

Clément Tauber

Assistant Professor
CEREMADE
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Date of birth: 13/04/1988
Nationality: French
Married, 2 Children
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Research interests: Analysis and Mathematical Physics

Functional analysis, Spectral theory, Schrödinger operator, Topological insulators, Index theory, Operator Algebra, Quantum Statistical Mechanics

Employment

2025– Assistant Professor (Maître de conférences)
CEREMADE, Université Paris Dauphine - PSL, France
2023–2025 Seconded (Mis à disposition) at CEREMADE, Université Paris Dauphine - PSL, France
2020–2025 Assistant Professor (Maître de conférences)
Institut de Recherche Mathématique Avancée, Université de Strasbourg, France
2019–2020 Postdoctoral position in the ANR (National Research Agency) project NonStops
Laboratoire de mathématiques AGM, Université de Cergy-Pontoise, France
2016–2019 Postdoctoral position with Prof. Gian Michele Graf
Institute for Theoretical Physics, ETH Zürich, Switzerland
2015–2016 Postdoctoral position with Prof. Gianluca Panati
Dipartimento di matematica, Università La Sapienza, Rome, Italie

Education

2012–2015 Ph.D in Physics (01/12/15), with highest honors
supervised by Krzysztof Gawędzki, Laboratoire de Physique, ENS de Lyon
Jury: D. Bernard, A. Cappelli, P. Degiovanni, B. Doyon, J. M. Maillet, K. Gawędzki
2009–2012 Bachelor and Master in physics, with highest honors
ENS de Lyon, France
2009 Admitted to Ecole Normale Supérieure de Lyon, MPI competitive exam
2006–2009 French "Classe préparatoires" MPSI/MP*
Lycée Louis le Grand, Paris

Languages

French: mother tongue, English: fluent, Italian: fluent, German: basics

Computer skills

Science: Mathematica, Python, Matlab – Web-design: HTML, CSS, Javascript, PHP

Grants

2025-2029 Member of PSL "Grand Programme" Statistical Physics and Mathematics
Coord.: G. Barraquand, D. Chafaï, C. Toninelli (collective funding: 2M€, 24 members)
2024-2029 Member of ANR project DYNACQUS
Coordinator: Armen Shirikyan (collective funding: 417 k€, 14 members)
2020–2022 Index Attractivité, Université de Strasbourg, 4000 €

Publications

Publications under review (preprint)

- 23. The index of a pair of pure states and the interacting integer quantum Hall effect
S. Bachmann, J. Shapiro and C. Tauber
[arXiv:2507.10807](#)

Publications in international peer-reviewed journals

- 22. Topological junctions for one-dimensional systems
D. Gontier and C. Tauber
[Letters in Mathematical Physics](#) 115, 67 (2025) [arXiv:2412.15887](#)
- 21. Classifying bulk-edge anomalies in the Dirac Hamiltonian
H. Jud and C. Tauber
[Annales Henri Poincaré](#) (Online First, 2025), [arXiv:2403.04465](#)
- 20. A note on adiabatic time evolution and quasi-static processes in translation-invariant quantum systems
V. Jaksic, C.-A. Pillet and C. Tauber
[Annales Henri Poincaré](#) 25, 751-771 (2024) [arXiv:2204.02177](#)
- 19. Approach to equilibrium in translation-invariant quantum systems: some structural results
V. Jaksic, C.-A. Pillet and C. Tauber
[Annales Henri Poincaré](#) 25, 715-749 (2024), [arXiv:2204.00440](#)
- 18. Topology in shallow-water waves: A spectral flow perspective
C. Tauber and G. C. Thiang
[Annales Henri Poincaré](#) 24, 107-132 (2023), [arXiv:2110.04097](#)
- 17. Estimating bulk and edge topological indices in finite open chiral chains
L. Jezequel, C. Tauber and P. Delplace
[Journal of Mathematical Physics](#) 63, 121901 (2022), [arXiv:2203.17099](#)
- 16. Topology in shallow-water waves: a violation of bulk-edge correspondence
G. M. Graf, H. Jud and C. Tauber
[Communications in Mathematical Physics](#) 383, 731-761 (2021), [arXiv:2001.00439](#)
- 15. Fine structure of heating in a quasiperiodically driven critical quantum system
B. Lapierre, K. Choo, A. Tiwari, C. Tauber, T. Neupert, R. Chitra
[Physical Review Research](#) 2 (3), 033461 (2020), [arXiv:2006.10054](#)
- 14. Emergent Black Hole Dynamics in Critical Floquet Systems
B. Lapierre, K. Choo, C. Tauber, A. Tiwari, T. Neupert and R. Chitra
[Physical Review Research](#) 2(2) 023085 (2020), [arXiv:1909.08618](#)
- 13. Anomalous bulk-edge correspondence in continuous media
C. Tauber, P. Delplace and A. Venaille
[Physical Review Research](#) 2(1) 013147 (2020), [arXiv:1902.10050](#)
- 12. Eigenvalue crossings in Floquet topological systems
K. Gomi and C. Tauber
[Letters in Mathematical Physics](#) 110 465-500 (2020), [arXiv:1906.10358](#)
- 11. A bulk-interface correspondence for equatorial waves
C. Tauber, P. Delplace and A. Venaille
[Journal of Fluid Mechanics](#) 868, R2 (2019), [arXiv:1812.05488](#)

