

# LPENS



LABORATOIRE DE PHYSIQUE  
DE L'ÉCOLE NORMALE SUPÉRIEURE

*PhD theses defended  
since January 1<sup>st</sup> 2019*

## 180 PhD theses defended since the creation of the lab

27 defended in 2019  
24 defended in 2020  
25 defended in 2021  
29 defended in 2022  
40 defended in 2023  
35 defended in 2024

## Team *Nano-Optics*

2019

- **NICOLAS Louis**  
*High resolution spectroscopy of diamond color center ensembles for quantum optics experiments*  
PhD supervisor : Gabriel Hétet  
Defended on November 19, 2019  
<https://tel.archives-ouvertes.fr/tel-03185648>
- **DELORD-CARNAUT Tom**  
*Spin-mechanics with micro-particles levitating in a Paul trap*  
PhD supervisor : Gabriel Hétet  
Defended on November 26, 2019  
<https://tel.archives-ouvertes.fr/tel-03217243v2>
- **HABRANT-CLAUDE Théo**  
*Contrôle de l'émission dans la bande télécom O de nanotubes de carbone individuels couplés à une micro-cavité fibrée*  
PhD supervisor : Christophe Voisin  
Defended on November 18, 2019  
<https://theses.hal.science/tel-03876836>

2021

- **LE GOFF Romaric**  
*GHz infrared photodetectors based on van der Waals heterostructures*  
PhD supervisor : Emmanuel Baudin, Bernard Plaçais  
Defended on June 21, 2021

2022

- **PELLET-MARY Clément**  
*Cross-relaxation in dense ensembles of NV centers and application to magnetometry*  
PhD supervisor : Gabriel Hétet  
Defended on December 7, 2022  
<https://theses.hal.science/tel-04597582>
- **BOREL Antoine**  
*Contrôle de l'émission optique de centres colorés individuels greffés sur des nanotubes de carbone par une micro-cavité fibrée*  
PhD supervisor : Christophe Voisin  
Defended on October 13, 2022  
<https://theses.hal.science/tel-04538130v1>

## 2023

- **PERDRIAT Maxime**

*Angular Control of Levitated Magnetic Particles for Studies of Gyromagnetism at the Micro-Scale*

PhD supervisor : Gabriel Hetet

Defended on April 14, 2023

<https://theses.hal.science/tel-04478554v2>

- **AMARA Mohamed-Raouf**

*Optical spectroscopy of single perovskite nanocrystals for quantum photonics*

PhD supervisor : Carole Diederichs

Defended on January 6, 2023

<https://theses.hal.science/tel-04056841v1>

## 2024

- **SAID Zakaria**

*CQED effects with individual perovskite nanocrystals*

PhD supervisor : Carole Diederichs

Defended on December 19, 2024

- **THARRAULT Marin**

*Study of high-frequency photodetection mechanisms in 2D materials heterostructures*

PhD supervisor : Emmanuel Baudin

Defended on May 29, 2024

## Team *Mesoscopic Physics*

### 2019

- **MENSAH Kokoura**  
*Nucleic acid testing with graphene transistor arrays*  
PhD supervisor : Ulrich Bockelmann, Bernard Plaçais  
Defended on September 13, 2019  
<https://pastel.archives-ouvertes.fr/tel-02631689>
- **MONTANARO Alberto**  
*Study of graphene-based high frequency optoelectronic devices for optoelectronic mixing*  
PhD supervisor : Bernard Plaçais  
Defended on April 1, 2019  
<https://tel.archives-ouvertes.fr/tel-02614339>
- **GRAEF Holger**  
*Dirac fermion optics and plasmonics in graphene microwave devices*  
PhD supervisor : Bernard Plaçais  
Defended on September 19, 2019  
<https://tel.archives-ouvertes.fr/tel-02697984>

### 2021

- **LE GOFF Romaric**  
*GHz infrared photodetectors based on van der Waals heterostructures*  
PhD supervisor : Emmanuel Baudin, Bernard Plaçais  
Defended on June 21, 2021  
<https://theses.hal.science/tel-02697984>

### 2022

- **GOURMELON Alexandre**  
*Radiofrequency studies of topological edge states on HgTe (Mercure Telluride) quantum wells*  
PhD supervisor : Bernard Plaçais  
Defended on September 19, 2022
- **BARTOLOMEI Hugo**  
*Collision Experiments in Quantum Hall Conductors*  
PhD supervisor : Gwendal Fève  
Defended on March 29, 2022  
<https://theses.hal.science/tel-03828422>

### 2023

- **SCHMITT Aurélien**  
*Relativistic electrons under extreme electric fields : transport and optoelectronic signatures*

*in graphene*

PhD supervisor : Emmanuel Baudin, Bernard Plaçais

Defended on September 29, 2023

## 2024

- **SCHRAEDER Christian**

*Biosensing with Graphene Transistor Arrays*

PhD supervisor : Ulrich Bockelmann, Bernard Plaçais

Defended on April 26, 2024

- **RUELLE Mélanie**

*Time-domain braiding of anyons in quantum Hall conductors*

PhD supervisor : Gwendal Fève, Jean-Marc Berroir

Defended on December 10, 2024

## Team *Hybrid Quantum Circuits*

2019

- **CONTAMIN Laurianne**

*Revealing synthetic spin textures with transport and microwave measurements*

PhD supervisor : Takis Kontos

Defended on October 2, 2019

<https://tel.archives-ouvertes.fr/tel-02535710v1>

2024

- **NEUKELMANCE Benoit**

*Spin-photon interface and quantum gates for spins in carbon nanotube*

PhD supervisor : Takis Kontos

Defended on March 15, 2024

<https://theses.hal.science/tel-04719374v1>

- **THERY Arnaud**

*Hybrid magnonics for axion dark matter detection*

PhD supervisor : Takis Kontos

Defended on November 6, 2024

## Team *Quantic*

### 2020

- **LESCANNE Raphael**  
*Engineering multi-photon dissipation in superconducting circuits for quantum error correction*  
PhD supervisor : Zaki Leghtas  
Defended on February 20, 2020  
<https://tel.archives-ouvertes.fr/tel-03164025>

