Xavier Kervyn

Max–Planck–Institut für Physik,
85748 Garching, Germany
Born on 18 May 2001. Belgian

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Current Research Interests

String theory, (flat space) holography, asymptotic symmetries, scatt. amplitudes and integrability

Education

TU München & Ludwig-Maximilians-Universität Munich, Germany 10/2023
Master of Science in Theoretical and Mathematical Physics 08/2025

- Msc. thesis @ **Max-Planck Institute**, supervised by Prof. Stephan Stieberger (in progress)
- Erasmus+ semester at the **University of Copenhagen**, Denmark (Fall/Winter 2024/25)

Peterhouse, University of Cambridge Cambridge, United Kingdom 10/2022
Master of Advanced Study (MASt) in Applied Mathematics 06/2023

- Part III essay: *BMS Symmetries of Gravitational Scattering* (Distinction, set by Dr. Prahar Mitra)

Ecole Polytechnique Fédérale de Lausanne Lausanne, Switzerland 09/2019
Bachelor of Science in Physics 08/2022

- Final year at **ETH Zürich**, Switzerland in the frame of the Swiss-Mobility program

Academic Research Experience

Max-Planck Institute for Physics Garching, Germany & remote 08/2024
Student Assistant, MPI String Theory Group –present

- MSc. thesis; research in string theory, flat space holography and amplitudes
- Funding: Max-Planck Society

Università degli Studi di Padova Padova, Italy & remote 07/2023
Visiting Researcher, Theoretical Physics 06/2024

- Research on integrability in AdS_3/CFT_2 under Prof. Alessandro Sfondrini
- Funding: Fondation du Domaine de Villette

University of Cambridge Cambridge, United Kingdom 12/2022
Part III student, Department of Applied Mathematics and Theoretical Physics 08/2023

- Essay on the *BMS Symmetries of Gravitational Scattering*, expanded into a review article
- Funding: Swiss Study Foundation & Colbianco Stiftung

CERN CMS collaboration Meyrin, Switzerland 06/2022
Undergraduate Researcher, ETH Zürich High-Energy Physics group 07/2022

- Research under Dr. Simone Pigazzini (ETHZ/CERN) on the new HL-LHC CMS ECAL
- Funding: ETH Zürich, Department of Physics

ETH Zürich Zürich, Switzerland 09/2021
Undergraduate Researcher, Exoplanets and Habitability group 12/2021

- Research under Prof. Sascha Quanz on the LIFE space mission (LIFEsim simulation software)

Publications & Preprints [Inspire HEP / Google Scholar]

1. X. Kervyn, *BMS Symmetries of Gravitational Scattering*, Aug., 2023. 10.48550/arXiv.2308.12979

Conferences, Schools and Workshops attended (*scheduled)

*School on asymptotic symmetries and flat holography, Galileo Galilei Inst., Florence, Italy [link]	05/2025
*Frontiers in Gravity, Niels Bohr Institute, Copenhagen, Denmark [link]	09/2024
PhD School: "Towards Gravity", Nordita, Stockholm, Sweden [link, *online*]	08/2024
Celestial Holography Summer School, Perimeter Institute, Waterloo, Canada [link, *online*]	07/2024
Strings 2024, CERN, Meyrin, Switzerland [link]	06/2024
Carollian Physics and Holography, ESI, Vienna, Austria [link]	04/2024
Workshop [...] in analysis and mathematical physics, LMU, Munich, Germany [link]	10/2023
Celestial 2023, University of Warsaw, Warsaw, Poland [link]	08/2023
Integrability, Dualities and Deformations, Durham University, Durham, UK [link]	07/2023
Young Researchers Integrability School & Workshop, Durham University, Durham, UK [link]	07/2023
Eurostrings 2023, Universidad de Oviedo, Gijon, Spain [link]	04/2023
Young Physicists Forum 2022, ETH Zürich, Zürich, Switzerland [link]	05/2022

Contributed Talks & Seminars (*scheduled)

Seminar on Scattering Amplitudes, **LMU Munich** — 05/2024
Spinor-Helicity Formalism, Twistor Theory and Scattering Amplitudes

