

Xavier Kervyn

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Born on 18 May 2001. Belgian

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RESEARCH INTERESTS

Keywords: quantum gravity, holography, CFT, supergravity, formal string theory, black holes, asymptotic symmetries, symmetries and dualities, SUSY, integrability in string and field theory, quantum information and gravity, twistors, celestial amplitudes and flat space holography.

I am a graduate student in theoretical physics at the University of Cambridge. My coursework in field theory and mathematical physics, alongside my research experiences, have altogether driven my interest towards studying the role of symmetries and integrability in the context of HEP theory.

My previous research experiences demonstrate my ability to work efficiently in a team but also study and solve research problems independently.

EDUCATION

Peterhouse, University of Cambridge <i>Master of Advanced Study (MASt) in Applied Mathematics</i> Grade: N/A. Expected graduation in June 2023.	2022 – 2023 Cambridge, UK
Eidgenössische Technische Hochschule Zürich <i>Swiss-Mobility, Bachelor of Science in Physics</i> Grade: 5.58/6. Exchange year. Graduate coursework in mathematical physics.	2021 – 2022 Zurich, Switzerland
Ecole Polytechnique Fédérale de Lausanne <i>Bachelor of Science in Physics</i> Grade: 5.18/6 (first two years)	2019 – 2022 Lausanne, Switzerland

RESEARCH EXPERIENCE

University of Cambridge <i>Part III Essay, Department of Applied Mathematics and Theoretical Physics</i> <ul style="list-style-type: none">Title: <i>BMS Symmetries of Gravitational Scattering</i> (Dr. Prahar Mitra). Grade: N/ABMS analysis, covariant phase space formalism, IR structure of gravity, celestial holography.	2022 – Present Cambridge, UK
CERN CMS collaboration & ETH Zürich <i>Bachelor project, High-Energy Physics Group</i> <ul style="list-style-type: none">Title: <i>Towards an automatised analysis framework for the upcoming Compact Muon Solenoid ECAL upgrade, aiming at improved amplitude and time resolutions with High-Luminosity LHC</i> (Dr. Simone Pigazzini)Study of a CMS ECAL prototype with a class IV LASER. Python package available on my Github.	2022 Meyrin, Switzerland
ETH Zürich <i>Semester project, Exoplanets and Habitability Group</i> <ul style="list-style-type: none">Title: <i>Measure and characterization of the impact of non-perfect nulls on the detectable planet population by LIFE, based on different stellar and planetary properties</i> (Prof. Sascha Quanz & Felix Dannert). Grade: 6/6Built a model to characterize the impact of non-perfect nulls on the detection yield of LIFE and derived technical requirements on the concept, taking into account sources of instrumental perturbation	2021 Zurich, Switzerland

PUBLICATIONS & PREPRINTS(*)

1. No peer-reviewed publications yet, working on it!

CONTRIBUTED TALKS & SEMINARS

1. **Kervyn, X.** (Mar. 2023) Gravitational scattering and covariant phase space methods in gravity (Talk, given in the frame of the Cambridge DAMTP Part III Seminars series)
2. **Kervyn, X.** (Dec. 2022) Holography and Twistor methods in AdS_5 (Talk, given in the frame of the Cambridge DAMTP Part III Seminars series)
3. **Kervyn, X., Roux, N.** (Jul. 2022) Towards an automatized analysis framework for the upcoming CMS ECAL upgrade, aiming at improved amplitude and time resolution with HL-LHC. (Bachelor project, *viva voce* examination)
4. **Kervyn, X.** (Dec. 2021) Measure and characterisation of the impact of non-perfect nulls on the detectable planet population by LIFE, based on different stellar and planetary properties. (Semester project, *viva voce* examination)

CONFERENCES, SCHOOLS AND WORKSHOPS ATTENDED (scheduled)

1. (Jul. 2023) **Strings 2023**, Perimeter Institute, Canada (remote)
2. (Apr. 2023) **Eurostrings 2023**, Gijon, Spain
3. (Apr. 2023) **Intersections of String Theory and QFT III**, King's College London, UK
4. Apr. 2022. **Young Physicists Forum 2022**, ETH Zürich, Switzerland

TEACHING

Science Tutor (volunteer)	2022 – 2023
<i>Village Book Builders</i>	(remote)
<ul style="list-style-type: none">• 1:1 weekly tutoring sessions with a child in Uganda. Helping with mathematics, physics and English.• VBB fights inter-generational poverty in low-income countries and prevents dropout rate at school.	

