



Lorenzo König

NASA Postdoctoral Program Fellow in astronomical instrumentation

Passionate early in life by all facets of astronomy, I came to the field of instrumentation through a physics and astronomy degree. My research is best described at the intersection of science and engineering, developing nanostructured optical devices to push the technological limits of high-contrast imaging in astronomy.

Languages

C2 German
C2 Italian
C1 English
C1 French

Skills

Project Management
Python
Matlab
Optical test beds
Clean room experience
Microfabrication



Education

- 10/2019 – 09/2023 **PhD** in space sciences
[University of Liège](#)
Supervisor: Olivier Absil
Development of Next-Generation Vortex Phase Masks
- 04/2017 – 09/2019 **Master of Science** in physics
[Ruhr-University Bochum](#)
Supervisor: Rolf Chini
Search for Eclipsing Binaries in the Orion OB1 Association
- 10/2013 – 03/2017 **Bachelor of Science** in physics
[University of Freiburg](#)
Supervisor: Ulrich Landgraf
Studies on a Prototype of an Underpressure Cooling System for the New Small Wheel for the ATLAS Experiment at CERN



Collaborations

- 09/2022 – 10/2022 Mikael Karlsson, Pontus Forsberg
[Uppsala University](#)
Manufacturing tests in the microfabrication lab for charge-4 vortex phase masks and metasurface phase masks
- since 09/2022 Denis Vandormael
[SIRRIS Liège](#)
Masking the center of annular groove phase masks to reduce polarization leakage
- since 09/2022 Niyati Desai, Skyler Palatnick, Dimitri Mawet, Maxwell Millar-Blanchaer
[California Institute of Technology, UC Santa Barbara](#)
Development of a polarization-independent metasurface design framework for scalar coronagraphic masks
- since 10/2021 Nicolas Roy, Michaël Lobet
[University of Namur](#)
A project using machine-learning techniques to design metasurface-based designs for vortex phase masks

Awards

09/21 *Best contributed talk prize at the belgian Photonics Online Meetup*

09/19 *Travel grant of the Massenberg foundation*

After work

Soccer
Volleyball
Climbing
Piano
Cooking



Publications with major contributions

- 10/2023 [König, L.](#), Palatnick, S., Desai, N., Absil, O., Millar-Blanchaer, M. and Mawet, D., *Metasurface-based scalar vortex phase mask in pursuit of $1e-10$ contrast*, [Proc. SPIE 12680](#), 126800Q (2023).
- 10/2023 Desai, N., [König, L.](#), Por, E. H., Juanola-Parramon, R., Belikov, R., Laginja, I., Guyon, O., Pueyo, L., Fogarty, K., et al., *Integrated photonic-based coronagraphic systems for future space telescopes*, [Proc. SPIE 12680](#), 126801S (2023).
- 10/2023 Palatnick, S., [König, L.](#), Millar-Blanchaer, M., Wallace, J. K., Absil, O., Mawet, D., Desai, N., Echeverri, D, John, D., and Schuller, J. A., *Prospects for metasurfaces in exoplanet direct imaging systems: from principles to design*, [Proc. SPIE 12680](#), 126800P (2023).
- 09/2023 Roy, N., [König, L.](#), Absil, O., Beauthier, C., Mayer, A. and Lobet, M., *Photonic structures optimization using highly data-efficient deep learning: Application to nanofin and annular groove phase masks*, [ArXiv preprint, arXiv:2309.01995](#) (2023).
- 07/2022 [König, L.](#), Absil, O., Lobet, M., Delacroix, C., Karlsson, M., Orban de Xivry, G. and Loicq, J., *Optimal Design of the Annular Groove Phase Mask Central Region*, [Optics Express 30\(15\)](#), 27048 (2022).
- 12/2020 [König, L.](#), Absil, O., Delacroix, C., Lobet, M., Karlsson, M., Vargas Catalán, E., Orban de Xivry, G., Loicq, J. and Habraken, S., *Vortex Phase Masks of Topological Charge 4 and higher with Diamond Subwavelength Gratings*, [Proc. SPIE 11451](#), 1145144 (2020).



Selected scientific communications

- 10/2023 2nd international vortex workshop, [University of Liège](#), *Invited talk*
- 08/2023 SPIE Optics and Photonics, [San Diego Convention Center](#), *Contributed talk*
- 08/2023 Towards Starlight Suppression for the Habitable Worlds Observatory Workshop, [Caltech](#), *Poster*
- 06/2023 CLEO Europe, [Messe Munich](#), *Contributed talk*
- 02/2023 Optimal Exoplanet Imagers, [Lorentz-Center Leiden](#), *Invited workshop*
- 11/2022 NYRIA workshop, [Officina Stellare Sarcedo](#), *Contributed talk*
- 09/2022 Belgian Photonics Online Meetup, [University of Brussels \(VUB\)](#), *Contributed talk*
- 09/2022 Exoplanet technology lab group seminar, [Caltech](#), *Invited seminar talk*
- 09/2022 Exoplanet group meeting, [UC Santa Barbara](#), *Invited seminar talk*
- 06/2022 In the Spirit of Lyot, [Scheltema Leiden](#), *Poster*
- 09/2021 Belgian Photonics Online Meetup, [Online conference](#), *Poster*
- 12/2020 SPIE Astronomical Telescopes and Instrumentation, [Online conference](#), *Poster and flash talk*
- 09/2020 EUPROMETA Doctoral School on Computational Photonics, [Karlsruhe Institute of Technology](#), *Poster and flash talk*



Leadership experience

10/2023	Scientific and local organizing committee member for the "2nd international vortex workshop", <i>University of Liège, Organization of the invited workshop</i>
since 12/2022	Active member of the "Young Minds", <i>European Physical Society (EPS), Division of the EPS promoting outreach activities</i>
03/2018 – 05/2019	Tutor for physical laboratories, <i>Ruhr-University Bochum, Mentoring of Bachelor students through laboratory experiences</i>
10/2018 – 05/2019	Volunteer for "Europa macht Schule", <i>German Academic Exchange Service (DAAD), Association promoting the european idea, bringing foreign students to classrooms across Germany</i>
02/2018	Member of the organizing team for the conference "Physics of Hadrons and Nuclei", <i>German Physical Society, Administrative tasks</i>
10/2015 – 03/2016	Assistant teacher for class "Experimental physics I", <i>University of Freiburg, Mentoring of around 30 students within an exercise group</i>