

Mathieu LEWIN

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Born on November 14th, 1977, in Senlis, France

Positions

Oct. 2014 –	CNRS position (Directeur de Recherche) CEREMADE, Université Paris-Dauphine
Sept. 2017 –	Part-time Professor École Polytechnique, Palaiseau
Oct. 2005 – Sept. 2014	CNRS position (Chargé de Recherche) Mathematics Department, Université de Cergy-Pontoise
Mar. 2005 – Aug. 2005	Post-doc INRIA CERMICS, École Nationale des Ponts et Chaussées, with Éric Cancès
Aug. 2004 – Feb. 2005	EU Post-doc University of Copenhagen (Denmark), with Jan Philip Solovej

Education and Qualifications

June 2009	Habilitation à diriger des recherches, Université de Cergy-Pontoise
June 2004	Ph.D. with Éric Séré, Université Paris Dauphine
Sept. 1998 – Aug. 2002	Student of the École Normale Supérieure de Cachan

Honors and Awards

2024 (– 2029)	Head of an interdisciplinary grant, with Éric Cancès and Julien Toulouse, attributed by the CNRS board of directors
2022	Invited speaker at the International Congress of Mathematics (ICM 2022)
2017 – 2023	Consolidator Grant of the European Research Council (ERC)
2015	Plenary speaker at the International Congress of Mathematical Physics
2012	EMS Prize
2010 – 2015	Starting Grant of the European Research Council (ERC)

Editorial Activities

2023 –	Editor for <i>Journal of Spectral Theory</i>
2022 –	Chief editor (with Anne-Laure Dalibard) for the <i>Annales de l'Institut Henri Poincaré C – Analyse Non Linéaire</i>
2019 –	Editor for <i>Probability and Mathematical Physics</i>
2014 –	Editor for <i>Letters in Mathematical Physics</i>
2013 –	Editor for <i>Mathematical Models and Methods in Applied Sciences (M3AS)</i>

Duties

2023 –	Head of the CEREMADE
2015-20, 2024–26	Elected member of the Executive Committee of the International Association of Mathematical Physics (IAMP)
2020 –	Member of the scientific committee of the labex CEMPI at Lille
2019 – 2022	Member of the research ethics committee of the university Paris-Dauphine
2015 – 2021	Elected member of the Administration Council of the French Association of Applied and Industrial Mathematics (SMAI)
Oct. 2014 – Dec. 2017	Scientific Manager for Interdisciplinarity at the CNRS Institute of Mathematics
2010 – 2014	Elected member of the Administration Council of the <i>Institut Henri Poincaré</i>

Committees & other duties

2024–	Member of the International Advisory Board of the International Conference Series on “Strongly Correlated Coulomb Systems (SCCS)”
2018	Head of the committee for the IAMP Early Career Award
2015 & 2016	Member of the mathematics & computer science committee of the French National Research Agency (ANR)
2015 & 2016	President of the hiring committee for assistant professor positions in Analysis at the university of Paris-Dauphine

Networks & Grants

2024 (– 2029)	PI, with Éric Cancès and Julien Toulouse, of an interdisciplinary grant attributed by the CNRS board of directors
2017 – 2023	PI of the ERC Consolidator Grant <i>Mathematics of Density Functional Theory</i> , H2020 no. 725528.
2018 – 2022	Local head of the ANR project <i>molQED</i> (molecular Quantum Electrodynamics) in chemistry
2010 – 2015	PI of the ERC Starting Grant <i>Mathematics and Numerics of Infinite Quantum Systems</i> , FP7/2007–2013 no. 258023.
2010 – 2014	Coordinator of the ANR project <i>NoNAP</i> (Nonlinear Methods in Atomic and Nuclear Physics)
2010 – 2011	Grant PHC-Alliance obtained in collaboration with Lyonell Boulton (Heriot Watt University, Scotland)
2005 – 2009	Member of the ANR project <i>ACCQUAREL</i> (Computational Approaches in Relativistic Quantum Chemistry)

Students

Post-Docs

Asbjorn Lauritsen, Nov. 2024 –
Michal Jex, Sept. 2020 – Aug. 2022
Peter Madsen, Oct. 2019 – Feb. 2023
Fabio Pizzichillo, Oct. 2018 – Oct. 2021
Thomas Ourmières-Bonafos, Sept. 2018 – Aug. 2019
Luca Nenna, Sept. 2017 – Aug. 2018
Faizan Nazar, Jan. 2017 – Aug. 2019
Jonas Lampart, Jan. 2014 – Sept. 2016
Simona Rota-Nodari, Oct. 2012 – Sept. 2013
Phan Thành Nam, Oct. 2011 – Sept. 2013
Nicolas Rougerie, Dec. 2010 – Sept. 2011
Marco Ghimenti, 2007
Guillaume Legendre (with É. Séré), Nov. 2006 – Aug. 2007