### 2023

- **BERDOU Camille**  
*Macroscopic bit-flip times in a two-photon dissipative oscillator*  
PhD supervisor : Zaki Leghtas  
Defended on March 14, 2023  
<https://theses.hal.science/tel-04235044v1>

### 2024

- **BORGOGNONI Alvise**  
*Mediating high-order photon-photon interactions by Cooper-pair pairing*  
PhD supervisor : Zaki Leghtas  
Defended on May 27, 2024
- **PRAQUIN Matthieu**  
*Mélange de signaux contra-propageants dans un dispositif Josephson à ondes progressives*  
PhD supervisor : Philippe Campagne-Ibarcq  
Defended on November 19, 2024
- **REGLADE Ulysse**  
*Quantum control of a cat-qubit with macroscopic bit-flip times*  
PhD supervisor : Zaki Leghtas  
Defended on June 17, 2024
- **VANSELOW Aron**  
*High-impedance superconducting circuits for the dissipative stabilization of four-component Schrödinger cat states*  
PhD supervisor : Philippe Campagne-Ibarcq  
Defended on July 25, 2024
- **LE REGENT François-Marie**  
*Méthodes analytiques et numériques pour l'optimisation des architectures de calcul quantique basées sur des qubits bosoniques stabilisés*



PhD supervisor : Mazyar Mirrahimi  
Defended on March 14, 2024

## Team *QUAD : Quantum Physics and Devices*

2019

- **ASGHARI Zahra**  
*High frequency optoelectronic devices in the mid infrared wavelength region*  
PhD supervisor : Carlo Sirtori  
Defended on March 22, 2019  
[http://theses.md.univ-paris-diderot.fr/ASGHARI\\_ZahraSadat\\_va2.pdf](http://theses.md.univ-paris-diderot.fr/ASGHARI_ZahraSadat_va2.pdf)
- **COSME Sébastien**  
*Superradiant infrared emitters*  
PhD supervisor : Angela Vasanelli  
Defended on February 12, 2019  
[http://theses.md.univ-paris-diderot.fr/COSME\\_Sebastien\\_2\\_complete.pdf](http://theses.md.univ-paris-diderot.fr/COSME_Sebastien_2_complete.pdf)
- **CALABRESE Allegra**  
*Optomechanical terahertz meta-atoms*  
PhD supervisor : Angela Vasanelli  
Defended on December 18, 2019

2021

- **BIGIOLI Azzurra**  
*Uncooled unipolar receivers for 9  $\mu\text{m}$  wavelength heterodyne detection*  
PhD supervisor : Carlo Sirtori  
Defended on February 2, 2021  
<https://theses.hal.science/tel-03696501>

2022

- **HAKY Andrew**  
*Semiconductor quantum plasmonics*  
PhD supervisor : Angela Vasanelli  
Defended on December 19, 2022  
<https://theses.hal.science/tel-04573769>

2023

- **BONAZZI Thomas**  
*Unipolar quantum devices for high-speed mid-IR optoelectronics on InP*  
PhD supervisor : Angela Vasanelli  
Defended on June 12, 2023  
<https://theses.hal.science/tel-04635855>

- **DANG-HUU Tung**  
*Light manipulation for enhanced photodetection performance and novel functionalities in colloidal nanocrystal-based infrared sensors*  
PhD supervisor : Angela Vasanelli  
Defended on September 27, 2023  
<https://theses.hal.science/tel-04573865>
- **DELY Hamza**  
*High throughput free-space data transmission at room-temperature in the mid-infrared using ultrafast unipolar devices*  
PhD supervisor : Carlo Sirtori  
Defended on March 27, 2023
- **DURUPT Laureline**  
*New Single-Mode Quantum Cascade Laser Architectures for Free-Space Optical Communications*  
PhD supervisor : Angela Vasanelli  
Defended on December 15, 2023

## 2024

- **BAHREHMAND Mohsen**  
*Charge-sensitive infrared phototransistor in a microcavity architecture for 9.5  $\mu\text{m}$*   
PhD supervisor : Yanko Todorov  
Defended on March 27, 2024
- **MARTIN Bruno**  
*Scaling limits in disordered Statistical Mechanics*  
PhD supervisor : Carlo Sirtori  
Defended on June 12, 2024
- **POLETTI Thomas**  
*Modulateur de phase et d'amplitude, et photonique intégrée pour les télécommunications en espace libre dans l'infra-rouge lointain*  
PhD supervisor : Carlo Sirtori  
Defended on March 7, 2024  
<https://theses.hal.science/tel-04630104v1>
- **SAEMIAN Mohammadreza**  
*Dispositifs quantiques haute vitesse pour la communication en espace libre à 4  $\mu\text{m}$*   
PhD supervisor : Carlo Sirtori  
Defended on May 28, 2024

## Team *Condensed Matter Theory*

2023

- **PHILIPPE Alwin**

*Theoretical study of electronic states and linear optical properties of superlattices, and thermionic cooling in heterostructures*

