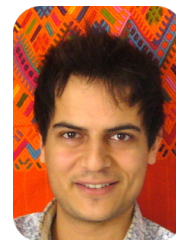


Louis Garrigue

*Postdoctoral researcher
in mathematical physics*

École des ponts
✉ louis.garrigue@enpc.fr
📁 cermics.enpc.fr/~garrigul



Positions

Sept 2020 – **Postdoc**, *Cermics*, in the team of Éric Cancès.

Education

2017 – 2020 **Doctorate in mathematical quantum physics**, *university Paris-Dauphine*, supervised by Mathieu Lewin, on mathematical aspects of Density functional theory.

Referees: Xavier Blanc and Robert Seiringer

2016 – 2017 **Master's degree in fundamental mathematics**, *university Paris-Diderot*.

2014 – 2016 **Master's degree in theoretical physics**, *École normale supérieure*.

2012 – 2017 **Student and civil servant at the École normale supérieure**.

Preprints

[7] L. Garrigue. Mixed state representability of entropy-density pairs (arxiv:2203.16441), preprint (2022).

[6] É. Cancès, L. Garrigue, D. Gontier. Second-order homogenization of periodic Schrödinger operators with highly oscillating potentials (arxiv:2112.12008), preprint (2021).

Publications

[5] L. Garrigue. Building Kohn-Sham potentials for ground and excited states (arxiv:2101.01127), *Archive for Rational Mechanics and Analysis* (2022).

[4] L. Garrigue. Some properties of the potential-to-ground state map in quantum mechanics (arxiv:2012.04054), *Communications in Mathematical Physics* (2021).

[3] L. Garrigue. Unique continuation for many-body Schrödinger operators and the Hohenberg-Kohn theorem. II. The Pauli Hamiltonian (arxiv:1901.03207), *Documenta Mathematica* (2020).

[2] L. Garrigue. Hohenberg-Kohn theorems for interactions, spin and temperature (arxiv:1906.03191), *Journal of Statistical Physics* (2019).

[1] L. Garrigue. Unique continuation for many-body Schrödinger operators and the Hohenberg-Kohn theorem (arxiv:1804.07564), *Mathematical Physics, Analysis and Geometry* (2018).

Contributed talks

Apr 11, 2022 **Seminar of mathematical physics**, *Fourier institute, Grenoble*.

Mar 21, 2022 **Seminar of mathematical physics**, *Mathematics institute of Bourgogne, Dijon*.

Mar 7, 2022 **Seminar of spectral theory**, *Institut Henri Poincaré, Paris*.

Jan 12, 2022 **Quantum N -body problem GDR, 3rd meeting**, *online*.

Sep 17, 2021 **Seminar on mathematical modelling, analysis and simulation of molecular systems (MOANSI)**, *Gamm group, led by Benjamin Stamm, Gero Friesecke and Reinhold Schneider*.

- Aug 6, 2021 **International congress on mathematical physics**, Geneva, Switzerland.
- Jun 14, 2021 **Seminar on multiscale problems in mathematical physics**, Angers, France.
- Mar 31, 2021 **Seminar of mathematical physics of the Centre for theoretical physics of Toulon**, Toulon, France.
- Mar 3, 2021 **Seminar of the laboratory of mathematics of the university of Bourgogne**, Dijon, France.
- Sep 15, 2020 **Conference Algorithms in Quantum Molecular Dynamics**, CIRM, Marseille, France.
- Sep 15, 2020 **Seminar of the laboratory of mathematics of Marseille**, France.
- Nov 21, 2019 **Seminar on Lie theory, geometry and analysis**, universit  de Lorraine, Metz, France.
Unique continuation and new Hohenberg-Kohn theorems.
- Oct 24, 2019 **The analysis of complex quantum systems**, CIRM Marseille, France.
New Hohenberg-Kohn theorems in statistical physics.
- Sep 22, 2019 **Density functionals for many-particle systems**, university of Singapore.
New Hohenberg-Kohn theorems.
- Apr 18, 2019 **PDE seminar of the laboratory of mathematics of Versailles**, France.
Strong and measure unique continuation for many-body Schr dinger's equation.
- Jan 28, 2019 **Optimal transport methods in Density functional theory**, Banff research station, Canada.
Unique continuation for the Hohenberg-Kohn theorem.
- Jul 20, 2018 **Young researchers symposium of ICMP**, Montr al, Canada, satellite event of the International congress of mathematical physics.
Contributed talk on unique continuation for many-body Schr dinger operators and the Hohenberg-Kohn theorem.
- Jul 9, 2018 **Conference on DFT with magnetic potentials**, Oslo, Norway.
Unique continuation for the Hohenberg-Kohn theorem.