PhD students

Francesco Cocco, Sept. 2025 –
Louis Detzen, Sept. 2024 –
Martin Malvy, with Laure Dumaz, Sept. 2022–
Rodrigue Lelotte, Sept. 2020 –Sept. 2023
Jean Cazalis, Sept. 2018 – Aug. 2022
Louis Garrigue, Sept. 2017 – Sept. 2020
Arnaud Triay-Alcouffe, Sept. 2015 – June 2019
Raphaël Ducatez, Sept. 2015 – Aug. 2018
Julien Ricaud, Oct. 2012 – June 2017
Salma Lahbabi, with Éric Cancès, Oct. 2010 – July 2013
Julien Sabin, Sept. 2010 – Dec. 2013
Séverine Paul, Sept. 2008 – Oct. 2012
Co-advisor of Amélie Deleurence (PhD with Éric Cancès), Sept. 2005 – Dec. 2008

Master & others

Francesco Cocco, 2025 (master Dauphine)
Louis Detzen, 2024 (master Dauphine)
Maher Billon, 2024 (ENS)
Pascal Capetillo & Jonathan Hornewall, 2022 (Polytechnique)
Yvann Gaudillot Estrada, 2021 (ENS)
Florent Fougères, 2021 (Polytechnique)
Rodrigue Lelotte, 2019 & 2020 (Polytechnique)
Louis Garrigue, 2017 (ENS)
Raphaël Ducatez, 2015 (ENS)
Arnaud Triay, 2013, 2014 & 2015 (ENS Lyon)
Thomas Dumas, 2013 (master Cergy)
Julien Ricaud, 2012 (master Paris 6)
Julien Sabin, 2008 & 2009 (ENS Lyon & master Dauphine)

Recent Teaching Activities

Courses

- 2016 – Various courses in Analysis, École Polytechnique
- 2007 – Master course in Mathematical Physics (with Éric Cancès), Univ. Paris Pierre & Marie Curie, **web**
- 2017 Master course in Mathematical Physics, Univ. Pierre & Marie Curie, **web**
- 2014 & 2015 Short Analysis course, École Normale Supérieure
- 2006 – 2016 PDE & Optimization (with Frédéric Legoll), École des Ponts - Paris Tech, **web**

Lectures for young researchers

- Feb. 2025 *Gross-Pitaevskii theory of supersolids* (5h), winter school and workshop *Mathematical Challenges in Quantum Mechanics*, L'Aquila, Italy
- Aug. 2024 *Theory of Inhomogeneous Classical Coulomb Systems* (5h), *Mathematical challenges in classical & quantum statistical mechanics*, Venice, Italy
- June 2024 *Mathematical Foundations of Density Functional Theory* (5h), *ISTA Summer School in Analysis and Mathematical Physics*, Kolterneuburg, Austria
- May 2024 *Lieb-Thirring inequalities* (4h), *Summer School and Workshop on "Spectral Theory, Fourier Analysis and PDE"*, Bilbao, Spain
- Aug. 2023 *Statistical mechanics of Coulomb and Riesz gases* (4h), *VIASM-IAMP Summer-school in Mathematical Physics*, Quy Nhon, Vietnam
- Mar. 2023 *Optimal transport in quantum chemistry and statistical mechanics* (2h), *Optimal Transport Theory and Applications to Physics*, Les Houches, France
- Nov. 2022 *Derivation of Gibbs measures from quantum mechanics* (4h), *Journées Louis Antoine*, Rennes, France
- Oct. 2022 Online course *Coulomb and Riesz gases: a review of what's known and unknown* (3h), Academy of Mathematics and System Sciences, Chinese Academy of Sciences, China. Can be watched on [youtube](#)
- Aug. 2022 *Coulomb and Riesz gases: the known and the unknown* (4h30), within the Conference *The Statistical Physics of Continuum Particle Systems with Strong Interactions*, Singapore
- May 2022 *The mathematical description of solids* (9h), Mini-school on mathematics for theoretical chemistry and physics, GDR *NBODY*, Paris, France
- Feb. 2022 *Lieb-Thirring inequalities: old and new* (3h), Conference of the GDR *Quantum Dynamics*, Toulouse, France
- Oct. 2021 *Large-scale limits for quantum gases* (4h), Conference on *Large-scale limits of interacting particle systems*, IHÉS, Bures sur Yvette, France. Can be watched on [youtube](#)
- Apr. 2021 Mini-course on *Riesz and Coulomb gases: what's known and unknown* (2h), Online seminar of the GDR MEGA. Can be watched on [youtube](#)
- Mar. 2019 *Nonlinear Gibbs measures and their derivation from quantum mechanics* (6h), Mittag-Leffler Institute, Stockholm, Sweden
- July 2017 *An introduction to critical point theory, with applications to quantum mechanics* (6h), Summerschool on *Current topics in Mathematical Physics*, Univ. Zürich, Switzerland
- 2016 Graduate Analysis Course, Université Paris-Dauphine
- June 2015 Lecture at IHES (in French) on *Nonlinear Gibbs measures and their derivation from quantum mechanics* (8h), can be seen on [youtube](#)
- Feb. 2015 *Open quantum systems and effective equations* (6h), Winterschool, Research Training Group 1838 on *Spectral Theory and Dynamics of Quantum Systems* (Univ. Stuttgart & Tübingen), Freudenstadt, Germany
- July 2013 *Mathematical foundations of quantum mechanics* (4h), Summerschool "Mathématiques – Chimie – Calcul Haute Performance", Institut du Calcul et de la Simulation (Univ. P. & M. Curie), Roscoff, France
- Jan. 2012 *Nonlinear equations with fractional powers of the Laplacian and applications to quantum mechanics* (8h with Enno Lenzmann), Università di Pisa, Italy
- Aug. 2011 *Geometric methods for nonlinear many-body quantum systems* (4h), Summerschool on *Current topics in Mathematical Physics*, Erwin Schrödinger Institute, Vienna, Austria

