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Date of birth: April 28 1985  
(31 year old)  
Nationality: french



## Positions held

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- 2011- ...**      [LABORATOIRE DE PHYSIQUE ET MODÉLISATION DES MILIEUX CONDENSÉS CNRS AND UNIVERSITÉ GRENOBLE 1.](#)  
Chargé de Recherche (Researcher) CNRS.
- 2010-2011**      [LABORATOIRE ANALYSE, GÉOMÉTRIE ET MODÉLISATION CNRS AND UNIVERSITÉ DE CERGY-PONTOISE.](#)  
Post-Doctoral associate. Advisor: Mathieu Lewin, ERC project MNIQS.
- 2007-2010**      [LABORATOIRE JACQUES-LOUIS LIONS UNIVERSITÉ PIERRE ET MARIE CURIE.](#)  
Graduate student. Advisors: Xavier Blanc and Sylvia Serfaty.

## Formation

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- 2007 – 2010**      [LABORATOIRE JACQUES-LOUIS LIONS](#), Université Pierre et Marie Curie.  
PHD in Mathematics.  
Advisors : Xavier Blanc and Sylvia Serfaty.  
Subject : Gross-Pitaevskii theory for rotating Bose-Einstein condensates : vortices and phase transitions.  
Defended December 9, 2010.
- 2006 – 2007**      [ÉCOLE NATIONALE SUPÉRIEURE DES MINES DE NANCY UNIVERSITÉ PIERRE ET MARIE CURIE - PARIS 6.](#)  
French Engineer Diploma: “Ingénieur Civil des Mines”.  
Master degree, Numerical Analysis and Partial Differential Equations.
- 2004 – 2006**      [ÉCOLE NATIONALE SUPÉRIEURE DES MINES DE NANCY UNIVERSITÉ HENRI POINCARÉ - NANCY 1.](#)  
Engineering studies.  
Master studies in Mathematics.

## Distinctions

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- 2015: Young Scientist Prize awarded by the International Union of Pure and Applied Physics
- 2014: Cours Peccot at the “Collège de France”
- 2010: Rosemont-Demassieux Prize, delivered by the “Chancellerie des Universités de Paris”

## Responsibilities

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- Principal Investigator of the ANR project Mathostaq, “Mathematical methods for the many-body problem in statistical and quantum mechanics”, 2013-2016
- Principal Investigator of the PEPS-PTI project (CNRS) “Méthodes mathématiques pour la physique des atomes froids”, 2013
- Principal Investigator of the PEPS-PTI project (CNRS) “Many-body quantum mechanics and cold atoms”, 2012

## Publications

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*This list follows the anti-chronological order of the preprints. To access full texts:*  
<http://arxiv.org/>

### Papers

- 28.** E. H. LIEB, N. ROUGERIE, J. YNGVASON, Rigidity of the Laughlin liquid, arXiv:1609.03818 (2016)
- 27.** D. LUNDHOLM, N. ROUGERIE, Emergence of fractional statistics for tracer particles in a Laughlin liquid, *Physical Review Letters* **116**, 170401 (2016)
- 26.** M. CORREGGI, N. ROUGERIE, Effects of boundary curvature on surface superconductivity, *Letters in Mathematical Physics* **106** (4), 445-467 (2016)
- 25.** M. LEWIN, P.T. NAM, N. ROUGERIE, A note on 2D focusing many-bosons systems, to appear in *Proceedings of the American Mathematical Society*, arXiv:1509.09045 (2015)
- 24.** D. LUNDHOLM, N. ROUGERIE, The average field approximation for almost bosonic extended anyons, *Journal of Statistical Physics* **161** (5), 1236–1267 (2015)
- 23.** P.T. NAM, N. ROUGERIE, R. SEIRINGER, Ground states of large bosonic systems: The Gross-Pitaevskii limit revisited, *Analysis and PDEs* **9** (2), 459–485 (2016)
- 22.** N. ROUGERIE, J. YNGVASON, Incompressibility estimates for the Laughlin phase, part II, *Communications in Mathematical Physics* **339**, 263-277 (2015)
- 21.** M. LEWIN, P.T. NAM, N. ROUGERIE, Derivation of nonlinear Gibbs measures from many-body quantum mechanics, *Journal de l'Ecole Polytechnique* **2**, 65-115 (2015)
- 20.** M. CORREGGI, N. ROUGERIE, Boundary behavior of the Ginzburg-Landau order parameter in the surface superconductivity regime, *Archive for Rational Mechanics and Analysis* **219** (1), 553-606 (2016)
- 19.** M. LEWIN, P.T. NAM, N. ROUGERIE, The mean-field approximation and the non-linear Schrödinger functional for trapped Bose gases, *Transactions of the American Mathematical Society* **368**, 6131-6157 (2016)
- 18.** N. ROUGERIE, J. YNGVASON, Incompressibility estimates for the Laughlin phase, *Communications in Mathematical Physics* **336** (3), 1109-1140 (2015)
- 17.** M. LEWIN, P.T. NAM, N. ROUGERIE, Remarks on the quantum de Finetti theorem for bosonic systems, *Applied Mathematics Research Express* **2015**, 48-63 (2015)
- 16.** M. CORREGGI, N. ROUGERIE, On the Ginzburg-Landau functional in the surface superconductivity regime, *Communications in Mathematical Physics* **332** (3), 1297-1343 (2014)
- 15.** N. ROUGERIE, S. SERFATY, Higher Dimensional Coulomb Gases and Renormalized Energy Functionals, *Communications on Pure and Applied Mathematics* **69** (3), 519 (2016)