EMPLOYMENTS

Recovery Team Leader	2020 – 2021
<i>EPFL Rocket Team</i>	Lausanne, Switzerland
<ul style="list-style-type: none">• Managed a team of 10 students, coordinated the project with other subsystems (approx. 8h/week).• Test / manufacturing procedures; parachutes, altimeter and ejection system design and confection.• Design of the drogue chute for the 'Bella Lui II' rocket: 1st place at the EuRoc competition in Portugal in the fall 2021, 2nd at the Spaceport America Cup (category SRAD-10K) in the summer 2021.	

SPECIFIC SKILLS

Languages: French (native speaker), English (C2 proficiency), German (B1-B2 proficiency)

Theoretical and Mathematical Physics: relevant coursework includes so far

- General Relativity, Black Holes, Solitons Instantons and Geometry, Gauge/Gravity Duality;
- (Advanced) Quantum Field Theory, Symmetries Particles and Fields, String Theory, SUSY;

Programming: C++ (OOP), Python (NumPy, Pandas, Matplotlib, Seaborn, Plotly.express, SciPy)

Data Analysis: Python (advanced), MATLAB (intermediate), Microsoft Excel (elementary)

Scientific work: \LaTeX , 3+ years of experience in writing scientific reports, Mathematica

AWARDS, GRANTS & SCHOLARSHIPS

Annual scholarship – <i>Swiss Study Foundation</i>	2022
CHF 20'000 awarded for Masters studies at the University of Cambridge	
Scholarship – <i>Colbianco Stiftung</i>	2022
CHF 2'000 awarded for Masters studies at the University of Cambridge	
Scholarship – <i>e-fellows.net</i>	2022
Admitted to the career and student network due to my results and extracurricular commitment	
Fellowship – <i>Swiss Study Foundation</i>	2022
The SSF supports outstanding students willing to contribute to science and society	
Swiss Mobility Program scholarship – <i>EPF Lausanne</i>	2021
CHF 1'500 awarded due to my results to pursue my studies at ETH Zurich	
Baccalaureate Merit Award – <i>Région Provence-Alpes Côte d'Azur</i>	2019
€400 awarded for achieving the highest distinction at the French Baccalaureate	
Prix Maupassant de la Jeune Nouvelle – <i>AMOPA 05</i>	2016
Literary prize	

ACADEMIC REFERENCES

- **Dr. Prahar Mitra** (*Part III essay setter*). Office B0.02, Department of Applied Mathematics & Theoretical Physics, University of Cambridge, Wilberforce Road, Cambridge CB3 0WA, UK.
Email: pm729@damtp.cam.ac.uk
- **Dr. Simone Pigazzini** (*CERN supervisor*). Office 32 2-C24, Institut für Teilchen- und Astrophysik, ETH Zürich, 23 Route de Meyrin, CH-1211 Genève, Switzerland.
Email: simone.pigazzini@cern.ch. Phone: +41 22 767 63 19
- **Prof. Matthias Gaberdiel** (*Lecturer for Quantum Mechanics I*). Office HIT K 23.1, Institut für Theoretische Physik, ETH Zürich, Wolfgang-Pauli-Str. 27, CH-8093 Zürich, Switzerland.
Email: gaberdim@ethz.ch. Phone: +41 44 633 25 82
- **Prof. Stephan Brunner** (*Lecturer for Mathematical Methods for Physicists*). Office PPB 312, Swiss Plasma Center Theory Group, Station 13, EPF Lausanne, CH-1015 Lausanne, Switzerland.
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