Organization of events

Long Programs

- 15 Apr. – 13 July 2013 (with Maria J. Esteban) Thematic Trimester *Variational and Spectral Methods in Quantum Mechanics*, Institut Henri Poincaré, [web](#)
- 2008 Coordinator of the semester *Systèmes Quantiques, Systèmes Complexes*, Université de Cergy-Pontoise

Conferences

- June 2025 (with J. Dolbeault, M.J. Esteban, R.L. Frank & É. Trélat), *Workshop on Functional Inequalities*, Paris-Dauphine, France
- Dec. 2024 (with R.L. Frank & P.T. Nam), conference on *Mathematical Physics and PDEs*, Herrsching, Germany
- Dec. 2022 (with S. Serfaty), conference on *Coulomb gases and universality*, Sorbonne Université, Paris, France
- 12 – 16 Aug. 2019 (with J. Yngvason), session on *many-body systems*, Conference QMATH 14, Århus, Denmark
- 20 – 25 May 2019 Workshop on *Mean-field and other effective models in mathematical physics*, Fondation Les Treilles, France
- 28 Jan. – 1 Feb. 2019 (with P. Gori Giorgi & B. Pass), Conference on *Optimal Transport Methods in Density Functional Theory*, Banff International Research Station, Canada
- 10 Sept. – 14 Sept. 2018 (with R. L. Frank & B. Schlein), Conference on *Many-body Quantum Mechanics*, CRM Montréal, Canada
- 30 June – 4 July 2014 (with R. L. Frank), Conference *Effective Equations in Mathematical Physics*, Mittag Leffler Institute, Stockholm, Sweden
- 14 – 18 Apr. 2014 (with P. D’Ancona, M.J. Esteban, L. Fanelli, L. Vega & N. Visciglia), Conference *Analysis of Relativistic and Non-Relativistic models in Quantum Mechanics*, La Sapienza, Roma, Italy
- 6 – 10 Aug. 2012 (with M. Griesemer) Session *Quantum many-body theory and condensed matter physics*, International Congress on Mathematical Physics, Ålborg, Denmark
- 21 – 25 June 2010 (with É. Séré) Conference *Mathematical Aspects of Quantum Electrodynamics*, Institut Henri Poincaré, Paris, France
- 28 May 2009 Session *Applications to Quantum Chemistry*, Conference SCICADE 09, Beijing, China
- 21 – 25 Apr. 2008 Conference *Quantum Statistical Physics and Information Theory*, Université de Cergy-Pontoise
- 31 Jan. – 1 Feb. 2008 (with F. Germinet & L. Bruneau) Conference *Spectral Problems in Quantum Mechanics*, Université de Cergy-Pontoise
- July 2007 (with G. Turinici) Session *Computational issues in Relativistic Quantum Chemistry*, ICIAM, Zurich, Switzerland
- 3 – 6 Sept. 2006 (with J.M. Barbaroux, F. Dunlop, F. Germinet, P. Hislop & F. Klopp) Conference *Transport and Spectral Problems in Quantum Mechanics* in honor of Jean-Michel Combes, Université de Cergy-Pontoise

Schools

- 28–29 June 2024 (with R. Cote, C. Fermanian, S. Klevtsov, G. Weick), Young Research Symposium at the *International Congress on Mathematical Physics*, Strasbourg, France
- 3 Aug. – 7 Aug. 2015 (with C. Hainzl, R. Seiringer, E. Stockmeyer, J. Tan & R. Tiedra), Summerschool *Current topics in Mathematical Physics*, Federico Santa María Technical University, Viña del Mar, Chile
- 2 – 7 Sept. 2013 (with M.J. Esteban & R. Seiringer), Summerschool *Current topics in Mathematical Physics*, CIRM Marseille, France

Seminars

- 2014 – Co-organizer of the monthly seminar on “Spectral Problems” of the GDR Quantum Dynamics, Institut Henri Poincaré
- 2017 – 2020 Co-organizer of the working group in Analysis and Probability, with Laure Dumaz
- 2005 – 2014 Co-organizer of the Mathematical Physics seminar, Université de Cergy-Pontoise

Outreach activities

- 2025 Interview by CNRS concerning the MAQUI project, [website](#)
- 2024 Interview by CNRS concerning the S2O publication model, [website](#)
- 2022 Interview by CNRS on the occasion of the ICM 2022, [website](#)
- 2021 Video interview for the website “Parlons Maths” (in French), [youtube](#)
- 2019 Video interview about the Dirac equation at ICIAM 2019, [youtube](#)
- 2019 Interview about the crystallization conjecture in *Sciences et Avenir*, no. 874
- 2017 M. Lewin, Bretzels, bagels, donuts et... topologie, CNRS Le Journal, [website](#)
- 2015 Portrait in *La Recherche*, [website](#)
- 2014 M. Lewin, Des cristaux et des maths, CNRS Le Journal, [website](#)
- 2014 Member of a communication team at CNRS about the year of crystallography

