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asoudais

Adrien Soudais

Post-doctoral researcher in high-energy astrophysics, specializing in numerical simulations of relativistic magnetospheres

Current position

ATER, Institut de Planétologie et d'Astrophysique de Grenoble (IPAG), Grenoble **September 2024 — present**

- ➜ Temporary Teaching Researcher assistant
- ➜ $\sim$ 90 hours of teaching duty: Electromagnetism: 64h of tutorials for 2^{nd} year of Bachelor - Classical mechanics I and II: 10.5h (tutorials I) + 16.5h (practicals II) for 1^{st} year of Bachelor

Research experience

ATER, Institut de Planétologie et d'Astrophysique de Grenoble (IPAG), Grenoble **September 2024 — present**

- ➜ Topic: Hybrid numerical simulations of black hole magnetospheres

Ph. D., Institut de Planétologie et d'Astrophysique de Grenoble (IPAG), Grenoble **September 2021 — August 2024**

- ➜ Topic: Hybrid numerical simulations of relativistic magnetospheres
- ➜ Supervisor: Benoît Cerutti

Research internship, IPAG, Grenoble **March — July 2021**

- ➜ Topic: Numerical simulation of pulsar magnetosphere
- ➜ Supervisor: Benoît Cerutti

Research internship, IPAG, Grenoble **July 2020**

- ➜ Topic: Nature of the high-energy emission of X-ray binaries: GX 339-4
- ➜ Supervisors: Pierre-Olivier Petrucci, Samuel Barnier

Research internship, IPAG, Grenoble **June — July 2019**

- ➜ Topic: Water in stars: collisions and radiative transfer. Modelling the water emission in stellar environments.
- ➜ Supervisor: Alexandre Faure

Publications (1 refereed, 1 proceedings)

1. **Soudais**, **A.**, Cerutti, B. & Contopoulos, I. Scaling up global kinetic models of pulsar magnetospheres using a hybrid force-free-PIC numerical approach. *A&A* **690,** A170 (2024).
2. **Soudais**, **A.** & Cerutti, B. *A hybrid numerical approach to model pulsar magnetospheres* in *SF2A-2022: Proceedings of the Annual meeting of the French Society of Astronomy and Astrophysics. Eds.: J. Richard* (eds Richard, J. *et al.*) (Dec. 2022), 53–56.

Education

Ph. D., Institut de Planétologie et d'Astrophysique de Grenoble (IPAG), Grenoble **2021 — 2024**

Master 2 in Astrophysics, Université Grenoble Alpes, Grenoble **2020 — 2021**

Magistère of Fundamental Physics, Université Grenoble Alpes, Grenoble **2018 — 2021**

- Post-graduate program

Master 1 in Fundamental physics, Université Grenoble Alpes, Grenoble **2019 — 2020**

Bachelor in Physics and Chemistry, Université Grenoble Alpes, Grenoble **2018 — 2019**

Preparatory school, Lycée Dumont d'Urville, Toulon **2016 — 2018**

- Preparatory school for the competitive examinations at the entrance of France's top engineering schools

Conferences and workshops (non-exhaustive)

Highlight talk, 31st Texas Symposium on Relativistic Astrophysics **September 2022**
Les Houches Summer school, Plasmas in extreme environments: from astrophysics to the laboratory **May 2023**
Talk, APS-DPP Anual Meeting **November 2023**
Talk, EAS (European Astronomical Society) **July 2023**
Talk, PCTS/PGI, Princeton **April 2023**
Workshop talk, Lorentz Center, Modeling Plasmas Around Black Holes **September 2023**

Projects

ZAAPy **2023 — to date**

- Python package for the *Zeltron* code. This package allows a quick 2D visualization of *Zeltron* simulations in flat and curved-spacetime.

Geodesics and photon curvature **April 2020**

- Numerical project in Python. Solving photon trajectories in a Schwarschild metric.

Education & Outreach experience

Teaching **2022—2023**

- Taught 74 hours of lectures and tutorials in geometric optics, 25 students/year for their 1^{st} year of bachelor

Outreach, Observing nights, **2022—2024**

- Animated public sessions of astronomy $\sim$ 2-3 hours/night, 2-3 nights/year

Outreach, Member of the organization committee of IPAG's PhD day **2022—2024**

- Yearly meeting (with catering) showcasing each PhD candidate's work to the whole lab

Student supervision **December 2021, 2023, 2024**

- Supervised two ninth-grade students

Skills

Programming Fortran, Python, Message-Passing Interface (MPI), HTML, CSS
High-performance computing (HPC) 8 millions CPU hours
Miscellanous LaTeX, Bash, git, GIMP
Tools Libre Office and Microsoft applications, communication tools
Driving license
French Native speaker
English Fluent
German Basic knowledge

Interests

- Bouldering, climbing, hiking
- Table tennis (10 years)
- Drums
- Board games, puzzles