KOROLEV Magali

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Second year of master physics student.
Main fields of interest : quantum physics, statistical physics, condensed-matter physics.

Education

- **International Centre for Fundamental Physics – ICFP-ENS** Sept. 2022 – July. 2024
  Master's Degree – École Normale Supérieure *Paris, France*
  Prestigious degree that is specifically intended for outstanding French and international students wishing to obtain a first-class education in fundamental physics with an immersion in an advance research ecosystem.

- **Licence Parcours Spécial Physique** Sept. 2019 – July. 2022
  Bachelor's Degree – Université Paul Sabatier *Toulouse, France*
  Selective and highly rigorous physics major/mathematics minor Bachelor's degree at Paul Sabatier University aimed towards research. Highest honors (17.81/20 in L1, 17.29/20 in L2, 18.30/20 in L3).

- **Baccalauréat S SVT spé maths section européenne** Sept. 2015 – July. 2018
  High school – Lycée René Char *Avignon, France*
  Scientific high school degree in biology, geology, physics, chemistry and mathematics, with additional electives in English (*section européenne*) and majoring in mathematics (*spé maths*). Highest honors (18.28/20).

Research Experience

- **Charge fractionalization in quantum wires** Jan. 2024 – July. 2024
  Internship supervised by LE HUR Karyn *Centre de Physique Théorique, École Polytechnique*
  Research internship on the theory of charge fractionalization in quantum wires (1D), exploration of bipartite fluctuations and other probes by exact calculation and numerical work using DMRG (*Density Matrix Renormalization Group*). Key-words : Bosonization, Luttinger liquids, statistical physics, many-body correlated systems, topology.

- **Random graphs of tuneable spectral dimension** Feb. 2023 – July. 2022
  Internship supervised by GONG Jiangbin, LEMARIÉ Gabriel *Centre for Quantum Technologies, NUS, Singapore*
  Research internship, study of random graph models with continuously tuneable spectral dimension, and application to phase transitions with an emphasis on the Anderson transition. Key-words : random graphs, complex networks, disorder, Anderson localization, critical phenomena.

- **Quantum chaos** Oct. 2022 – Dec. 2022
  Tutored research project supervised by ARON Camille *LPENS, École Normale Supérieure, France*
  Bibliographical research project on quantum chaos. Key-words : Berry-Tabor and BGS conjectures, Gutzwiller Trace Formula, Random Matrix Theory.

- **Strongly correlated electrons systems** Febr. 2022 – June. 2022
  Internship supervised by BACKES Steffen *CPHT, École Polytechnique and RCAST, University of Tokyo*
  Investigation of the complicated interacting many-body problem and strongly correlated systems with the Dynamical Mean-Field Theory. Key-words : quantum, solid-state and condensed-matter physics (2nd quantization, Green's functions, Hubbard and Ising models, Anderson impurity model & DMFT).

- **Quantum chaos** June. 2021 – July. 2021
  Internship supervised by GEORGEOT Bertrand *LPT, Toulouse, France*
  Introduction to chaos theory; study of the classical and quantum kicked rotator. Key-words : quantum and semi-classical physics, chaos, Anderson localization.

- **Quantum Computation and Quantum Information** Febr. 2021 – May. 2021
  Tutored research project supervised by MARTINS Cyril *LCPQ, Toulouse, France*

  Key-words : quantum mechanics, algebra, Josephson junction, quantum computers, q-bits, quantum teleportation.

Talks

- **Diffusion in random graphs** Jul. 2023
  International workshop on disordered and glassy systems *MajuLab, Centre for Quantum Technologies, Singapore*

  40 mins talk on "Models of random graphs with a tunable dimension as a toy model for the study of critical phenomena"

Teaching Experience

- **Higher education** 2020 – Present
  Tutor in mathematics and physics for 1st year University students since 2020 and for 2nd year University students since 2021 in mathematics (linear algebra, calculus) and physics (classical and quantum). Sometimes I give "khôlles" to students in "classe prépa" (MPSI, PCSI, CUPGE).

- **Secondary education** 2018 – Present
  Private instructor for middle school and high school students in mathematics, physics, chemistry and biology.

Languages

- **Programming**
  Python, Maple, Mathematica/Wolfram language, LaTeX

- **Spoken Languages**
  French: Native (C2); **English**: Fluent (C1); **German**: Proficient (B2); **Russian**: Elementary (A2)

Social Engagement – Volunteering

- **AEST - Amicale des Etudiants en Sciences de Toulouse** Sept. 2020 – June. 2021
  Volunteer for the sciences students of Toulouse (FR) oranization

- **La Croix Rouge - The French Red Cross** May. 2020 – Oct. 2020
  Volunteer for the local group of the French Red Cross in Toulouse (FR)

- **ESN - Erasmus Students Network** 0ct. 2018 – May. 2019
  Volunteer for the Erasmus and foreign students organization : local group of Strasbourg (FR) from Oct. 2018 to Jan. 2019, local group of Mainz (DE) from Apr. 2019 to May. 2019

- **Greenpeace** Oct. 2018 – Jan. 2019
  Volunteer for the local group of Greenpeace in Strasbourg (FR)

- **ADEM - Amicale des Etudiants en Mathematiques** Oct. 2018 – Jan. 2019
  Volunteer for the maths students of Strasbourg (FR) organization

Other

- **Extra-curricular activities / hobbies**
  Drawing, painting, judo, gymnastics, theatre, traveling.

- **Gap year** 2018 – 2019
  Gap year spent to find myself : I wanted to mature and experience the world before going to University so I spent the year traveling, working, volunteering, self-teaching how to paint, draw, sew, perfecting my English and my German and following introductory classes in biology, geology, maths and physics online.