10. Strongly Disordered Floquet Topological Systems
J. Shapiro and C. Tauber
[Annales Henri Poincaré 20\(6\) 1837-1875 \(2019\)](#), [arXiv:1807.03251](#)
9. Spin Conductance and Spin Conductivity in Topological Insulators: Analysis of Kubo-Like Terms
G. Marcelli, G. Panati and C. Tauber
[Annales Henri Poincaré 20\(6\) 2071-2099 \(2019\)](#), [arXiv:1801.02611](#)
8. Effective vacua for Floquet topological phases: A numerical perspective on the switch-function formalism
C. Tauber
[Physical Review B 97\(19\) 195312 \(2018\)](#), [arXiv:1801.08807](#)
7. Bulk-edge correspondence for two-dimensional floquet topological insulators
G. M. Graf and C. Tauber
[Annales Henri Poincaré 19\(3\) 709-741 \(2018\)](#), [arXiv:1707.09212](#)
6. Gauge-theoretic invariants for topological insulators: a bridge between Berry, Wess-Zumino, and Fu-Kane-Mele
D. Monaco and C. Tauber
[Letters in Mathematical Physics 107\(7\) 1315-1343 \(2017\)](#), [arXiv:1611.05691](#)
5. Phase rotation symmetry and the topology of oriented scattering networks
P. Delplace, M. Fruchart and C. Tauber
[Physical Review B 95\(20\) 205413 \(2017\)](#), [arXiv:1612.05769](#)
4. Topological edge states in two-gap unitary systems: a transfer matrix approach
C. Tauber and P. Delplace
[New Journal of Physics 17\(11\) 115008 \(2015\)](#), [arXiv:1509.05342](#)
3. Construction and properties of a topological index for periodically driven time-reversal invariant 2D crystals
D. Carpentier, P. Delplace, M. Fruchart, K. Gawedzki and C. Tauber
[Nuclear Physics B 896 779-834 \(2015\)](#), [arXiv:1503.04157](#)
2. Nonequilibrium transport through quantum-wire junctions and boundary defects for free massless bosonic fields
K. Gawedzki and C. Tauber
[Nuclear Physics B 896 138-199 \(2015\)](#), [arXiv:1501.07433](#)
1. Global gauge anomalies in coset models of conformal field theory
P. de Fromont, K. Gawedzki and C. Tauber
[Communications in Mathematical Physics 328\(3\) 1371-1400 \(2014\)](#)
[arXiv:1301.2517](#)

Popularization publication

- [A] De la lumière à sens unique. Métamatériaux topologiques et guides d'onde unidirectionnels, with M. FRUCHART (2017, in French)
 Popularization paper for [le Rayon](#), on-line journal of the French physical society

Scientific activity

Ph.D supervision

2025– Francesco Cocco (co-supervision with M. Lewin)

Workshop and conference organization

- 2021–2024 ICMP 2024 Organizing Committee (co-chair), XXI International Congress on Mathematical Physics (Strasbourg, July 2024, 600 participants, budget: 400'000 €)
- Jun. 2022 Workshop organization: Quantum Hall Effect and Topological Phases in Strasbourg (Université de Strasbourg, 25 speakers)
- Sep. 2018 Workshop organization: Recent progress in mathematics of topological insulators (ETH Zürich, 18 international speakers, 30 participants, budget: 35'000 CHF)