14. M. LEWIN, P.T. NAM, N. ROUGERIE, Derivation of Hartree's theory for generic mean-field Bose systems, *Advances in Mathematics* **254**, 570-621 (2014)
13. N. ROUGERIE, S. SERFATY, J. YNGVASON, Quantum Hall phases and plasma analogy in rotating trapped Bose gases, *Journal of Statistical Physics* **154**, 2-50 (2014)
12. N. ROUGERIE, S. SERFATY, J. YNGVASON, Quantum Hall states of bosons in rotating anharmonic traps, *Physical Review A*, **87**, 023618 (2013)
11. M. CORREGGI, N. ROUGERIE, Inhomogeneous Vortex Patterns in Rotating Bose-Einstein Condensates, *Communications in Mathematical Physics* **321**, 817-860 (2013)
10. M. LEWIN, N. ROUGERIE, On the binding of polarons in a mean-field quantum crystal, *ESAIM: Control, Optimization, Calculus of Variations* **19**, 629-656 (2012)
9. M. LEWIN, N. ROUGERIE, Derivation of Pekar's Polarons from a Microscopic Model of Quantum Crystals, *SIAM Journal on Mathematical Analysis* **45**, 1267-1301 (2013)
8. M. CORREGGI, F. PINSKER, N. ROUGERIE, J. YNGVASON, Critical Rotational Speeds for Superfluids in Homogeneous Traps, *Journal of Mathematical Physics* **53**, Special issue: in honor of Elliott Lieb's 80th birthday, 095203 (2012)
7. M. CORREGGI, F. PINSKER, N. ROUGERIE, J. YNGVASON, Rotating superfluids in anharmonic traps: ed From vortex lattices to giant vortices, *Physical Review A* **84**, 053614 (2011)
6. M. CORREGGI, F. PINSKER, N. ROUGERIE, J. YNGVASON, Critical Rotational Speeds in the Gross-Pitaevskii Theory on a Disc with Dirichlet Boundary Conditions, *Journal of Statistical Physics* **143**, 261-305 (2011)
5. N. ROUGERIE, Annular Bose-Einstein Condensates in the Lowest Landau Level, *Applied Mathematics Research Express* **Volume 2011**, 95-121 (2011)
4. N. ROUGERIE, Vortex Rings in Fast Rotating Bose-Einstein Condensates, *Archive for Rational Mechanics and Analysis* **203**, 69 (2012)
3. M. CORREGGI, N. ROUGERIE, J. YNGVASON, The transition to a Giant Vortex Phase in a Fast Rotating Bose-Einstein Condensate, *Communications in Mathematical Physics* **303**, 451-508 (2011)
2. N. ROUGERIE, The Giant Vortex State for a Bose-Einstein Condensate in a Rotating Anharmonic Trap : Extreme Rotation Regimes, *Journal de Mathématiques pures et appliquées* **95**, 296-347 (2011)
1. X. BLANC, N. ROUGERIE, Lowest-Landau-Level vortex structure of a Bose- Einstein condensate rotating in a harmonic plus quartic trap, *Physical Review A* **77**, 053615 (2008)

