delaroche, Christophe*<sup>5</sup>; *Massonnet, Didier*<sup>5</sup>; *Picard, Frederic*<sup>5</sup>; *Hejc, Gerhard*<sup>6</sup>  
<sup>1</sup>*Astrium Space Transportation (GERMANY)*; <sup>2</sup>*European Space Agency (NETHERLANDS)*; <sup>3</sup>*Laboratoire Kastler Brossel, ENS, Paris (FRANCE)*; <sup>4</sup>*Observatoire de Paris (FRANCE)*; <sup>5</sup>*CNES, French Space Agency, Toulouse (FRANCE)*; <sup>6</sup>*TimeTech GmbH (GERMANY)*
- 17:30 Closing Session

## Friday, 16 April 2010

Visit of ESTEC Facilities