PhD supervisor : Francesca Carosella

Defended on July 21, 2023

## Team *Nano-THz*

### 2019

- **PISTORE Valentino**

*Modelocking of THz quantum cascade lasers: dispersion control and non-linearities*

PhD supervisor : Sukhdeep Dhillon

Defended on November 28, 2019

<https://tel.archives-ouvertes.fr/tel-03141220>

### 2020

- **KRIZMAN Gauthier**

*Magneto-optical study of topological phase transitions in  $Pb_{1-x}Sn_xSe$  alloys and their heterostructures*

PhD supervisor : Yves Guldner

Defended on October 2, 2020

<https://tel.archives-ouvertes.fr/tel-03271063>

- **HUANG Panhui**

*graphene-based devices for terahertz technology*

PhD supervisor : Juliette Mangeney

Defended on July 16, 2020

<https://theses.hal.science/tel-03593139>

- **MASSABEAU Sylvain**

*Optical and electronic properties of graphene quantum dots in the Terahertz spectral range*

PhD supervisor : Juliette Mangeney

Defended on November 24, 2020

<https://theses.hal.science/tel-03699753>

### 2021

- **HAWECKER Jacques**

*Terahertz time resolved spectroscopy of Intersubband Polaritons and Spintronic Emitters*

PhD supervisor : Sukhdeep Dhillon

Defended on June 30, 2021

<https://tel.archives-ouvertes.fr/tel-03470371>

- **VERGNET Hadrien**

*THz wave generation with two lamellar nanostructures: AlGaAs microcavities and PtSe<sub>2</sub> thin films*

PhD supervisor : Jérôme Tignon, Emmanuel Baudin, Sukhdeep Dhillon

Defended on December 3, 2021

<https://theses.hal.science/tel-03828521>

- **MESSELOT Simon**

*Terahertz Tamm cavities for light-matter coupling with graphene based materials*

PhD supervisor : Juliette Mangeney

Defended on December 16, 2021  
<https://theses.hal.science/tel-04277116v1>

## 2022

- **KERJOUAN Romaine**  
*Synchrotron-like THz emitters based on corrugated graphene*  
PhD supervisor : Robson Ferreira  
Defended on October 6, 2022
- **SONG Chao**  
*Ultrafast terahertz properties of ultra-thin metallic structures - from terahertz pulses to harmonic generation*  
PhD supervisor : Sukhdeep Dhillon  
Defended on September 27, 2022

## 2023

- **APRETNA Thibault**  
*HgTe nanocrystals and graphene quantum dots for THz optoelectronics : intraband absorption, carrier dynamics and coherent THz emission*  
PhD supervisor : Juliette Mangeney  
Defended on March 28, 2023  
<https://theses.hal.science/tel-04155941v1>
- **HEMMAT Minoosh**  
*the Layer-dependent optical properties of two-dimensional PtSe<sub>2</sub> for mid-infrared and terahertz photonics*  
PhD supervisor : Sukhdeep Dhillon  
Defended on November 24, 2023

## 2024

- **ABAJYAN Pavel**  
*Génération et Contrôle de Peignes de Fréquences Optiques dans les Lasers à Cascades Interbandes*  
PhD supervisor : Sukhdeep Dhillon  
Defended on February 29, 2024  
<https://theses.hal.science/tel-04557609v1>
- **BERMEJO ORTIZ Joaquin**  
*Topology, symmetry breaking, and valleys in IV-VI Dirac systems*  
PhD supervisor : Louis-Anne De Vaultier  
Defended on April 26, 2024

- **COEYMANS Solen**

*Graphene double quantum dots and hybrid resonators for THz quantum devices*

PhD supervisor : Juliette Mangeney

Defended on November 7, 2024

## Team *Physics of Fluctuations, Correlations and Information*

2019

- **GRANET Etienne**  
*Advanced integrability techniques and analysis for quantum spin chains*  
PhD supervisor : Jesper Jacobsen  
Defended on September 3, 2019  
<https://tel.archives-ouvertes.fr/tel-02308192>
- **KRAJENBRINK Alexandre**  
*Beyond the typical fluctuations: a journey to the large deviations of the Kardar-Parisi-Zhang growth model*  
PhD supervisor : Pierre Le Doussal  
Defended on June 20, 2019  
<https://tel.archives-ouvertes.fr/tel-02537219>
- **COUVREUR Romain**  
*Geometric lattice models and irrational conformal field theories*  
PhD supervisor : Jesper Jacobsen  
Defended on June 25, 2019  
<https://tel.archives-ouvertes.fr/tel-02569051>
- **JIN Tony**  
*From noisy spin chains to quantum exclusion processes: case studies of stochastic open quantum many-body systems*  
PhD supervisor : Denis Bernard  
Defended on September 25, 2019  
<https://tel.archives-ouvertes.fr/tel-02879969>

2020

- **ROBERTSON Niall**  
*Non-compact conformal field theory and lattice models — the open case*  
PhD supervisor : Jesper Jacobsen  
Defended on June 16, 2020  
<https://tel.archives-ouvertes.fr/tel-02909756>
- **WALTER Benjamin**  
*Field Theories for Stochastic Processes*  
PhD supervisor : Kay Wiese (codirector)  
Defended on April 1, 2020
- **LE PRIOL Clément**  
*Long range interactions in the avalanches of elastic interfaces*  
PhD supervisor : Pierre Le Doussal  
Defended on November 13, 2020  
<https://theses.hal.science/tel-03191605>