**Proceedings, Reviews, Lecture notes ...**

10. N. ROUGERIE, Some contributions to many-body quantum mathematics, *Habilitation thesis, arXiv:1607.03833* (2016)

9. M. LEWIN, P.T. NAM, N. ROUGERIE, Bose gases at positive temperature and non-linear Gibbs measures , *proceedings of the 18th ICMP, Santiago de Chile 2015*, *arXiv:1602.05166*
8. N. ROUGERIE, Estimations d'incompressibilité pour la phase de Laughlin, *Lettre de l'INSMI, cnrs.fr/insmi/spip.php?article1367* (2015)
7. N. ROUGERIE, From Bosonic Grand-Canonical Ensembles to Nonlinear Gibbs Measures , Séminaire Laurent Schwartz, Année 2014-2015, *arXiv:1507.01440*
6. N. ROUGERIE, De Finetti theorems, mean-field limits and Bose-Einstein condensation, course at the LMU, Munich, April 2015 (translation of my cours Peccot), *arXiv:1506.05263*
5. N. ROUGERIE, Théorèmes de de Finetti, limites de champ moyen et condensation de Bose-Einstein, Cours Peccot au Collège de France, Février-Mars 2014, *arXiv:1409.1182*
4. N. ROUGERIE, Sur la modélisation de l'interaction entre polarons et cristaux quantiques, Séminaire Laurent Schwartz, Année 2012-2013, Exposé Numéro 7, 18 décembre 2012 *arXiv:1306.0235*.
3. M. CORREGGI, F. PINSKER, N. ROUGERIE, J. YNGVASON, Vortex Phases of Rotating Superfluids, Proceedings of the 21st International Laser Physics Workshop, Calgary, July 23-27, 2012 *arXiv:1212.3680* (2012)
2. M. CORREGGI, F. PINSKER, N. ROUGERIE, J. YNGVASON, Giant vortex phase transition in rapidly rotating trapped Bose-Einstein condensates, *European Journal of Physics, Special Topics* **217**, 183–188, proceedings of the conference *Theory of quantum gases and quantum coherence*, Lyon 2012, (2013)
1. N. ROUGERIE, La théorie de Gross-Pitaevskii pour un condensat de Bose-Einstein en rotation : vortex et transitions de phase, PHD thesis, *tel-00547404* (2010)

## Talks

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- *Rigidity of the Laughlin liquid*, “Mathematical results in quantum physics”, Qmath13 , Atlanta, October 2016
- *Emergent anyons in quantum Hall physics*, Many-Body theory and effective equations, Oberwolfach, September 2016
- *Structure of large bosonic systems : de Finetti theorems and applications*, Institute for Analysis und Algebra, Technische Universität Braunschweig, September 2016
- *Localized regime for mean-field bosons in a double-well potential*, Conference on Methods of Modern Mathematical Physics, Toronto, August 2016
- *Emergent anyons in quantum Hall physics*, EMS-IAMP Summer School in Mathematical Physics, Rome, July 2016
- *Mean-field and dilute limits for large bosonic systems: the use of quantum de Finetti theorems*, Spectral and scattering theories in Quantum Field Theory, Porquerolles, May 2016
- *Incompressibility estimates for the Laughlin phase*, Mathematical Physics seminar, Bristol, April 2016
- *Emergent anyons in quantum Hall physics*, conference Spectral Theory of Novel Materials, CIRM, Marseille, April 2016
- *Effets de courbure en supraconductivité de surface*, séminaire Physique Mathématique, Institut Fourier, Grenoble, March 2016