Others activities

- 2016–17 Talks about ERC grants in mathematics at the Polish Academy of Science (2016), for a training of CNRS managers (2017) and at the celebration of the 10 years anniversary of ERC at CNRS, with EU13 countries (2017), [webpage](#)

PUBLICATIONS

Books

- [1] M. Lewin. *Spectral theory and quantum mechanics*. Universitext. Springer International Publishing, 2024.
- [2] M. Lewin. *Théorie spectrale et mécanique quantique*. Mathématiques et Applications (SMAI). Springer International Publishing, 2022.
- [3] R. L. Frank, A. Laptev, M. Lewin, and R. Seiringer, editors. *The Physics and Mathematics of Elliott Lieb: The 90th Anniversary Volume (2 books)*. EMS Press, 2022.

Preprints

- [1] I. Anapolitanos, M. Lewin, and M. Roth. Differentiability of the van der Waals interaction between two atoms. *ArXiv e-prints*, 2019. [arXiv:1902.06683](#).

Published or Accepted Articles

- [1] E. Carlen, M. Lewin, E. H. Lieb, and R. Seiringer. Stability estimate for the Lane-Emden inequality. *Calc. Var. Partial Differential Equations*, in press, 2025. [arXiv:2410.20113](#).
- [2] M. Jex, M. Lewin, and P. Madsen. Classical Density Functional Theory: The Local Density Approximation. *Rev. Math. Phys.*, 37(04): 2450037, 2025. [arXiv:2310.18028](#), DOI.
- [3] M. Lewin and P. T. Nam. Positive-density ground states of the Gross-Pitaevskii equation. *Probab. Math. Phys.*, 6(3): 647–731, 2025. [arXiv:2310.03495](#), DOI.
- [4] S. Di Marino, M. Lewin, and L. Nenna. Grand-Canonical Optimal Transport. *Arch. Rat. Mech. Anal.*, 249: art. 12, 2025. [arXiv:2201.06859](#), DOI.
- [5] R. L. Frank, D. Gontier, and M. Lewin. Optimizers for the finite-rank Lieb-Thirring inequality. *Amer. J. Math.*, 147(2): 503–560, April 2025. [arXiv:2109.05984](#), DOI.
- [6] S. Di Marino, M. Lewin, and L. Nenna. Ground state energy is not always convex in the number of electrons. *J. Phys. Chem. A*, 128(49): 10697–10706, November 2024. [arXiv:2409.08632](#), DOI.
- [7] M. Jex, M. Lewin, and P. Madsen. Classical Density Functional Theory: Representability and Universal Bounds. *J. Stat. Phys.*, 190: 23, mar 2023. [arXiv:2210.07785](#), DOI.
- [8] M. Lewin, E. H. Lieb, and R. Seiringer. Improved Lieb-Oxford bound on the indirect and exchange energies. *Lett. Math. Phys.*, 112: Art. 92, 2022. Themed collection “Mathematical Physics and Numerical Simulation of Many-Particle Systems”; V. Bach and L. Delle Site (eds.). [arXiv:2203.12473](#), DOI.
- [9] M. Lewin. Coulomb and Riesz gases: The known and the unknown. *J. Math. Phys.*, 63: 061101, 2022. Special collection in honor of Freeman Dyson. [arXiv:2202.09240](#), DOI.
- [10] J. A. Carrillo, M. G. Delgadino, R. L. Frank, and M. Lewin. Fast diffusion leads to partial mass concentration in Keller-Segel type stationary solutions. *Math. Models Methods Appl. Sci.*, 32(4): 831–850, 2022. [arXiv:2012.08586](#), DOI.
- [11] A. Teale, T. Helgaker, A. Savin, M. Lewin, and 66 other authors. DFT Exchange: Sharing Perspectives on the Workhorse of Quantum Chemistry and Materials Science. *Phys. Chem. Chem. Phys.*, 2022. Advance article. Preprint available on ChemRxiv:2022-13j2v. DOI.
- [12] M. J. Esteban, M. Lewin, and É. Séré. Dirac-Coulomb operators with general charge distribution. II. The lowest eigenvalue. *Proc. London Math. Soc.*, 123(4): 345–383, 2021. [arXiv:2003.04051](#), DOI.
- [13] M. J. Esteban, M. Lewin, and É. Séré. Dirac-Coulomb operators with general charge distribution. I. Distinguished extension and min-max formulas. *Ann. Henri Lebesgue*, 4: 1421–1456, 2021. [arXiv:2003.04004](#), DOI.
- [14] R. L. Frank, D. Gontier, and M. Lewin. The nonlinear Schrödinger equation for orthonormal functions II. Application to Lieb-Thirring inequalities. *Comm. Math. Phys.*, 384: 1783–1828, 2021. [arXiv:2002.04964](#), DOI.