## 2021

- **GAUTIÉ Tristan**  
*Stochastic and quantum dynamics of repulsive particles: from random matrices to trapped fermions*  
PhD supervisor : Pierre Le Doussal  
Defended on November 4, 2021  
<https://theses.hal.science/tel-03884840>

## 2022

- **LAFAY Augustin**  
*Geometrical lattice models, algebraic spiders and applications to random geometry*  
PhD supervisor : Jesper Jacobsen  
Defended on September 12, 2022  
<https://theses.hal.science/tel-03966966v1>
- **TER BURG Cathelijne**  
*Measurements of the FRG fixed-point function and what we can learn from them*  
PhD supervisor : Kay Wiese  
Defended on March 25, 2022  
<https://theses.hal.science/tel-04497913v1>
- **MUKERJEE Gauthier**  
*The depinning transition of the quenched Kardar-Parisi-Zhang equation*  
PhD supervisor : Kay Wiese  
Defended on December 15, 2022

## 2023

- **CHERNYAK Dmitry**  
*Schur-Weyl duality and exact solvability of non-compact quantum lattice models*  
PhD supervisor : Jesper Jacobsen  
Defended on September 22, 2023
- **DIAZ Manuel**  
*Non-equilibrium theory of resistive switching in strongly correlated quantum materials*  
PhD supervisor : Denis Bernard  
Defended on February 21, 2023
- **GOURAUD Gabriel**  
*Dynamique hors équilibre et systèmes désordonnés*  
PhD supervisor : Pierre Ledoussal  
Defended on September 21, 2023  
<https://theses.hal.science/tel-04390068v1>

**2024**

- **HRUZA Ludwig**

*Fluctuation of coherences in noisy mesoscopic quantum systems with diffusive transport*

PhD supervisor : Denis Bernard

Defended on February 16, 2024

## Team *Disordered Systems and Applications*

2019

- **GABRIÉ Marylou**  
*Towards an understanding of neural networks : mean-field incursions*  
PhD supervisor : Krzakala Florent  
Defended on September 20, 2019  
<https://tel.archives-ouvertes.fr/tel-02921539>
- **SCALIET Camille**  
*Amorphous solids from the glass transition to 1 Kelvin*  
PhD supervisor : Francesco Zamponi  
Defended on September 26, 2019  
<https://theses.hal.science/tel-02490838>

2020

- **ROY Félix**  
*Dynamics of Interacting Species in Ecosystems*  
PhD supervisor : Giulio Biroli  
Defended on November 25, 2020  
<https://tel.archives-ouvertes.fr/tel-03105957>
- **SHARMA Dhruv**  
*Macroeconomic agent-based models : a statistical physics perspective*  
PhD supervisor : Francesco Zamponi  
Defended on November 26, 2020  
<https://tel.archives-ouvertes.fr/tel-03199888>
- **BUDZYNSKI Louise**  
*Algorithmic barriers in random Constraint Satisfaction Problems*  
PhD supervisor : Guilhem Semerjian  
Defended on September 29, 2020  
<https://tel.archives-ouvertes.fr/tel-03207370>
- **ABBARA Alia**  
*Statistical mechanics of inference problems with correlated patterns : an incursion between the replica method and message passing algorithms*  
PhD supervisor : Krzakala Florent  
Defended on November 10, 2020  
<https://tel.archives-ouvertes.fr/tel-03497407>
- **DONG Jonathan**  
*A computational tour on random matrices: computational imaging and optical computing*  
PhD supervisor : Krzakala Florent  
Defended on November 17, 2020  
<https://theses.hal.science/tel-03636999>

## 2021

- **MAILLARD Antoine**  
*Fundamental limits of high-dimensional estimation : a stroll between statistical physics, probability and random matrix theory*  
PhD supervisor : Krzakala Florent  
Defended on August 30, 2021  
<https://tel.archives-ouvertes.fr/tel-03474190>

## 2022

- **OHANA Ruben**  
*Leveraging (physical) randomness in machine learning algorithms*  
PhD supervisor : Florent Krzakala  
Defended on September 16, 2022  
<https://theses.hal.science/tel-03828849>
- **REFINETTI Maria**  
*The Role of Architecture, Data Structure and Algorithm in Machine Learning : a Statistical Physics Approach*  
PhD supervisor : Florent Krzakala  
Defended on June 24, 2022  
<https://theses.hal.science/tel-03850746>
- **D'ASCOLI Stéphane**  
*Overparametrization, architecture and dynamics of deep neural networks: from theory to practice*  
PhD supervisor : Giulio Biroli  
Defended on June 22, 2022  
<https://theses.hal.science/tel-04627374v1>

## 2023

- **BISARDI Matteo**  
*Protein evolution and sequence landscapes*  
PhD supervisor : Francesco Zamponi  
Defended on November 29, 2023  
<https://theses.hal.science/tel-04696587>
- **FRABOUL Jules**  
*Eco-evolutionary dynamics of multi-species communities*  
PhD supervisor : Giulio Biroli  
Defended on September 14, 2023  
<https://theses.hal.science/tel-04399626v1>
- **VENTURA Enrico**  
*Demolition and Reinforcement of Memories in Spin Glass-like Neural Networks*  
PhD supervisor : Francesco Zamponi  
Defended on December 1, 2023  
<https://theses.hal.science/tel-04862247v1>