Seminar on Generalized Symmetries in QFT, **LMU Munich** — 12/2023
Gauging of Discrete Higher Form Symmetries in non-Abelian Yang-Mills theory

DAMTP Part III Seminar Series, **University of Cambridge** — 03/2023
Gravitational Scattering and Covariant Phase Space methods in Gravity

DAMTP Part III Seminar Series, **University of Cambridge** — 12/2022
Holography and Twistor methods in AdS_5

Group Seminar, **ETH Zürich HEP group & CERN CMS collaboration** — 07/2022
Towards an automatized analysis framework for the upcoming HL-LHC CMS ECAL upgrade

LIFEsim Seminar, **ETH Zürich Exoplanets and Habitability Group** — 12/2021
Characterisation of the impact of non-perfect nulls on the detectable planet population by LIFE

Outreach (*scheduled)

Online Seminar, **Swiss Study Foundation** — 05/2024
Organisator, peer event – "The future of CERN and High-Energy Physics"

Online Seminar, **Swiss Study Foundation** — 12/2023
Organisator & speaker, peer event – "The role of Symmetries in Physics"

Website, **online** — 2022–...
Built a website to share online resources in mathematics and physics with like-minded students

Classroom Presentation, **Lycée Dominique Villars** — 2019–...
Presenting my curriculum and advertising STEM university studies to high-school students

Teaching Experience

Volunteer Tutor remote 06/2022
It Takes a Village / Village Book Builders 03/2023

- 1:1 weekly online tutoring sessions with a 13yo. child in Mukono, Uganda (10 months)

Skills

Languages: French (native); English, German (work proficiency)
Programming: C++ (OOP), Python (NumPy, Pandas, Matplotlib, Seaborn, Plotly.express, SciPy)
Data Analysis: Python (advanced), MATLAB (intermediate), Microsoft Excel (elementary)
Scientific work: LaTeX (Overleaf), `Mathematica`, scientific writing, funding search and application

Selected Coursework

- **Theoretical physics**: QFT; GR; SUSY; (Super)String Theory & AdS/CFT; Generalized Symmetries; Instantons & Black Holes; TQFT; Scattering Amplitudes in QFT
- **Mathematics**: Differential Geometry; Lie groups & Symmetries
- **Computer Science**: Object-Oriented Programming in C++ & Python; Computational Physics

Selected Awards, Grants & Scholarships

Erasmus+ Scholarship – *Ludwig-Maximilians-Universität Munich* 05/2024
€600/month, 4 months. Awarded to support an exchange semester at the University of Copenhagen

College Prize in Applied Mathematics – *Peterhouse, University of Cambridge* 12/2023
£300. Awarded in recognition of my academic achievements

Retrospective Scholarship in Mathematics – *Peterhouse, University of Cambridge* 12/2023
£125. Awarded in recognition of my academic achievements

Research Grant – *Fondation du Domaine de Villette* 06/2023
CHF 5'000. Supporting research and attendance to conferences in the summer 2023

Annual Scholarship – *Swiss Study Foundation* 11/2022
CHF 20'000. Financial support for master studies at the University of Cambridge

Excellence Scholarship – *Colbianco Stiftung* 08/2022
CHF 2'000. Financial support for master studies at the University of Cambridge

Swiss Mobility Program grant – *Ecole Polytechnique Fédérale de Lausanne* 09/2021
CHF 1'500. Supporting an exchange year at ETH Zurich

Academic References

- **Prof. Alessandro Sfondrini** (*Project supervisor*)
  Dipartimento di Fisica e Astronomia "Galileo Galilei" - DFA, via F. Marzolo 8, Padova, Italy.
  Email: alessandro.sfondrini@unipd.it.

- **Dr. Prahar Mitra** (*Cambridge Part III essay setter*)
  Room C4.202, Science Park 904, Institute for Theoretical Physics, University of Amsterdam, Postbus 94485, 1090 GL Amsterdam, Netherlands. Email: p.mitra@uva.nl.

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