ACES Workshop 2024

23–25 October 2024

European Space Research and Technology Centre
ESA-ESTEC, Keplerlaan 1, Noordwijk – The Netherlands
Erasmus Auditorium

Program

Day 1 (October 23)

(ACES I - Session chair: S. Weinberg)

12:30 Registration

13:30 Welcome, *S. Weinberg (European Space Agency, NL)*

13:45 ACES science, *C. Salomon (École Normale Supérieure, FR)*

14:15 ACES payload system test with MWL, *A. Helm and S. Koller (Airbus Defence and Space, DE)*

14:55 PHARAO: The final stretch…, *P. Laurent, (Observatoire de Paris, FR)*

15:20 ***Coffee break***

(ACES II - Session chair: C. Salomon)

15:50 ACES commissioning plan, *L. Cacciapuoti (European Space Agency, NL)*

16:15 MWL data analysis at SYRTE, *M. Lilley (Observatoire de Paris, FR)*

16:45 European Laser Timing (ELT): Testing some challenging parts of the processing chain, *A. Schlicht (Technical University of Munich, DE)*

17:15 ***Posters session***

18:30 ***Adjourn***

Day 2 (October 24)

(Atomic clocks - Session chair: C. Lisdat)

08:30 Present status and future perspectives of atomic fountain frequency standards participating to ACES ground infrastructure, *L. Lorini (Observatoire de Paris, FR)*

09:00 An ytterbium ion optical clock with 2.2×10^{-18} fractional systematic uncertainty, *A. Tofful (National Physical Laboratory, UK)*

09.30 Advancements in ytterbium optical lattice clocks at NIST, *A. Ludlow (National Institute for Standards and Technology, USA)*

10.00 Accuracy and precision of the JILA 1D strontium clock, *A. Aeppli (Joint Institute for Laboratory Astrophysics, USA)*

10.30 Laser excitation of the thorium-229 nucleus - Towards a nuclear clock, *E. Peik (Physikalisch-Technische Bundesanstalt, DE)*

11:00 ***Coffee break***

(Time and frequency links I - Session chair: D. Piester)

11:30 Free space optical time transfer utilizing the ACES clocks, *U. Schreiber (Technical University of Munich - DE)*

12:00 The European optical fibre network for clock comparisons, *C. Clivati (Istituto Nazionale di Ricerca Metrologica, IT)*

12.30 Free-space optical links, *P. Wolf (Observatoire de Paris, FR)*

13:00 ***Lunch***

14:30 *Round table (Chair: U. Schreiber)*

Measurement campaigns

Research proposals: Wettzell, KRISS, UWA, OCA (5 min overview per proposal)

Coordination of ACES with ground clock comparisons through fiber links

Clock status file + data sharing

15:30 ***Coffee break***

(Clock applications I - Session chair: C. Clivati)

16:00 Development of transportable optical lattice clocks and their applications, *M. Takamoto (RIKEN, JP)*

16:30 Optical clocks in space for new physics searches, M. Safronova *(University of Delaware, USA)*

17:00 The geophysics of past and future variations in the Earth's rate of rotation, *D. C. Agnew (online, Scripps Institution for Oceanography, University of California San Diego, USA)*

17.30 ***Adjourn***

19.00 ***Workshop dinner***

Day 3 (October 25)

(Clock applications II - Session chair: H. Margolis)

08:30 Highly Charged Ion Optical Clocks to Test Fundamental Physics, *P. Schmidt (Physikalisch-Technische Bundesanstalt, D*E)

09.00 Comparison of $^{176}Lu^{+}$ Optical Frequency Standards at 5×10^{-19} uncertainty

09:20 General relativistic chronometry, E. Hackmann *(ZARM and Bremen University, DE)*

09.50 The FOCOS Mission Concept - Fundamental physics with an Optical Clock Orbiting in Space, *K. Gibble (Penn State University, USA)*

10.10 JPL atomic clock research activities for current and future space missions, *N. Yu (Jet Propulsion Laboratory, USA)*

10.30 ***Coffee break***

(Time and frequency links II - Session chair: L. Cacciapuoti)

11:00 Australian Laser Timing Link Support for ACES and Future Space Optical Clock Missions, *S. Schediwy (University of Western Australia, AU)*

11.20 Frequency-comb based open-path frequency transfer and its application to a three-node timing network with compact optical clocks, *F. Giorgetta (National Institute for Standards and Technology, USA)*

11.40 Proposal for Participation of KRISS-KASI in the ACES Mission with ELT Optical Link, *L. Won-kyu (Korea Research Institute of Standards and Science, South Korea)*

12.00 Geodesy – It is about Time, *U. Hugentobler (Technical University of Munich, DE)*

12.30 ***Closure of the meeting***

Poster session

1. Ultra-stable optical clock cavities as resonant mass gravitational wave detectors. In search for new physics, M. Zawada *(KL Famo, Institute of Physics, Nicolaus Copernicus University in Torun, PL)*
2. Optical clocks and cavity stabilised lasers for future space deployment, *G. Barwood (National Physical Laboratory, UK)*
3. Passive TWSTFT for UTC(k) dissemination, *M. Plumaris (Sapienza University of Rome, IT)*
4. Analysis of the Wettzell ELT test measurements to the ISS in July 2024, *S. Marz (Technical University of Munich, FESG, DE)*
5. The Grasse-MéO Satellite Laser Ranging Station contribution to ACES-PHARAO-ELT mission, *J. Chabé (OCA/geoazur, FR)*
6. Transient nearches for new ultralight bosonic fields with clocks: Dark Matter and multimessenger astronomy, *J. Arakawa (University of Delaware, USA)*
7. Determination of physical heights via time transfer, *K. E. Lachmann (ZARM, University of Bremen, DE)*
8. ACES, atomic clocks and the speed of light, *L. Riofrio (Quantum Astrobiology Center of Manizales, USA)*
9. Time Comparison Unit (TCU), *D. Di Giuliomaria (Thales Alenia Space, IT)*
10. ESA Quantum in space activities, *E. Wille (European Space Agency, The Netherlands)*
11. The Genesis mission and its prospects for time and frequency transfer over trans-continental baselines, *P. Waller (European Space Agency, The Netherlands)*
12. European Laser Timing for ACES status 2023-2024, I. Procházka *(Czech Technical University in Prague, Czech Republic)*