- **CAMILI Francesco**

*Nouvelles perspectives en mécanique statistique et inférence à haute dimension*

PhD supervisor : Marc Mézard

Defended on March 21, 2023

## Team *Statistical Physics and Inference for Biology*

### 2020

- **MARCHI Jacopo**  
*Statistical mechanics of viral-immune co-evolution*  
PhD supervisor : Thierry Mora, Aleksandra Walczak  
Defended on September 23, 2020  
<https://tel.archives-ouvertes.fr/tel-03013175>
- **BATTISTA Aldo**  
*Low-dimensional continuous attractors in recurrent neural networks: from statistical physics to computational neuroscience*  
PhD supervisor : Rémi Monasson  
Defended on October 27, 2020  
<https://tel.archives-ouvertes.fr/tel-03203294>
- **MOLARI Marco**  
*Modeling and Bayesian inference for antibody affinity maturation*  
PhD supervisor : Simona Cocco  
Defended on October 29, 2020  
<https://tel.archives-ouvertes.fr/tel-03267835>
- **LEFEBVRE Baptiste**  
*Online characterization of the retinal network*  
PhD supervisor : Olivier Marre, Thierry Mora  
Defended on December 11, 2020  
<https://tel.archives-ouvertes.fr/tel-03272760>

### 2021

- **ISACCHINI Giulio**  
*Statistical Learning of Immune Receptor Repertoires*  
PhD supervisor : Thierry Mora, Aleksandra Walczak  
Defended on September 28, 2021  
<https://theses.hal.science/tel-04012451v1>
- **ROUSSEL Clément**  
*Learning and Sampling Complex Landscapes with Restricted Boltzmann Machines: from Theory to the Fitness of the TEM-1 Protein*  
PhD supervisor : Simona Cocco  
Defended on December 2, 2021  
<https://theses.hal.science/tel-03774086>
- **FANTHOMME Arnaud**  
*Recurrent Neural Networks models: inference, representations, and the role of regularization*  
PhD supervisor : Rémi Monasson  
Defended on December 8, 2021  
<https://theses.hal.science/tel-04117542v2>

## 2022

- **SPISAK Natanael**  
*Statistical inference of evolutionary paths*  
PhD supervisor : Thierry Mora, Aleksandra Walczak  
Defended on July 8, 2022
- **CHARDES Victor**  
*Inference and modeling of biological networks: from active matter to the immune system*  
PhD supervisor : Thierry Mora, Aleksandra Walczak  
Defended on September 21, 2022  
<https://theses.hal.science/tel-04645457v1>
- **BENSOUDA Meriem**  
*Statistical biophysics models of immune repertoire dynamics*  
PhD supervisor : Thierry Mora, Aleksandra Walczak  
Defended on September 23, 2022  
<https://theses.hal.science/tel-04878814v1>
- **MALBRANKE Cyril**  
*Building synergies between evolution-based and physic-grounded protein modeling: computational design of novel functional Cas9 enzymes*  
PhD supervisor : Rémi Monasson  
Defended on November 30, 2022

## 2023

- **CAMAGLIA Francesco**  
*Statistical Analysis of Thymic Maturation*  
PhD supervisor : Thierry Mora, Aleksandra Walczak  
Defended on June 26, 2023  
<https://theses.hal.science/tel-04311106>
- **MAURI Eugenio**  
*Reconstructing evolution with data-driven models: from epistasis inference to mutational paths*  
PhD supervisor : Simona Cocco  
Defended on November 10, 2023
- **RUIZ ORTEGA Maria**  
*Statistical response in immune repertoires*  
PhD supervisor : Thierry Mora, Aleksandra Walczak  
Defended on June 27, 2023

2024

- **LOFFREDO Emanuele**

*Learning and modeling in biological systems: from minimal representation to real data*

PhD supervisor : Rémi Monasson

Defended on October 31, 2024

- **MAHUAS Gabriel**

*Sensory coding in strongly correlated neural populations*

PhD supervisor : Thierry Mora

Defended on September 16, 2024

<https://theses.hal.science/tel-04839909v1>

- **LEGENKAIA Mariia**

*Reconstruction de trajectoires neuronales de basse dimension à partir des enregistrements de l'activité de population : des limitations statistiques à la conception expérimentale*

PhD supervisor : Rémi Monasson

Defended on December 10, 2024



## Team *Classical and Quantum Many-Body Systems*

### 2020

- **QIN Liang**  
*Application of irreversible Monte Carlo in realistic long-range systems*  
PhD supervisor : Werner Krauth  
Defended on October 21, 2020  
<https://tel.archives-ouvertes.fr/tel-02998657>

### 2021

- **DAGARD Victor**  
*Renormalization and disorder*  
PhD supervisor : Bernard Derrida  
Defended on September 3, 2021  
<https://theses.hal.science/tel-03486163v1>

### 2022

- **LI Botao**  
*Computation and models: Case studies for hard disks in statistical physics and for deep learning*  
PhD supervisor : Werner Krauth  
Defended on December 14, 2022  
<https://theses.hal.science/tel-04791080v1>

### 2023

- **BIGUÉ Arnaud**  
*From few- to many-body physics: study of an impurity in a spin-1/2 Fermi superfluid*  
PhD supervisor : Xavier Leyronas  
Defended on September 9, 2023

## Team *Theoretical Biophysics and Neuroscience*

### 2019

- **CONTRERAS Diego**  
*Modeling morphogenesis of epithelial tissues : from forcestogeometry and back*  
PhD supervisor : Vincent Hakim  
Defended on December 16, 2019  
<https://tel.archives-ouvertes.fr/tel-03260200>

### 2020

- **BERLEMONT Kevin**  
*From neural coding to descision making*  
PhD supervisor : Jean-Pierre Nadal  
Defended on June 29, 2020  
<https://tel.archives-ouvertes.fr/tel-03154023>

