Kélian Sommer

PhD Student · CNRS/IN2P3

Laboratoire Univers et Particules de Montpellier, France

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Education

Laboratoire Univers et Particules de Montpellier - CNRS/IN2P3 *Montpellier*

PhD, Physics *2021 - present*

- Supervisors: Eric Nuss, Bertrand Plez, Johann Cohen-Tanugi
- Subject: **High-precision photometry in the era of ZTF and LSST cosmological surveys : characterization of instrumental and atmospheric transmissions**
- Involvement in the StarDICE metrology experiment for the Photometric Calibration Working Group (PCWG) and the Dark Energy Science Collaboration (DESC)
- Development, calibration and operation of an uncooled infrared thermal camera for sky radiance measurements to improve photometric observations quality
- Advanced data reduction, signal processing and image analysis in infrared thermography and optical photometry
- Leading observations and scientific data acquisition at Observatoire de Haute-Provence
- Design and prototyping of a transportable instrument capable of measuring telescope throughput at sub-percent uncertainty level in the context of Zwicky Transient Facility (ZTF)

ESTACA Engineering School *Paris/Saclay*

Master of aerospace engineering *2016 - 2021*

- Preparatory class (2016-2018)
- Launchers : propulsion systems, aerodynamics, operations
- Satellites : orbital mechanics, Guidance Navigation & Control (GNC), mechanical, thermal and electrical architecture
- Embedded systems : Real-Time Operating Systems (RTOS), microcontroller programming, sensors and actuators
- School research project : development of an autonomous, connected and embedded system which can measure air pollutants in big cities and display data to population in real time (involving sensors calibration, data acquisition, programming embedded systems)
- Master's thesis project : Conceptual design and analysis of Manned Orbital Vehicle for Ariane 6 next generation launcher

Paris Observatory *Remote*

University diploma *2019 - 2021*

- Fundamentals for astrophysics (Graduate level)
- Instrumentation, measuring chain and projects (Master level)

Sorbonne Faculty of Science and Engineering *Remote*

Graduate level teaching units *2019 - 2020*

- Quantum mechanics
- Electromagnetism and optics

Previous research experience

Laboratoire Univers et Particules de Montpellier - CNRS/IN2P3 *Montpellier*

Master's degree internship (2nd year) *Feb 2021 - Aug 2021*

- Advisors: Eric Nuss, Bertrand Plez, Johann Cohen-Tanugi
- Subject: **Atmosphere characterization with an uncooled infrared thermal camera instrument prototype**

Center for Particle Physics of Marseille - CNRS/IN2P3 *Marseille*

Master's degree internship (1st year) *Jun 2020 - Sep 2020*

- Advisor: Aurelia Secroun
- Subject: **Development of a control-command software for LISA space-based gravitational waves detector prototype bench**

Research interests

Instrumentation: LWIR detectors, calibration of sensors and optical instruments, atmosphere transmission characterization
Cosmology: type 1a supernovae and dark energy
Techniques: photometry, radiometry, instrument control-command and data analysis

Publications

Published

M. Betoule, S. Antier, E. Bertin, P. E. Blanc, S. Bongard, J. Cohen-Tanugi, S. Dagoret-Campagne, F. Feinstein, D. Hardin, C. Juramy, L. Le Guillou, A. Le Van Suu, M. Moniez, J. Neveu, E. Nuss, B. Plez, N. Regnault, E. Sepulveda, **K. Sommer**, T. Souverin. **StarDICE I. Sensor calibration bench and absolute photometric calibration of a Sony IMX411 sensor**. Astronomy & Astrophysics. 2023

In Review

B. Carreres, J. E. Bautista, F. Feinstein, D. Fouchez, B. Racine, M. Smith, M. Amenouche, M. Aubert, S. Dhawan, M. Ginolin, A. Goobar, P. Gris, L. Lacroix, E. Nuss, N. Regnault, M. Rigault, E. Robert, P. Rosnet, **K. Sommer**, R. Dekany, S. L. Groom, N. Sravan, F. J. Masci, J. Purdum. **Growth-rate measurement with type-Ia supernovae using ZTF survey simulations**. Astronomy & Astrophysics. 2023

In Prep

K. Sommer, J. Cohen-Tanugi, E. Nuss, B. Plez, M. Betoule, L. Le Guillou, S. Bongard, T. Souverin, J. Neveu, E. Sepulveda. **Design and performance assessment of a Collimated Beam Projector using a broadband light source**. Astronomy & Astrophysics

K. Sommer, J. Cohen-Tanugi, E. Nuss, B. Plez, M. Moniez, S. Dagoret-Campagne, M. Betoule, L. Le Guillou, S. Bongard, T. Souverin, J. Neveu, E. Sepulveda. **Calibration of an uncooled LWIR thermal camera for cirrus cloud detection in astronomy**. MDPI Sensors

Teaching Experience

Teaching Assistant - University of Montpellier
Master students observational astrophysics project *Fall 2022*
Observatoire de Haute-Provence (CNRS)

Professional Experience

2019 **Summmer job as warehouse and order picker**, Zalando Logisitics Sud SE CO. KG
2018 **Assistant engineer internship in aeronautics**, Safran Landing Systems
2017 **Summer job as production operator in electrical industry**, Socomec

Service and outreach

Collaboration member: DESC, LSST-France, ZTF
Associations member: Société Française d'Astronomie et d'Astrophysique (SF2A) and Société Française d'Astronomie (SAF)

Computational and technical skills

Operating systems/environments: UNIX/Linux, Windows, Docker
Computer languages: Python, C/C++, Arduino, FreeRTOS, Git, LaTeX
Astronomical software: SourceExtractor, SaoDS9, PixInsight
CAD: Catia, Solidworks, FreeCAD, Fusion360

Languages

French: native
English: fluent
Spanish and german: basic

Miscellaneous

Hobbies: amateur astrophotography, visual astronomy, 3D printing, programming
Sports: cycling, running, hiking

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