Teaching

- Feb 2022 – Jun 2022 **Personal projects**,  cole des ponts.
Presentation and management of a numerical project, coded by the students (first year, equivalent to L3)
- Sep 2017 – Jun 2020 **Tutorials of exercices**, university Paris-Dauphine.
Sessions of exercices in analysis (L2), linear algebra (L1) and optimization (M1)
- Sep 2017 – Jun 2020 **Physics for all**,  cole normale sup rieure.
Three lectures for the class "Physics for all", addressed to students of the ENS in humanities. Special relativity II (applications), cosmology, particle and high energy physics. Notes at akrajenbrink.weebly.com/teaching.html
- 2016 – 2017 **Oral interrogations**, college Stanislas, in mathematics, to train students for competitive examinations for entrance in grandes  coles.

Research interships

- Jan – Feb 2016 **Vaccums of a supersymmetric theory**, laboratory of theoretical physics of the ENS, Paris, supervised by Jan Troost.
Seiberg-Witten theory and solving the structure of inequivalent vaccums of the supersymmetric $\mathcal{N} = 1^*$, $SU(4)$ theory.
- Feb – Jul 2015 **Cosmology**, Berkeley's laboratory of cosmology, USA, supervised by Robert Cahn.
Development and implementation of the algorithm of the assignment of fibers of the telescope to sky objects for the DESI project (dark energy spectroscopic survey), continued and used in the experiment. First light in 2019.

Jun 2013 **Quantum electrodynamics in cavity**, *laboratory Kastler-Brossel ENS, Paris*, supervised by Igor Dotsenko.
Sampling quantum measurements after time reversal of a Rydberg atom/photon system in cavity.

Miscellaneous

July – August 2015 **Internship in a consular scientific service**, *Consulate General of France in San Francisco, USA*, with Philippe Perez.
Meetings with researchers of Berkeley laboratories in climate science. Redaction of reports on Californian climatology research for the Cop 21.

2009 **French mathematical olympiad**, *second prize of the region Auvergne*.

Reviewer for **Journal of Mathematical Physics, AMS**
journals

Coding Julia, Python, C++, Javascript

Participation to conferences

Jan 9-13, 2023 **The analysis of relativistic quantum system**, *Cirm, Marseille*.

Jun 13-18, 2022 **Mathematical Challenges in Quantum Mechanics**, *Como, Italy*, workshop and summer school.

Mar 28 - Apr 1, 2022 **Advancing quantum mechanics with mathematics and statistics, workshop 1: multiscale approaches in quantum mechanics**, *IPAM UCLA, Los Angeles*.

Feb 23-25, 2022 **Quantum Dynamics GDR, 14th meeting**, *Toulouse, France*.

Jan 10-13, 2022 **Quantum N -body problem GDR, 3rd meeting**, *online*.

Sep 16-17, 2021 **Moansi annual meeting**, *Gamm group, led by Benjamin Stamm, Gero Friesecke and Reinhold Schneider*.

Aug 25-27, 2021 **Solid Math 2021**, *École des ponts, France*.

Oct 27-29, 2021 **Congress of young researchers in applied mathematics**, *École polytechnique, France*.

Aug 2-7, 2021 **International congress on mathematical physics and Young researchers symposium**, *Geneva, Switzerland*.

Jun 14-16, 2021 **Seminar on multiscale problems in mathematical physics**, *Angers, France*.

May 17-28, 2021 **SIAM conference on mathematical aspects of material science**, *Bilbao, Spain*, online.

Mar 10-12, 2021 **Quantum Dynamics GDR, 13th meeting**, *Dijon, France*, online.

Feb 8-12, 2021 **Quantum N -body problem GDR, 2nd meeting**, *online*.

Sep 14-18, 2020 **Algorithms in Quantum Molecular Dynamics**, *Cirm, Marseille, France*.

Sep 2-4, 2020 **New horizons in density functional theory**, *online*, Faraday discussions workshop.

Feb 5-7, 2020 **Quantum Dynamics GDR, 12th meeting**, *Strasbourg, France*.

Jan 8-10, 2020 **Quantum N -body problem GDR, 1st meeting**, *Lille, France*.

Oct 21-25, 2019 **The analysis of complex quantum systems : large Coulomb systems and related matters**, *CIRM Marseille, France*.

Sep 23-27, 2019 **Density functionals for many-particle systems : mathematical theory and physical applications of effective equations**, *institute for mathematical sciences, university of Singapore*.

- May 27-31, 2019 **Souriau 2019**, *University Paris-Diderot, France*, Conference in honour of Jean-Marie Souriau.
- Feb 13-15, 2019 **Quantum Dynamics GDR, 11th meeting**, *Bordeaux, France*.
- Jan 28- Feb 1st, 2019 **Optimal transport methods in Density functional theory**, *Banff research station, Canada*.
- Jul 20-28, 2018 **International congress on mathematical physics and Young researchers symposium**, *Montréal, Canada*.
- Jul 9-13 2018 **Seminar on DFT with magnetic potentials**, *Oslo, Norway*.
Entitled “Do electron current densities determine all there is to know ?”
- Feb 19-24, 2018 **Mathematical Challenges in Quantum Mechanics**, *Sapienza university, Roma, Italy*, workshop and winter school.
- May 31th-Jun 7th, 2017 **Density functional theory meets Optimal transport**, *Jyväskylä, Finland*, workshop.