- [15] D. Gontier, M. Lewin, and F. Q. Nazar. The nonlinear Schrödinger equation for orthonormal functions I. Existence of ground states. *Arch. Rat. Mech. Anal.*, 240: 1203–1254, 2021. [arXiv:2002.04963](#), DOI.
- [16] M. Lewin, P. T. Nam, and N. Rougerie. Classical field theory limit of many-body quantum Gibbs states in 2D and 3D. *Invent. Math.*, 224(2): 315–444, 2021. [arXiv:1810.08370](#), DOI.
- [17] M. Lewin and S. Rota Nodari. The double-power nonlinear Schrödinger equation and its generalizations: uniqueness, non-degeneracy and applications. *Calc. Var. Partial Differ. Equ.*, 59: 197, 2020. [arXiv:2006.02809](#), DOI.
- [18] S. Fournais, M. Lewin, and A. Triay. The Scott correction in Dirac-Fock theory. *Comm. Math. Phys.*, 378: 569–600, 2020. [arXiv:1911.09482](#), DOI.
- [19] M. Lewin and J. Sabin. The Hartree and Vlasov equations at positive density. *Comm. Partial Differential Equations*, 45(12): 1702–1754, 2020. [arXiv:1910.09392](#), DOI.
- [20] M. Lewin, E. H. Lieb, and R. Seiringer. The Local Density Approximation in Density Functional Theory. *Pure Appl. Anal.*, 2(1): 35–73, 2020. [arXiv:1903.04046](#), DOI.
- [21] I. Anapolitanos and M. Lewin. Compactness of molecular reaction paths in quantum mechanics. *Arch. Rat. Mech. Anal.*, 236(2): 505–576, 2020. [arXiv:1809.06110](#), DOI.
- [22] M. Lewin, E. H. Lieb, and R. Seiringer. Floating Wigner crystal with no boundary charge fluctuations. *Phys. Rev. B*, 100: 035127, July 2019. [arXiv:1905.09138](#), DOI.
- [23] M. Lewin, P. Madsen, and A. Triay. Semi-classical limit of large fermionic systems at positive temperature. *J. Math. Phys.*, 60: 091901, 2019. [arXiv:1902.00310](#), DOI.
- [24] D. Gontier and M. Lewin. Spin symmetry breaking in the translation-invariant Hartree-Fock Uniform Electron Gas. *SIAM J. Math. Anal.*, 51(4): 3388–3423, 2019. [arXiv:1812.07679](#), DOI.
- [25] D. Gontier, C. Hainzl, and M. Lewin. Lower bound on the Hartree-Fock energy of the electron gas. *Phys. Rev. A*, 99: 052501, 2019. [arXiv:1811.12461](#), DOI.
- [26] M. J. Esteban, M. Lewin, and É. Séré. Domains for Dirac-Coulomb min-max levels. *Rev. Mat. Iberoam.*, 35(3): 877–924, 2019. [arXiv:1702.04976](#), DOI.
- [27] M. Lewin. Existence of Hartree-Fock excited states for atoms and molecules. *Lett. Math. Phys.*, 108(4): 985–1006, 2018. [arXiv:1708.00287](#), DOI.
- [28] M. Lewin. Semi-classical limit of the Levy-Lieb functional in Density Functional Theory. *C. R. Math. Acad. Sci. Paris*, 356(4): 449–455, 2018. [arXiv:1706.02199](#), DOI.
- [29] M. Lewin, E. H. Lieb, and R. Seiringer. Statistical mechanics of the Uniform Electron Gas. *J. Éc. polytech. Math.*, 5: 79–116, 2018. [arXiv:1705.10676](#), DOI.
- [30] M. Lewin, P. T. Nam, and N. Rougerie. Gibbs measures based on 1D (an)harmonic oscillators as mean-field limits. *J. Math. Phys.*, 59: 041901, 2018. [arXiv:1703.09422](#), DOI.
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- [35] J. Lampart and M. Lewin. Semi-classical Dirac vacuum polarisation in a scalar field. *Ann. Henri Poincaré*, 17(8): 1937–1954, 2016. [arXiv:1506.00895](#), DOI.
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- [51] E. Lenzmann and M. Lewin. Dynamical ionization bounds for atoms. *Analysis & PDE*, 6(5): 1183–1211, 2013. [arXiv:1207.6898](#), DOI.
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- [19] M. Lewin. Solutions of the multiconfiguration equations in quantum chemistry. *Oberwolfach Reports*, 1(3): 1541–1586, 2005. Workshop “Calculus of variations” June, 2004.

General Audience Articles

- [1] M. Lewin. L'équation de Schrödinger pour les atomes et les molécules. *Gazette des Mathématiciens*, 177: 9–24, July 2023. Société Mathématique de France.
- [2] M. Chupin, J. Dolbeault, M. J. Esteban, and M. Lewin. Une cartographie de la communauté mathématique française. *Matapli – Bulletin de la Société de Mathématiques Appliquées et Industrielles* no. 115 (Mars), p. 51–71 & *La Gazette des Mathématiciens – Bulletin de la Société Mathématique de France* no. 156 (Avril), p. 49–61, 2018.
- [3] M. Lewin. Bretzels, bagels, donuts et... topologie. *CNRS Le Journal*, 2017.
- [4] M. Lewin. Limite de champ moyen et condensation de Bose-Einstein. *Gazette des Mathématiciens*, 139: 35–49, Jan 2014. Société Mathématique de France.
- [5] M. Lewin. Des cristaux et des maths. *CNRS Le Journal*, 2014.