Talks at international conferences

- 2025 Topological Aspects of Condensed Matter Theory (Université Lyon 1)
Quantissima sur Oise (CY Advanced Studies)
Topological Transport and Magnetic Matter (Sapienza Università di Roma)
TopoAcoustics 25 (Université du Mans)
- 2024 Large-time Dynamics of Classical and Quantum Systems (Université Toulouse III - Paul Sabatier)
Recent Developments and Challenges in Topological Phases (Kyoto University)
Quantum Statistical Mechanics - MAQM (Université Toulouse III - Paul Sabatier)
- 2023 Frontiers in Mathematical Physics (CY Advanced Studies)
- 2022 A tale of Mathematics and Physics: Tribute to Krzysztof Gawedzki (ENS de Lyon)
- 2021 ANR NonStops Meeting (CY Advanced Studies)
Topological phases of matter (Leysin)
Mathematical aspects of quantum phases of matter (Banach Center, Bedlewo)
Mathematical Aspects of Materials Science (SIAM MS20, online)
- 2020 12th Conference of GDR DynQua (Université de Strasbourg)
- 2019 Workshop Disorder and Chaos (Polygone CNRS, Grenoble)
Advanced Theoretical and Numerical Methods for waves in structured Media (Université d'Aix-Marseille)
Topology, Photonics and beyond (Alfried Krupp Wissenschaftskolleg Greifswald)
Mathematical Physics at the Crossings (VirginiaTech, Blacksburg)
- 2018 Solid Math 2018 (McGill University, Montréal)
XIXth International Congress Mathematical Physics, Young Res. Symp. (Montréal)
Mathematical challenges in quantum mechanics (Sapienza Università di Roma)
- 2017 From Field Theory to Non-Equilibrium (Université de Nice)
- 2016 Trieste quantum days (SISSA, Trieste)
Mathematical challenges in quantum mechanics (Bressanone)
- 2013 Workshop on field theories with defects (Universität Hamburg)

Talks: institute seminars

- 2025 Lattice Seminar (online)
- 2024 Cond Math Seminar, UMPA, ENS de Lyon
Séminaire Analyse et EDP, Laboratoire AGM, CY Cergy Paris Université
- 2023 Séminaire analyse-probabilité, CEREMADE, Université Paris-Dauphine
Laboratoire de Physique Théorique et Hautes Énergies, Paris
- 2022 Séminaire Interdisciplinaire de Physique Mathématique, Grenoble
Problèmes Spectraux en Physique Mathématiques, IHP, Paris
- 2021 Seminar Theory of Quantum Matter, Sorbonne université, Paris
Institut de Mathématiques de Toulouse, Université Toulouse III Paul Sabatier
One World IAMP Mathematical Physics Seminar (online)
Institut de Recherche Mathématique Avancée, Université de Strasbourg
Cergy-McGill Seminar (online)
- 2020 Institut de Recherche Mathématique Avancée, Université de Strasbourg
Institut Camille Jordan, Université de Lyon (online)
- 2019 Stochastic Problems in Mathematical Physics and Economics, Université Paris-Diderot
- 2018 Department Mathematik, Friedrich-Alexander-Universität Erlangen-Nürnberg
Institut Fourier, Université Grenoble Alpes
Centre de recherche en mathématiques de la décision, Université Paris Dauphine
Institut Camille Jordan, Université de Lyon
Laboratoire J.A. Dieudonné, Université de Nice
Laboratoire de physique théorique de Toulouse
Laboratoire de physique théorique et modèles statistiques, Université Paris-Saclay
- 2017 Fachbereich Mathematik, Tübingen Universität
Laboratoire de physique de l'ENS de Lyon
- 2016 Institut de physique théorique, ETH Zürich
- 2014 Dipartimento di matematica, Università La Sapienza, Rome