- *Derivation of non-linear Gibbs measures from many-body quantum mechanics*, séminaire Physique Mathématique, Université Lyon 1, January 2016
- *The surface superconductivity regime in Ginzburg-Landau theory*, Workshop “Superconductivity, superfluidity, vortices”, Paris, October 2015
- *The surface superconductivity regime in Ginzburg-Landau theory*, invited talk, 18th International Congress on Mathematical Physics, Santiago de Chili, July 2015
- *Derivation of non-linear Gibbs measures from many-body quantum mechanics*, invited talk, 18th International Congress on Mathematical Physics, Santiago de Chili, July 2015
- *Incompressibility estimates for the Laughlin phase*, program “Quantum Many-Body Systems, Random Matrices, and Disorder”, ESI, Vienna, June 2015
- *The Ginzburg-Landau model in the surface superconductivity regime*, workshop “Semiclassical Analysis and Magnetic Fields”, Rennes, May 2015
- *Structure of large bosonic systems: around the quantum de Finetti theorem*, Technische Universität München, April 2015
- *De Finetti theorems, mean-field limits and Bose-Einstein condensation*, course at the Ludwig-Maximilian Universität, Munich, April 2015
- *Incompressibility estimates for the Laughlin phase*, “Le monde quantique” Trimester, IHES, Mars 2015
- *Classical Coulomb gases: mean-field approximation and beyond*, Applied Analysis Seminar, Université d’Aix-Marseille, January 2015
- *Questions around Bose-Einstein condensation*, Physics Colloquium, ENS Lyon, January 2015
- *Classical Coulomb gases: mean-field approximation and beyond*, Mathematical Physics Seminar, Université de Genève, December 2014
- *Derivation of non-linear Gibbs measures from many-body quantum mechanics*, X-EDP Seminar, November 2014
- *Incompressibility estimates for the Laughlin phase*, University Rome 3, November 2014
- *Méthodes mathématiques pour la physique des atomes froids*, Colloque physique théorique et ses interfaces, Paris, November 2014
- *The Ginzburg-Landau model in the surface superconductivity regime*, Analysis Seminar, University of Zürich, October 2014
- *On the derivation of non-linear Schrödinger functionals for trapped Bose gases*, conference “Selected Problems in Mathematical Physics”, La Spezia, Italy, September 2014
- *Derivation of non-linear Schrödinger models based on the structure of bosonic states*, workshop “Effective equations in Mathematical Physics”, Institut Mittag-Leffler, Stockholm, June 2014
- *The Ginzburg-Landau model in the surface superconductivity regime*, seminar “Problèmes Spectraux en Physique Mathématique”, Institut Henri Poincaré, Paris, May 2014
- *Incompressibility estimates for the Laughlin phase*, workshop “Theoretical and Numerical Aspects of Quantum Transport”, Aalborg, Denmark, April 2014
- *Théorèmes de de Finetti, limites de champ moyen et condensation de Bose-Einstein*, cours Peccot at the Collège de France, Paris, February-March 2014
- *Classical Coulomb gases beyond mean-field theory*, Paris-London Analysis Seminar, Paris, December 2013
- *L’équation de Hartree et le théorème de de Finetti*, Séminaire Analyse Numérique et EDPs, Orsay, November 2013
- *Structure of large bosonic systems: the mean-field approximation and the quantum de Finetti theorem*, Mathematical physics seminar, Princeton University, November 2013
- *Bose-Einstein condensation of interacting particles and the quantum de Finetti theorem*, Philippe Nozières Seminar on Theoretical Physics, Grenoble, October 2013
- *Structure of large bosonic systems: the mean-field approximation and the quantum de Finetti theorem*, Conference “Mathematical Horizons for Quantum Physics 2”, National University of Singapore, September 2013