### 2021

- **QU Qiuyang**  
*Modelling growing epithelium*  
PhD supervisor : Martine Ben Amar  
Defended on July 7, 2021  
<https://theses.hal.science/tel-03956847>

### 2022

- **ACKERMANN Joseph**  
*Gowth and mechanics of cellular structure*  
PhD supervisor : Martine Ben Amar  
Defended on January 24, 2022  
<https://theses.hal.science/tel-03885483>
- **KANG Ling**  
*Oscillations, synchronization and waves in neuronal networks*  
PhD supervisor : Vincent Hakim  
Defended on November 20, 2022
- **NGHIEM Trang-Anh**  
*Visual coding in the presence of spontaneous neural activity and eye movements*  
PhD supervisor : Rava Azeredo Da Silveira  
Defended on March 28, 2022

- **BLANCO MALERBA Simone**  
*Encoding and decoding of information through efficient neural representations*  
PhD supervisor : Rava Azeredo Da Silveira  
Defended on December 19, 2022  
<https://theses.hal.science/tel-04639048v1>

## 2023

- **DAI Anna**  
*Morphogenesis and Growth of Soft Biological tissue*  
PhD supervisor : Martine Ben Amar  
Defended on September 18, 2023  
<https://theses.hal.science/tel-04703170>
- **TROISI Lucie**  
*Development of a new class of synthetic gene circuits based on protein-protein interactions*  
PhD supervisor : Vincent Hakim  
Defended on October 13, 2023
- **MOLNAR Kelly**  
*Contribution of non-muscle myosins to C-elegans embryonic elongation*  
PhD supervisor : Michel Labouesse, Martine Ben Amar  
Defended on April 14, 2023  
<https://theses.hal.science/tel-04242407>

## 2024

- **HERNANDEZ Claudio**  
*The Physics of Early Drosophila Development*  
PhD supervisor : Massimo Vergassola  
Defended on September 26, 2024  
<https://theses.hal.science/tel-04876697v1>
- **PATIL Nirbhay**  
*A statistical mechanics approach to understanding economic inequalities*  
PhD supervisor : Jean-Pierre Nadal  
Defended on October 15, 2024

## Team *Microfluidics, Emulsion and Biology*

2019

- **CHORLAY Aymeric**  
*Physics of lipid droplet biogenesis*  
PhD supervisor : Abdou Rachid Thiam  
Defended on November 29, 2019  
<https://tel.archives-ouvertes.fr/tel-03248641>
- **AJJAJI Dalila**  
*Interaction of hepatitis C virus core protein with lipid droplets : mechanism and function*  
PhD supervisor : Abdou Rachid Thiam  
Defended on December 20, 2019  
<https://theses.hal.science/tel-03700180>

2021

- **SANTINHO Alexandre**  
*Lipid Droplet Nucleation in the Endoplasmic Reticulum Membrane of the Cell*  
PhD supervisor : Abdou Rachid Thiam  
Defended on December 10, 2021  
<https://theses.hal.science/tel-04197641v1>
- **FAUGERAS Vincent**  
*Cellular Permeability Assessment of Drugs through Biomimetic Droplet Interface Bilayers*  
PhD supervisor : Abdou Rachid Thiam  
Defended on December 16, 2021  
<https://theses.hal.science/tel-04268818v1>

2023

- **BHAPKAR Apoorva**  
*Unmasking the Interplay of SCAP and ACAT in Sterol Sensing and Cholesterol Ester Function Beyond Storage in Lipid Droplets*  
PhD supervisor : Abdou-Rachid Thiam  
Defended on December 6, 2023
- **CARPENTIER Maxime**  
*Effet de l'absence de Scipin sur l'homéostasie lipidique cellulaire et le trafic des protéines*  
PhD supervisor : Abdou-Rachid Thiam  
Defended on December 13, 2023
- **DUMESNIL Calvin**  
*Biogenesis of cholesterol-ester-rich lipid droplets*  
PhD supervisor : Abdou-Rachid Thiam  
Defended on December 11, 2023

## Team *Multiscale Physics of Living Systems*

2019

- **PERON CANE Caroline**  
*Monitoring bacterial secreted proteins in real time*  
PhD supervisor : Nicolas Desprat, Alice Lebreton  
Defended on October 7, 2019  
<https://tel.archives-ouvertes.fr/tel-03139872>

2020

- **HAMOURI Fatima**  
*Optical control of protein activity and gene expression by photo-activation of caged-cyclofen for cancer initiation studies*  
PhD supervisor : David Bensimon  
Defended on July 10, 2020

2021

- **RIEU Martin**  
*Kinetic locking and nanometric tracking of nucleic acid extension using super-resolved magnetic tweezers*  
PhD supervisor : Jean-François Allemand, Vincent Croquette  
Defended on March 15, 2021  
<https://theses.hal.science/tel-03612821>

2023

- **EISENMANN Isabelle**  
*Phototaxis and collective phenomena in the motile micro-alga *Chlamydomonas reinhardtii**  
PhD supervisor : Nicolas Desprat  
Defended on December 1, 2023  
<https://theses.hal.science/tel-04794379v1>

## Team *Membrane Molecular Mechanisms*

### 2020

- **FAVIER Sophie**

*Role of the JUNO oocyte protein in the mechanism of block to polyspermy in mammals*

