



**FIRST
TF**



Communautés de Compétences Techniques

JOURNÉE THÉMATIQUE

Horloges compactes & miniatures

10 octobre 2016 - Paris

WORKSHOP

Compact & miniature atomic clocks

10 october 2016 - Paris



PROGRAM

09h-10h00

Welcome coffee - Poster installation

10h : SESSION 1 - Introduction & overview

10h : **Welcome – Introduction**

N. Dimarcq (SYRTE)

10h15 : **Trends in time-frequency requirements for space**

J. Delporte (CNES)

10h30 : **Benefits of compact/miniaturised atomic clocks on ESA systems & missions**

P. Waller (ESA)

10h45 : **DGA road-map for compact atomic clock**

J-M Lesage (DGA)

11h : **Compact and miniature atomic clocks: overview, status & challenges**

S. Micalizio (INRIM) & R. Boudot (FEMTO-ST)

11h45 : SESSION 2 - Towards industrial atomic clocks

11h45 : **Engineering model of the optical space Cs clock**

R. Schmeissner (Thales TED)

12h05 : **Stability at the 10^{-15} level with a turnkey cold atom clock**

B. Pelle (MuQuans)

12h25 : **Towards an industrial miniature atomic clock**

J-M Danet (SYRLINKS)

Lunch buffet & Poster session

14h : SESSION 3 - Emerging fields

14h: **Digital electronics and local oscillators for compact atomic clocks**

C. Calosso (INRIM)

14h20 : **Dual-frequency laser sources for CPT atomic clocks**

G. Lucas-Leclin (LCF)

14h40 : **Technology platform of micro-integrated semiconductor laser modules**

A. Bawamia (FBH)

15h : **Diffraction optics for a compact, cold atom clock**

J. McGilligan (Strathclyde University)

15h20 : **Towards a compact Yb^+ ion optical clock**

C. Lacroûte (FEMTO-ST)

15h45 : POSTER SESSION

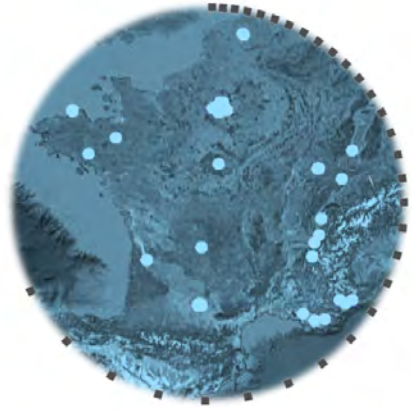
17h : CONCLUSIONS & OUTLOOK



Network for Research, Innovation, Education, Services and Training in Time-Frequency

FIRST-TF is a thematic network aiming to gather all the actors involved in time-frequency on a national scale.

Building a network of experts, FIRST-TF supports collaborative projects in Time & Frequency metrology with a broad spectrum of applications, from fundamental physics to satellite-based positioning systems. In the current socio-economical context where synchronization-related problems are omnipresent, encouraging laboratory innovations and ensuring effective technology transfers are of high importance for the network. Finally, the FIRST-TF network coordinates opportunities in teaching as well as tools for lifelong learners, the general public and school audiences on space-time metrology, a fascinating topic at the crossroads of several disciplinary fields. Around 60 laboratories, companies and technical agencies are now part of the FIRST-TF network.



Visit our website first-tf.fr for further information.



Communautés de Compétences Techniques

The CCT PDS is one of the **CNES Technical Skills Communities**. Its objective is to share knowledge and expertise between the CNES (French Space Agency), institutional entities, laboratories and companies involved in the field of Satellite Navigation.

The CCT PDS concerns techniques, technologies and applications implemented for satellite positioning and timing for the space, ground and the user segments. Systems at the heart of this CCT are GNSS (Global Navigation Satellite Systems) positioning systems such as GPS, Galileo, GLONASS, COMPASS and its SBAS augmentations (WAAS, EGNOS, MSAS, SDCM, GAGAN). Location systems such as Argos, Cospas-Sarsat, DORIS are also covered. Different static or dynamic positioning methods are addressed, taking into account the use of additional data (SBAS, DGPS, RTK, GPS & GNSS permanent networks, Assisted-GNSS ...), specific algorithms (RAIM ...) or hybridization with other techniques (communication means, RFID, MEMS ...).

Visit our website cct.cnes.fr to subscribe to the CCT PDS and be informed of its activities. For further information, please contact cct-pds@cnes.fr.



Workshop "Compact & miniature atomic clocks"

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Thank you for your participation to this workshop. We hope that it has fulfilled your expectations. Please feel free to contact us for any question or comment.