Thesis

- [1] M. Lewin. Large Quantum Systems: a Mathematical and Numerical Perspective. Habilitation à Diriger des Recherches, University of Cergy-Pontoise, June 2009.
- [2] M. Lewin. *Some nonlinear models in Quantum Mechanics*. PhD thesis, University of Paris-Dauphine, June 2004.

Others

- [1] M. Lewin. Théorie spectrale et mécanique quantique. Cours de l'École Polytechnique, 2018.
- [2] M. Lewin. Éléments de théorie spectrale : le Laplacien sur un ouvert borné. Notes de cours de Master 2, 2017.
- [3] M. Lewin. Describing lack of compactness in Sobolev spaces. Lecture notes on *Variational Methods in Quantum Mechanics*, University of Cergy-Pontoise, hal:02450559, 2010.

TALKS

International Conferences (selection)

2024	Oct.	Mini-Workshop on <i>Condensed Matter Physics</i> , Garmish-Partenkirchen, Germany
	July	Long talk at the Physics Symposium on <i>Open questions in the quantum many-body problem</i> , Paris, France. Can be watched on Carmin TV or youtube
	Apr.	Conference on <i>Frontiers in Analysis and Mathematical Physics</i> , Seoul, Korea
2023	Oct.	Mini-workshop on <i>Mathematics of Many-body Fermionic Systems</i> , Oberwolfach, Germany
	Sept.	Workshop on <i>Many-Body Quantum Systems</i> , Oberwolfach, Germany
	Aug.	VIASM-IAMP <i>summer school and workshop in Mathematical Physics</i> , Quy Nhon, Vietnam
	June	Conference <i>Frontiers in Mathematical Physics</i> , CY University, Cergy-Pontoise, France
	June	Conference <i>Correlations in Mathematical Quantum Mechanics</i> in honor of Jan Philip Solovej, Copenhagen, Denmark
	June	Colloquium du laboratoire de physique, ENS Lyon, France
	May	Colloquium of the Mathematical Institute, LMU Munich, Germany
	Mar.	<i>Maxwell Institute Mini-symposium in Analysis and PDEs</i> , Edinburgh, UK
	Mar.	Long course at the Conference on <i>Optimal Transport Theory and Applications to Physics</i> , Les Houches, France
2022	Aug.	Long course at the Conference on <i>The Statistical Physics of Continuum Particle Systems with Strong Interactions</i> , Singapore
	July	Conference <i>Advances in Mathematical Physics</i> in honor of Elliott H. Lieb on his 90th Birthday, Harvard, USA
	July	Invited speaker at the online ICM 2022. Can be watched on youtube
	May	Conference on <i>Mathematical results of many-body quantum systems</i> , Herrsching, Germany
	Apr.	Online talk at the workshop on <i>Model Reduction in Quantum Mechanics</i> , IPAM, University of California Los Angeles, USA
	Mar.	Conference <i>CY Days in Nonlinear Analysis</i> , Cergy-Pontoise, France
	Mar.	Workshop <i>Inverse Problems and related fields</i> , Marseille, France
2021	Nov.	Workshop <i>Inverse Problems and related fields</i> , Marseille, France
	Aug.	Conference <i>Solid Math</i> , Marne La Vallée, France
	June	IAMP One World Mathematical Physics Seminar, online. Can be watched on youtube
	June	SwissMAP workshop on <i>Emergent theories for wave turbulence and particle dynamics</i> , Les Diablerets, Switzerland
	May	Conference on <i>Schrödinger equations</i> , Le Croisic, France
	Apr.	Eighth Texas Analysis and Mathematical Physics Symposium, online conference at UT Austin, USA
2020	Jan.	Conference of the GDR <i>N-Body</i> , Lille, France
2019	Nov.	Symposium on <i>Developments in the Mathematical Sciences</i> , Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany
	Oct.	Conference on <i>The analysis of complex systems</i> , CIRM, France
	Sept.	Conference on <i>Density Functionals for Many-Particle Systems: Mathematical Theory and Physical Applications of Effective Equations</i> , Singapore
	July	Minisymposia on <i>Dirac Hamiltonians with critical singularities</i> , ICIAM Conference, Valencia, Spain
	June	Conference on <i>Mathematical and Numerical Analysis of Electronic Structure Models</i> , Suzhou, China
	Jan.	Kick-off conference of the trimester on <i>Spectral Methods in Mathematical Physics</i> , Mittag-Leffler Institute, Stockholm, Sweden
	Jan.	Conference <i>Results in Contemporary Mathematical Physics</i> in honor of Rafael Benguria, Santiago, Chile
2018	Dec.	Conference <i>Results in Contemporary Mathematical Physics</i> in honor of Rafael Benguria, Santiago, Chile
	Oct.	Workshop on the occasion of the <i>60th birthday of Claude-Alain Pillet</i> , Montreal, Canada

