Armand LECLERC

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Education

Ecole Normale Supérieure de Lyon **September 2019 – August 2021**

Master in Theoretical Physics (grade of 16.7/20, "Très bien")

Relevent Coursework followed:

- Nonlinear physics and instabilities
- General relativity and cosmology
- Advanced aspects of symmetries
- Topological phases
- Large deviation theory
- Interacting quantum fields
- Phase transitions and critical phenomena
- Advanced statistical mechanics
- Path integrals and applications
- Green's functions
- Nuclear physics
- Advanced quantum mechanics
- Dynamical systems and chaos
- Nonlinear dynamics and statistical theories for geophysical flows
- Condensed matter
- Tensors, geometry and general relativity
- Astrophysics
- Introduction to particle physics
- Quantum Field Theory
- Supraconductivity
- Symetries and groups

Ecole Normale Supérieure de Lyon **September 2018 – June 2019**

Degree in Physics (Mention: "Très Bien")

Relevent Coursework followed:

- Theoretical mechanics and special relativity
- Mathematical methods
- Atoms, molecules and bonds
- Statistical thermodynamics
- Electromagnetism

Victor Hugo High School **September 2015 – June 2018**

CPGE attestation (Top of the class)

Content:

- Three-year training in Physics, Mathematics and Chemistry
- Success at the competition to enter the ENS de Lyon

Research experience and Projects

Current: PhD Project **2022-2025**

- My PhD project aims at establishing a link between Condensed matter theoretical tools, and astrophysical wave problems and instabilities. We find that symmetries, degeneracies and topological properties can be extracted and used to make new predictions of waves and perturbations of peculiar properties in astrophysical contexts.
- Experience gained: scientific papers writing, scientific poster presentations, participated in international conference and workshops.

5-month Internship (University of Exeter): **March 2022-July 2022**

- numerical study of MUSIC simulations of the Sun, under the direction of Isabelle Baraffe.
- study of g-modes excitation by overshooting convective plumes.

6-month Internship (CRAL, Lyon): Topological properties of convection **Sept.2021-Feb.2022**

- Generalized the problem of asteroseismo-topology to the problem of stellar convection.
- Derived analytical results on the non-hermitian topological properties of the problem.

5-month Internship (Obs. de Strasbourg): Instabilities in anisotropic galaxies **Summer 2021**

- Numerical study of instabilities in anisotropic spheroidal galaxies.
- Built new functions on existing code to study more general profiles of anisotropies.

3-month Internship (CRAL, Lyon): Asteroseismo-topology **Summer 2020**

- Bringing the tools of topological physics from condensed matter to the astrophysics domain of asteroseismology.
- Developed both analytical and numerical tools for analysis of the topological mode in the wave problem.

International Physics Tournament **2019-2020**

- Participation with a team of 10 students to the IPT, learn to work as a team.
- Confrontation to two open questions, and work the bibliography, theoretical model and experimental confirmations (worked on non-circular vortex rings and optical compass).

2-month Internship (ILM, Lyon): Quantum Dots on ferroelectric crystals **Summer 2019**

- Study of the interaction of nano-objects and ferroelectric crystals.
- Practiced my skills experimental optics, clean room, Scanning Electron Microscope, and data processing.

Laboratory Project (ENS de Lyon Physics Laboratory) : Quantum Circuits **March 2019**

- Developed a method of electronic litography with a SEM, learned to handle the SEM and its software.

Other skills and interests

Languages written and spoken

- French, natural speaker
- English, C1 (Cambridge Advanced English attestation)

Extracurriculars

- Travels: UK (England and Scotland multiple times, week-long bike trip in Southern Ireland), biking trip in the Loire region, and others in Europe
- Music: practiced the drums since I was 10, played in bands. Also go regularly to concerts and festivals.
- Cooking: I take cooking lessons.