Teaching

Teaching duty

- 2023– Teaching duty (Université Paris Dauphine - PSL)
Calculus 1 (L1), Analysis 1 and 2 (L1), Analysis 3 (DL2), Analysis 4 (L2 and CPES), Numerical Methods (L2), Introduction to Statistical physics (L3), Environmental issues (L1)
- 2020–2023 Teaching duty (Université de Strasbourg)
Analysis 2 (L1 MPA), Mathematics for science (L1 Sciences pour la Santé), Numerical analysis, Python (L2 Mathématiques)
- 2016–2019 Proseminar: Student tutoring for comprehension and presentation of scientific articles (2 to 4 students per year, Bachelor and Master, Physics department, ETH Zürich)
- 2013–2015 Teaching duty (192 hours), Physics Department, ENS de Lyon
Exercise classes: Mathematical methods for physics (B3 and M1), Symmetries and Lie Groups (M1), Analytical Mechanics (B3), Special Relativity (B3)
Oral interrogations, Classe Passerelle pour l'Enseignement Supérieur
Preparation to "Agregation", Rehearsal written exams for physics teaching position's contest
- 2010–2013 Oral interrogations, Lycée La Martinière Monplaisir, Lyon
- 2009–2010 Volunteer work: tutoring underprivileged high school students, Lycée Jacques Breel

Web-app

- 2022 Development of "fractions", a web-app to practice fraction calculus
ceremade.dauphine.fr/~tauber/fractions/index.html

Undergraduate students

- 2025 C. Cherto, *Equivariant Homotopy Theory for Local Unitary Operators* (Stage M2)
R. Laporte, *Levinson's theorem* (Stage M1)
C. Petit, *Indice de paire de projections et hamiltonienne de Landau* (Stage L3)
F. Bourgi and S. Zawde, *Les variables cachées en mécanique quantique* (Mémoire L3)
- 2024 P. Parnis, *Opérateurs compacts, alternative et opérateurs de Fredholm* (Stage L3)
F. Castillo, *Hall conductivity and Chern number* (Projet bibliographique M1)
- 2023 R. Al Majdalany: *Shallow Water Wave Localisation in Inhomogeneous Medium* (Stage M2)
L. Walaszek : *L'alternative de Fredholm* (Mémoire M1)
A. Besançon : *Théorème de Poincaré-Bendixson* (Mémoire L3)
T. Robert : *Propriété relativiste des électrons dans le graphène* (Projet tutoré L3)
- 2022 F. Dupont : *Gerbes de fibrés en droite dans les systèmes de Floquet* (Stage M1)
G. Bonillo and Z. Zobundzija : *Transition BKT* (Projet tutoré L3)
- 2021 C. Santos and N. Lacroix : *Indices topologiques en mécanique quantique* (Projet tutoré L3, 2021)
- 2019 B. Lapierre: *Heating and Dynamics in Floquet Conformal Field Theory* (Master Thesis)
- 2018 E. La Valle: *Time-reversal invariant Floquet topological insulators* (Master Thesis)
- 2017 G. Huang: *Floquet dynamics of boundary conformal field theory* (Master Thesis)

Academic and collective activity

Scientific societies

- French Mathematical Society (member of the executive board)
International Association of Mathematical Physics (member)

Hiring committees

- 2024 Postdoc - Junior research chair for PSL Grand Programme
2023 ECC - AGM, CY Cergy Paris Université - Mathématiques et applications
2022 MCF 4634 - ICJ, Université de Lyon - Physique Mathématique

Ph.D committees

- 2025 L. Scaglione: *Phases topologiques et la correspondance généralisée bulk-bord pour les matériaux aperiodiques* (Université Lyon 1, Examineur)
- 2024 A. Tarantola: *Scattering Theory and Applications to Topological Condensed Matter* (ETH Zürich, Rapporteur)
- 2023 T. Jappens : *Some classification problems of symmetry protected topological states* (KU Leuven, Examineur)

Referee: Peer-reviewing for journals

- Communications in Mathematical Physics (Springer)
Annales Henri Poincaré (Springer)
SIAM Journal on Mathematical Analysis
Journal of Mathematical Physics (AIP)
Mathematical Physics, Analysis and Geometry (Springer)

Journal of Geometry and Physics (Elsevier)
MathSciNet Mathematical Reviews (AMS)
Physical Review B, Letters, Research, and X (APS)
Journal of Physics A and Materials (IOPsciences)
The European Physical Journal B (Springer)
Letters in Mathematical Physics (Springer)
SIGMA (Free journal network)
Journal of Statistical Physics (Springer)
Probability and Mathematical Physics (MSP)

Miscellaneous

2016–2017 Postdoc representative, Institute for theoretical physics, ETH Zürich
Jul. 2016 Support staff: international conference StatPhys2016 (ENS de Lyon)
2012–2015 Ph.D Seminar: Establishment and organization of a bi-monthly seminar for theoretical
 physics Ph.D students (ENS de Lyon)

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