	July	Conference on <i>Physics and Mathematics of Quantum Field Theory</i> , Banff International Research Station, Canada
	July	<i>International Congress on Mathematical Physics</i> (contributed talk), Montréal, Canada
	July	Colloquium of the Mathematics Department, LMU Munich, Germany
	June	SIAM Conference on <i>Nonlinear Waves</i> , Los Angeles, USA
	June	Workshop on <i>The analysis of Dirac equations</i> , Orsay, France
	May	Conference on <i>Partial Differential Equations in Physics and Materials Science</i> , Heraklion, Crete
	May	Conference on <i>Recent Results on Quantum Many-Body Systems</i> (in honor of Heinz Siedentop), Herrsching, Germany
	Mar.	Workshop on <i>Mathematical Methods in Quantum Chemistry</i> , Oberwolfach, Germany
2017	Sept.	Workshop on <i>Quantum Field Theory</i> , Oberwolfach, Germany
	Aug.	Conference on <i>Mathematical challenges in classical & quantum statistical mechanics</i> , Venice, Italy
	May	Workshop <i>Optimal Transport meets Density Functional Theory</i> , Jyväskylä, Finland
	Mar.	Workshop on <i>Macroscopic limits of quantum systems</i> , TU Munich, Germany
	Feb.	Conference <i>New trends in Mathematical Physics at the interface of Analysis and Probability</i> , London, UK
	Jan.	Workshop on <i>Applications of Optimal Transportation in the Natural Sciences</i> , Oberwolfach, Germany
2016	Dec.	Workshop on <i>Evolution Equations</i> , Valdivia, Chile
	Oct.	Workshop on <i>Synergies between Mathematical and Computational Approaches to Quantum Many-Body Physics</i> , ESI Vienna, Austria
	Sept.	Workshop on <i>Many-Body Quantum Systems and Effective Theories</i> , Oberwolfach, Germany
	Aug.	Conference on <i>Methods of Modern Mathematical Physics</i> (Young Researcher Symposium on the Occasion of the 70th Birthday of Barry Simon), Fields Institute Toronto, Canada
	June	Conference on <i>New challenges in mathematical modelling and numerical simulation of superfluids</i> , CIRM Marseille, France
	June	Conference on <i>Spectral Theory and Mathematical Physics</i> , Univ. Cergy-Pontoise, France
	June	Conference on <i>Mathematical Many-Body Theory and its Applications</i> , BCAM, Bilbao, Spain
	May	Workshop on <i>Quantum Dynamics & Control</i> , Institut Henri Poincaré, Paris, France
	May	Symposium on <i>Trends in Mathematical Crystallisation</i> , Warwick University, UK
	Jan.	<i>Indo-French conference in Mathematics</i> , Chennai, India
2015	Oct.	Conférence “États de la recherche” on <i>Supraconductivity, superfluidity & Vortices</i> , IHP Paris, France
	July	Plenary speaker at the <i>International Congress of Mathematical Physics</i> , Santiago de Chile
	June	ANR Meeting on <i>Spectral and scattering theories in Quantum Field Theory</i> , Porquerolles, France
	June	Workshop on <i>Mathematical Methods in Quantum Molecular Dynamics</i> , Oberwolfach, Germany
	Apr.	Chemistry workshop on <i>Advances in electronic structure theory</i> , Jussieu, Paris, France
	Mar.	Séminaire <i>Monde Quantique</i> , I.H.E.S, France
	Feb.	Opening lecture of the <i>Mary Cartwright lecture</i> by Maria J. Esteban, London Mathematical Society, London, UK
	Jan.	<i>6th itinerant meeting in PDE</i> , SISSA, Trieste, Italy
2014	Oct.	<i>Spectral Theory</i> Workshop to celebrate the 70th birthday of Brian Davies, King’s College London, UK
	Oct.	Conference on <i>Nonlinearity, Transport, Physics, and Patterns</i> , Fields Institute, Toronto, Canada
	Sept.	Conference <i>Scaling Limits and Effective Theories in Classical and Quantum Mechanics</i> , ESI Vienna, Austria
	Apr.	Conference <i>Theoretical and Numerical Aspects of Quantum Transport</i> , Ålborg, Denmark
	Mar.	Conference <i>Mathematical and Numerical Methods for Complex Quantum Systems</i> , Univ. Illinois Chicago, USA
	Mar.	Warwick EPSRC Symposium on <i>Statistical Mechanics: Many-Body Quantum Systems</i> , UK
2013	Oct.	Workshop on <i>Disordered Quantum Many-Body Systems</i> , Banff, Canada