PhD supervisor : Christine Gourier

Defended on May 20, 2020

<https://tel.archives-ouvertes.fr/tel-03482588>

### 2022

- **THIMONIER Chloé**

*Sonosensitive emulsions for therapeutic applications*

PhD supervisor : Nicolas Taulier (co-encadrant Wladimir Urbach)

Defended on September 22, 2022

<https://theses.hal.science/tel-04421301v2>

### 2023

- **DUBOIS Yaelle**

*Role and implication of post-fertilization release of CD9 and JUNO in polyspermy block*

PhD supervisor : Christine Gourier

Defended on December 15, 2023

### 2024

- **MARTIN-FORNIER Nathan**

*Mammalian fertilization: impact of the spermatozoon's flagellar beating force and its consequences*

PhD supervisor : Christine Gourier

Defended on February 27, 2024

## Team *Active Cell Matter*

2023

- **AMIRI Sirine**

*Quantification of cytoskeleton-nucleus mechanotransduction during cell squeezing through narrow spaces*

PhD supervisor : Cecile Sykes

Defended on December 12, 2023

- **d'HUMIERES Johan**

*The mechanical role of the nucleus in cell invasion in *Caenorhabditis elegans**

PhD supervisor : Julie Plastino

Defended on December 7, 2023

## Team *Micromegas* : *Nano-Fluidics*

### 2019

- **POGGIOLI Anthony**  
*Nonlinear ionic transport at the nanometric and Ångströmetric scales*  
PhD supervisor : Lydéric Bocquet  
Defended on November 28, 2019  
<https://tel.archives-ouvertes.fr/tel-02869126>
- **CANALE Luca**  
*Multiscale ice and snow friction*  
PhD supervisor : Lydéric Bocquet  
Defended on September 12, 2019  
<https://tel.archives-ouvertes.fr/tel-03371506>

### 2020

- **LAINÉ Antoine**  
*Sliding friction at the nanoscale*  
PhD supervisor : Alessandro Siria  
Defended on September 1, 2020

### 2021

- **MARCOTTE Alice**  
*Experimental study of the dynamic properties of the liquid-carbon interface at the nanoscale*  
PhD supervisor : Lydéric Bocquet  
Defended on December 13, 2021  
<https://theses.hal.science/tel-04207920v1>
- **EMMERICH Théo**  
*Activated carbon nanofluidics: from blue energy to ionic memory*  
PhD supervisor : Lydéric Bocquet  
Defended on December 16, 2021  
<https://theses.hal.science/tel-03603163>
- **KAVOKINE Nikita**  
*Many-body effects in nanoscale fluid transport*  
PhD supervisor : Lydéric Bocquet  
Defended on June 30, 2021  
<https://theses.hal.science/tel-03332325>

### 2022

- **DODE Antoine**  
*On the frictions and motion of rowing boats*



PhD supervisor : Lydéric Bocquet  
Defended on December 8, 2022  
<https://theses.hal.science/tel-04611783v1>

## 2023

- **CHAPUIS Nicolas**  
*Nouvelles approches pour l'énergie osmotique et les chaleurs perdues*  
PhD supervisor : Lydéric Bocquet  
Defended on December 18, 2023
- **ROBIN Paul**  
*Corrélations et fluctuations dans le transport d'ions aux nanoéchelles*  
PhD supervisor : Lydéric Bocquet  
Defended on July 7, 2023

## 2024

- **COQUINOT Baptiste**  
*Couplages électro-fluidiques induits par les fluctuations à l'interface solide-liquide*  
PhD supervisor : Lydéric Bocquet  
Defended on June 5, 2024  
<https://theses.hal.science/tel-04887563v1>
- **LIZEE Mathieu**  
*Measurement of electro-hydrodynamic friction*  
PhD supervisor : Alessandro Siria  
Defended on June 18, 2024

## Team *Mechanics, Soft Matter and Morphogenesis*

2020

- **JULES Théo**  
*Geometry and mechanics of origamis*  
PhD supervisor : Mokhtar Adda-Bedia  
Defended on October 12, 2020  
<https://tel.archives-ouvertes.fr/tel-03128874>

2022

- **BOSSERT Marine**  
*Experimental study of cavitation in mesoporous materials*  
PhD supervisor : Etienne Rolley  
Defended on July 8, 2022  
<https://theses.hal.science/tel-03850750>

2023

- **DOUIN Adèle**  
*Seismic Events Prediction in Knitted Fabric through Deep Learning*  
PhD supervisor : Frederic Lechenault  
Defended on March 20, 2023

2024

- **GLUKHOVA Svetlana**  
*Cutting Soft Materials*  
PhD supervisor : Frédéric Lechenault  
Defended on September 26, 2024
- **MICHEL Laura**  
*Model mechanical metamaterials for memory storage and computation*  
PhD supervisor : Frédéric Lechenault  
Defended on September 20, 2024
- **POYDENOT Florian**  
*Des gouttelettes à la pluie : croissance et coalescence à travers les échelles dans les nuages*  
PhD supervisor : Bruno Andreotti  
Defended on July 4, 2024

## Team *Non-Linear Physics*

### 2021

- **PRABHUDESAI Gaurav**  
*Fluctuations in turbulent flows*  
PhD supervisor : Stephan Fauve, François Pétrélis  
Defended on February 17, 2021  
<https://tel.archives-ouvertes.fr/tel-03192088>
- **VAN KAN Adrian**  
*Critical transitions in turbulence*  
PhD supervisor : Alexandros Alexakis, Marc Brachet  
Defended on September 9, 2021  
<https://theses.hal.science/tel-03979252v1>

