

SALOMON GUINCHARD

<https://salomon73.github.io> | Up to December 10, 2023

PERSONAL INFORMATIONS

Full name: Salomon Jacques Jean Guinchard

Date and place of birth: December 12, 1999, Besançon (France)

Citizenship: French

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E-mail: salomon.guinchard@orange.fr

Spoken languages: French (Mother tongue) - English (Fluent) - Spanish (Conversational) - German (Basics) - Russian (Basics)

EDUCATION

Princeton University - Princeton Plasma Physics Laboratory

Feb 2023 - Aug 2023

Visiting researcher

Ecole Polytechnique fédérale de Lausanne

2021 - 2023

Master of Science in theoretical physics

Ecole Polytechnique fédérale de Lausanne

2017 - 2021

Bachelor of Science in physics

Lycée Saint-Ambroise Chambéry

2014 - 2017

Baccalauréat scientifique

Grade: 17.31/20 (With honor)

EXPERIENCE

Ecole Polytechnique Fédérale de Lausanne

Sept. 2021 - Jul. 2022

Thermodynamics Notebook programmer

Lausanne (Switzerland)

- **Aim:** provide additional resources for physics courses at EPFL.

Ecole Polytechnique Fédérale de Lausanne

Sept. 2021 - Jan. 2023

Teaching Assistant - Physique avancée I

Lausanne (Switzerland)

- Help first year of Physics Bachelor students solve their physics exercises.
- Help deepen their understanding of the subject during Q&A sessions.

Ecole Polytechnique Fédérale de Lausanne

Jan. 2021 - July 2021

Teaching Assistant - Physique avancée II

Lausanne (Switzerland)

- Help first year of Physics Bachelor students solve their thermodynamics exercises.
- Help deepen their understanding of the subject, and improve their intuition.

Ecole Polytechnique Fédérale de Lausanne
Partial differential equations Notebook Programmer

Jan. 2021 - July 2021
Lausanne (Switzerland)

- Programming of a Jupyter Notebook implementing partial differential equations.
- Visual modelisation of heat diffusion in different physical systems.
- Visual modelisation of Turing Patterns arising from Reaction-Diffusion models.
- **Aim:** provide additional resources for physics courses.

Ecole Polytechnique Fédérale de Lausanne
Teaching Assistant - Analyse avancée I

Sept. 2019 - Jan. 2020
Lausanne (Switzerland)

- Help first year of Physics Bachelor students solve their mathematical analysis exercises.
- Help deepen their understanding of the subject during Q&A sessions.

PUBLICATIONS

S. Guinchard, W. Sengupta, S. Hudson, *Application of Lagrangian techniques for calculating the on-axis rotational transform*, To be submitted on ArXiv, Dec. 2023.

G. Le Bars, S. Guinchard, P. Kaminski, et al., *Fennecs: A novel particle-in-cell code for simulating the formation of magnetized non-neutral plasmas trapped by electrodes of complex geometries*, Computer Physics Communications, Aug. 2023, Submitted

UNPUBLISHED WORKS RELATED TO MY STUDIES

Effect of magnetic axis torsion and magnetic surfaces ellipticity on the rotational transform and the magnetic shear - Jan. 2022 - Supervised by A. Baillod and J. Loizu

Dependence of quasi-helical symmetry and quasi-axisymmetry on magnetic axis torsion and magnetic surfaces ellipticity - June 2022 - Supervised by A. Baillod and J. Loizu

Numerical study of the effect of secondary electron emission on the dynamics of electron clouds in gyrotron guns - Jan. 2023 - Supervised by G. Le Bars and J. Loizu

Stellarator design and optimization: A novel approach based on variational principles - Aug. 2023 - Master's thesis - Supervised by S. Hudson, J. Loizu and J.P. Hogge - GPA 6.0/6.0

CONFERENCES

S. Guinchard, W. Sengupta, S. R. Hudson, *Application of Lagrangian techniques for calculating the on-axis rotational transform*, To be presented at the 50th EPS conference on Plasma Physics, Jul. 2024.

S. Guinchard, W. Sengupta, S. R. Hudson, *Application of Floquet theory to on-axis rotational transform computation*, SPECTaculars meetings, online invited talk, Nov. 08, 2023.