- *Mean-field bosonic systems and the quantum de Finetti theorem*, Conference “Mathematical properties of large quantum systems”, Institut Henri Poincaré, Paris, June 2013
- *Mean-field classical Coulomb systems and the renormalized jellium energy*, Warwick Statistical Mechanics Seminar, Warwick University, May 2013
- *Quantum Hall states and plasma analogy in rotating trapped Bose gases*, Maths-Physics Young Researchers Meeting, Institut Henri Poincaré, Paris, April 2013
- *Quantum Hall states and plasma analogy in rotating trapped Bose gases*, Institute for Theoretical Physics, ETH Zürich, March 2013
- *Sur la modélisation de l'interaction entre polarons et cristaux quantiques*, Laurent Schwartz Seminar, Ecole Polytechnique, December 2012
- *Quantum Hall states and plasma analogy in rotating trapped Bose gases*, Institut Fourier, Grenoble, November 2012
- *Inhomogeneous Vortex Patterns in Rotating Bose-Einstein Condensates*, Young Researcher Symposium, 17th International Congress on Mathematical Physics (ICMP12), Aalborg, Denmark, August 2012
- *On the binding of polarons in a mean-field quantum crystal*, Collège de France, Paris, May 2012
- *Dérivation de la théorie de Pekar du polaron à partir d'un modèle de cristal quantique*, Laboratoire Jacques-Louis Lions, Paris, January 2012
- *Around the third critical speed in Gross-Pitaevskii theory*, Conference “Multiscale Modeling, Simulation, Analysis and Applications”, National University of Singapore, December 2011
- *On the third critical speed in Gross-Pitaevskii theory*, Journées Lions-Magenes, Laboratoire Jacques-Louis Lions, Paris, December 2011
- *Derivation of Pekar's polarons from a microscopic model of quantum crystals*, Università di Roma Tre, Rome, November 2011
- *Derivation of Pekar's polarons from a microscopic model of quantum crystals*, Laboratoire Paul Painlevé, Lille, November 2011
- *Un modèle de petit polaron et sa limite macroscopique*, meeting ANR Ardypiteq, IRMAR, Rennes, November 2011
- *Cristaux quantiques et modèles pour le polaron*, meeting ANR NoNap, Institut Henri Poincaré, October 2011
- *Gross-Pitaevskii Theory in a Flat Trap: the Third Critical Speed*, Conference “Superconductivity, Bose-Einstein Condensation and Liquid Crystals”, Aarhus, Denmark, June 2011
- *Cristaux quantiques et modèles pour le polaron*, IRMAR, Rennes, June 2011
- *Sur les vitesses critiques en théorie de Gross-Pitaevskii*, Numerical Analysis and PDEs seminar, Orsay, April 2011
- *Théorie de Gross-Pitaevskii pour des superfluides en rotation*, Mathematical Physics seminar, Institut Fourier, Grenoble, April 2011
- *Vortex géants et cercles de vortex dans un condensat de Bose-Einstein en rotation rapide*, Laboratoire de Physique Théorique et Modèles Statistiques, Orsay, April 2011
- *La troisième vitesse critique en théorie de Gross-Pitaevskii*, Institut Élie Cartan, Nancy, April 2011
- *Quelques résultats mathématiques sur les condensats de Bose-Einstein en rotation rapide*, Laboratoire de Physique et Modélisation des Milieux Condensés, Grenoble, March 2011
- *Sur les vitesses critiques en théorie de Gross-Pitaevskii*, Laboratoire de Mathématiques et Applications, Metz, February 2011
- *Around the third critical speed in Gross-Pitaevskii theory*, Troisième rencontre du GDR Dynamique Quantique, Orléans, February 2011
- *Quelques résultats mathématiques sur les condensats de Bose-Einstein en rotation*, Laboratoire de Physique des Lasers, Université Paris 13, January 2011
- *Around the third critical speed in Gross-Pitaevskii theory*, Université d'Aarhus, Denmark, November 2010

- *Around the third critical speed in Gross-Pitaevskii theory*, journée du projet ATHENA, FRUMAM, Marseille, November 2010
- *Autour de la troisième vitesse critique en théorie de Gross-Pitaevskii*, Students seminar, Mathematics Department, Université de Cergy-Pontoise, October 2010
- *Bose-Einstein condensates : extreme rotation regimes and giant vortices*, Analysis seminar, Université Paris 6 – ENS Ulm, April 2010
- *Giant vortex for a Bose-Einstein condensate in rapid rotation*, Transatlantic seminar, Université Paris 6 – Brown University, December 2009
- *Extreme rotation regimes for a Bose-Einstein condensate*, Erwin Schrödinger Institute for Mathematical Physics, Vienna, June 2009
- *Rotation ultra-rapide d'un condensat de Bose-Einstein*, Spectral Theory and Mathematical Physics seminar, Université Paris 11, Orsay, March 2009
- *Rotation ultra-rapide d'un condensat de Bose-Einstein*, Students' seminar "Numerical Analysis and PDEs", Université Paris 11, Orsay, January 2009
- *Rotation ultra-rapide d'un condensat de Bose-Einstein*, Laboratoire Jacques-Louis Lions, October 2008

### Popularizing work

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- *L'Equation du millénaire*, comic book in collaboration with Gaël Octavia and Camille Bouvard, published by the "Fondation Science Mathématique de Paris": <http://www.sciencesmaths-paris.fr/fr/bd-462.htm>