### 2023

- **VERNET Marlone**  
*Turbulence, transport and thermoelectricity in liquid metals*  
PhD supervisor : Christophe Gissinger  
Defended on October 27, 2023  
<https://theses.hal.science/tel-04714108v1>

### 2024

- **DANIEL Florentin**  
*Instabilities and turbulent transport in astrophysical hydrodynamic systems*  
PhD supervisor : Christophe Gissinger  
Defended on September 25, 2024
- **MOUET Valentin**  
*Turbulence en milieu diphasique*  
PhD supervisor : François Pétrélis  
Defended on October 3, 2024

## Team *Fields, Gravity and Strings*

2019

- **DUAN Zhihao**  
*Topological string theory and applications*  
PhD supervisor : Amir-Kian Kashani-Poor  
Defended on July 8, 2019  
<https://tel.archives-ouvertes.fr/tel-02341882>
- **LAVDAS Ioannis**  
*AdS<sub>4</sub>/CFT<sub>3</sub> and quantum gravity*  
PhD supervisor : Costas Bachas  
Defended on October 3, 2019  
<https://tel.archives-ouvertes.fr/tel-02966558>
- **ZAN Bernardo**  
*Studies in strongly coupled quantum field theories and renormalization group flows*  
PhD supervisor : Slava Rychkov  
Defended on November 7, 2019
- **ZHONG Deliang**  
*Correlation Functions in Integrable Higher-dimensional CFTs*  
PhD supervisor : Valdimir Kazakov, Benjamin Basso  
Defended on September 30, 2019

2020

- **GE Dongsheng**  
*Quantum information encoded in semi-classical gravity*  
PhD supervisor : Giuseppe Policastro  
Defended on September 28, 2020  
<https://tel.archives-ouvertes.fr/tel-03262512>
- **LI Songyuan**  
*Topological holography*  
PhD supervisor : Jan Troost  
Defended on November 27, 2020  
<https://tel.archives-ouvertes.fr/tel-03269600>

2021

- **FERRANDO Gwenael**  
*Non-compact Integrable Spin Chain for the Conformal Fishnet Theory*  
PhD supervisor : Vladimir Kazakov  
Defended on September 15, 2021  
<https://theses.hal.science/tel-03987820v1>

**2022**

- **QIAO Jiaxin**  
*On the Wick Rotation of the Four-point Function in Conformal Field Theories*  
PhD supervisor : Slava Rychkov  
Defended on June 14, 2022  
<https://theses.hal.science/tel-04583922>
- **PAPADOPOULOS Vassilis**  
*Membranes, Holography and Quantum Information*  
PhD supervisor : Costas Bachas  
Defended on November 22, 2022  
<https://theses.hal.science/tel-04648562v1>

**2023**

- **JARAMILLO DUQUE David**  
*Topological strings and Higgsing trees*  
PhD supervisor : Amir-Kian Kashani-Poor  
Defended on September 22, 2023
- **SIROIS Benoit**  
*Développement et application de nouvelles méthodes pour le bootstrap conforme numérique*  
PhD supervisor : Slava Rychkov  
Defended on September 21, 2023
- **ZHENG Zechuan**  
*Bootstrap Method in Theoretical Physics*  
PhD supervisor : Miguel Paulos, Vladimir Kazakov  
Defended on September 15, 2023

## Team *Astrophysics*

### 2021

- **BELLOMI Elena**  
*3D chemical structure of the interstellar medium*  
PhD supervisor : Michel Pérault, Patrick Hennebelle, Benjamin Godard  
Defended on February 12, 2021  
<https://tel.archives-ouvertes.fr/tel-03273709>
- **REGALDO SAINT BLANCARD Bruno**  
*Statistical modeling of the polarized emission of interstellar dust*  
PhD supervisor : François Levrier, François Boulanger  
Defended on November 2, 2021  
<https://theses.hal.science/tel-03600846>
- **DELL'OVA Pierre**  
*Exploring the interstellar contents of a Pevatron: molecules, dust and star formation in the evolved supernova remnant IC443*  
PhD supervisor : Maryvonne Gerin, Antoine Gusdorf  
Defended on December 9, 2021  
<https://theses.hal.science/tel-03828552>

### 2022

- **RICHARD Thibaud**  
*Characteristics of turbulent dissipation in the interstellar medium*  
PhD supervisor : Pierre Lesaffre  
Defended on March 30, 2022  
<https://theses.hal.science/tel-03850855>
- **CHARTIER Nicolas**  
*Statistical methods to accelerate forward modelling of galaxy surveys data*  
PhD supervisor : Nick Kaiser  
Defended on October 14, 2022  
<https://theses.hal.science/tel-04893576v1>

### 2023

- **WALTER Clément**  
*Exploration de l'émission Galactique du CO avec les données de Planck*  
PhD supervisor : François Levrier  
Defended on July 3, 2023  
<https://theses.hal.science/tel-01575418v1>

### 2024

- **RICHARD Pablo**  
*Étude statistique des structures non gaussiennes du milieu interstellaire turbulent à partir*

*des données observationnelles*

PhD supervisor : François Levrier

Defended on October 14, 2024

- **ARMANTE Mélanie**

*L'origine de la distribution de masse des étoiles et de la complexité chimique dans les nuages en effondrement hiérarchique*

PhD supervisor : Pierre Lesaffre, Antoine Gusdorf

Defended on March 6, 2024

- **AUCLAIR Constant**

*Modélisation statistique des avant-plans interstellaires au fond diffus cosmologique*

PhD supervisor : François Boulanger, Erwan Allys

Defended on September 18, 2024

*Team Cosmology and Gravitation*