- Oct. Conference *Mathématiques pour le graphène*, Univ. Joseph Fourier, Grenoble, France
- Sept. Conference *Analytical and quantum mechanical aspects of Schrodinger and Dirac operators*, Pisa, Italy
- June Journées E.D.P., Biarritz, France
- May Conference on *Conical Intersections in Mathematical Physics*, Institut Henri Poincaré, Paris
- May Workshop on *Analytical Aspects of Mathematical Physics*, ETH Zürich, Switzerland
- Apr. Workshop on *Numerical Challenges in Relativistic Quantum Chemistry*, Institut Henri Poincaré, Paris, France
- Apr. *EMS Weekend*, session on *Partial Differential Equations and Applications*, Århus, Denmark
- Mar. Conference *Analysis and Stochastics in Complex Physical Systems*, Leipzig, Germany
- Feb. 5th meeting of the GDR “Quantum Dynamics”, Lille, France
- 2012** Oct. Conference on *Recent Developments in the Mathematical Analysis of Large Systems*, Erwin Schrödinger Institute, Vienna, Austria
- Sept. Conference on *New Perspectives in Nonlinear PDEs*, Rome, Italy
- Aug. VMS–SMF Joint Congress, Session on PDE, Hue, Vietnam
- Aug. Workshop on *New developments in relativistic quantum mechanics and applications*, Newton Institute, Cambridge, UK
- July *Mathematics of Many-Particle Systems* (conference in honor of Elliott H. Lieb, on the occasion of his 80th birthday), Berlin, Germany
- July *6th European Mathematical Congress (EMS Prize talk)*, Kraków, Poland
- May Workshop on *Mathematical and Numerical Analysis of Electronic Structure Models*, Beijing, China
- May Workshop on *Quantum Many-Body Systems*, Montréal, Canada
- Apr. *Spectral Days*, Munich, Germany
- 2011** Oct. *EMS Week End*, session on *PDEs and applications to mechanics and physics*, Bilbao, Spain
- July Thematic Minisymposia on *Quantum Modeling in Molecular Simulation* and on *Current interests in Mathematical Physics*, International Congress on Industrial and Applied Mathematics (ICIAM 2011), Vancouver, Canada
- July Conference *Intellectual Challenges in Multiscale Modelling of Solids*, University of Oxford, UK
- June Workshop *Mathematical Methods in Quantum Chemistry*, Oberwolfach, Germany
- Feb. Fourth School and Workshop on *Mathematical Methods in Quantum Mechanics*. Bressanone, Italy
- 2010** Sept. Conference on *New Approaches in Many-Electron Theory*, Max-Planck-Institut für Polymerforschung, Mainz, Germany
- Sept. QMATH11 (**plenary speaker**), Hradec Králové, Czech Republic
- Aug. ICM 2010 Satellite Conference on *Quantum Systems*, Chennai, India
- June Workshop on *Matter and Radiation*, Erwin Schrödinger Institute, Vienna, Austria
- May *SIAM Conference on Mathematical Aspects of Material Sciences*, Session on *Electronic structure*, Philadelphia, USA
- Apr. *2010 British Mathematical Colloquium* and *British Applied Mathematics Colloquium*, Session *Spectral Theory*, Edinburgh, Scotland
- Mar. *Annual meeting of the German Math. Society (DMV)*, Session *Mathematical methods in quantum chemistry and electronic structure theory*, Munich, Germany
- 2009** Sept. *International Conference on Numerical Analysis and Applied Mathematics*, Symposium on *Numerical methods and their applications in molecular simulation*, Rethymnon, Crete
- Sept. Conference *Mathematics of Complex Quantum Systems*, Oberwolfach, Germany
- Aug. Banff workshop on the *Analysis of nonlinear wave equations and applications in engineering*, Banff, Canada
- 2008** Sept. IMA Annual Program Year Workshop *Mathematical and Algorithmic Challenges in Electronic Structure Theory*, Minneapolis, USA
- July *XI Encuentro de Matematica y sus Aplicaciones (plenary speaker)*, Quito, Ecuador
- June *Canadian-French Conference*, Montréal, Canada

2007	Sept.	<i>QMATH 10</i> , Moeiciu, Romania
	Aug.	4th Danish Symposium on <i>Applied Analysis</i> , Copenhagen, Denmark
	July	<i>International Conference on Scientific Computation and Differential Equations</i> (SciCADE 2007). Symposium <i>Applications to Chemistry</i> , Saint-Malo, France
	Mar.	<i>Relativistic Effects in Heavy Elements</i> , Ottrott, France
	Feb.	Workshop <i>Multiscale and Variational Methods in Material Science and Quantum Theory of Solids</i> , Oberwolfach, Germany
	Jan.	Conference <i>Semi-classical Days XIV</i> , CIRM, Marseille, France
2006	Oct.	Conference <i>Mathematical and Numerical Aspects of Quantum Chemistry Problems</i> , Oberwolfach, Germany
	July	Conference <i>Mathematics in Chemistry</i> , Lisbon, Portugal
	June	Workshop on <i>Quantum Mechanics of Complex Systems</i> , Erwin Schrödinger Institute, Vienna, Austria
2005	Dec.	Conference <i>Topological and Variational Methods in Partial Differential Equations</i> , Guanajuato, Mexico
	Nov.	Conference <i>Mathematical Methods for Ab Initio Quantum Chemistry</i> , Nice, France
	Apr.	Fourth international conference on <i>Analysis and Quantum</i> , München, Germany
2004	Dec.	Conference of the 2004-2005 Warwick EPSRC Symposium on <i>Mathematical challenges in quantum chemistry</i> , Warwick, UK
	Aug.	Conference of the 2004-2005 Warwick EPSRC Symposium on <i>Large many-body systems</i> , Warwick, UK
	July	Satellite conference of the 4th European Congress of Mathematics (ECM), <i>Spectrum and Quantum Mechanics</i> , Stockholm, Sweden
	June	Workshop on <i>Calculus of variations</i> , Oberwolfach, Germany
2003	Dec.	Meeting of the EU network “Analysis and Quantum”, ESI, Vienna, Austria
	Feb.	<i>Applied Mathematics and Applications of Mathematics</i> (AMAM), Symposium of <i>Quantum Chemistry</i> , Nice, France