S. Guinchard, S. R. Hudson, W. Sengupta, E. J. Paul, *Lagrangian techniques and on axis rotational transform - Vacuum field energy for coil design*, Seminar given at Columbia University, Aug. 01, 2023.

A. Baillod, S. Guinchard, J. Loizu, J. P. Graves, *Equilibrium β -limit in a quasi-axisymmetric stellarator with self-consistent bootstrap current*, Simons Collaboration on Hidden Symmetries and Fusion Energy Meeting, Princeton (NJ), USA, 2023.

S. Hudson, S. Guinchard, E. Paul, W. Sengupta, C. Aderson, *Minimizing the magnetic energy with prescribed on-axis rotational transform*, SPECTaculars meetings, online talk, May 24, 2023.

G. Le Bars, S. Guinchard, J.-P. Hogge, et al., *FENNECS: A flexible code to simulate non-neutral plasmas trapped in penning-like annular potential wells*, in 49th EPS Conference on Plasma Physics, EPS 2023, Publisher: European Physical Society (EPS), Bordeaux, France, 2023.

PRIZES AND AWARDS

Gilbert Haussmann award

Sept. 2024

Nominated - pending result

EPFL (Lausanne)

- Meant to award a deserving graduate or PhD. student in the field of physics. Pending result, nominated in Oct. 2023 for 2024.

SKILLS

Analytics and synthesis skills

Strong abilities to analyse and synthetise results (as a former EPFL student).

Physical fields

Plasma physics, quantum physics, astrophysics.

Mathematical fields

Real & complex analysis, optimal transport, topology, group theory.

Typesetting Document

LaTeX, Beamer LaTeX, Office.

Programming

C++, FORTRAN, Python, Bash, Matlab and Mathematica.

Plasma physics related codes

SPEC, Simsopt, BoozXforms.

Tools

MPI, OpenMP, SLURM, Git.

EXTRACURRICULAR ACTIVITIES

Ecole de Musique de Lausanne - EML

2019 - 2023

Pianist student

Lausanne (Switzerland)

- I attended the Music School of Lausanne as a pianist (second cycle), in the class of Galina Lagresle.
- In 2020, I passed the first-cycle exam with distinction (Très bien) and am currently preparing the second-cycle exam.

SSA EPFL

Jan. - July 2021

Team member

Lausanne (Switzerland)

- Part of the conception of a portative camera tracking satellites and polluting spatial debris

AI4 Mars - JPL (NASA)

March - May 2020

Photo/data analyst

- Photo/data analysis from the rover Curiosity for Hiro Ono - NASA Jet Propulsion Laboratory, in order to apply machine learning to the rover Perseverance

Aix-Savoie Triathlon

2015 - 2017

*Member of the local triathlon club**Aix les Bains (France)*

- Participated in competitions

OTHER INTERESTS

Music

Classical and Jazz music enthusiast.

Endurance sports

Cycling, Triathlon, Swimming, Ski-Touring and Trail.

Promote environmental awareness**Reading**

Jack London and Boris Vian's works particularly speak to me.

Physics and MathematicsNuclear fusion, Quantum physics, Astrophysics,
High critical-temperature superconductors, Fractals
Optimal transport.**OTHER PROFESSIONAL EXPERIENCES**

Chantier Marée Haute

Oct. 2023

*Stratifier for a shipyard**Concarneau (France)*

- Sanding and stratification of the hull of fishing trawlers for a shipyard.

Atelier Alter-Ego

July 2018 - August 2018

*Market research for a real estate development company**Aix-les-Bains (France)*

- Real estate market research in Aix les Bains and Chambéry areas.

Atelier Alter-Ego

July 2017

*Painter**Aix-les-Bains (France)*

- Painting of the outsides and facades of a renovated 19th century mansion.

ABM TP

July 2016

*Demolition worker**Aix-les-Bains (France)*

- Dismantling of all interiors of a 19th century mansion.

Charpente Contemporaine

June 2015

*Carpentry worker**Grenoble (France)*

- 2 weeks summer internship in a carpentry company.
- Building wooden houses frames and working on construction sites.

Restaurant Atmosphère

January 2014

*Commis chef**Le Bourget du Lac (France)*

- 2 weeks internship as a commis chef in a 1 Michelin star restaurant.