

**FERRIER-BARBUT Igor**  
**Chargé de recherche CNRS**

Laboratoire Charles Fabry  
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[Google Scholar](#)

### RESEARCH INTERESTS:

Quantum physics, atomic, molecular and optical physics  
Quantum many-body physics  
Long-range interacting systems  
Atom-light interactions

### RESEARCH EXPERIENCE:

Atomic molecular and optical physics:

**2018-present Chargé de recherche CNRS**

Laboratoire Charles Fabry, Institut d'optique  
Palaiseau, France  
Quantum optics - atoms team

**2014-2018 Post-doctoral researcher, group leader, Marie Skłodowska-Curie fellow**  
5. Physikalisches Institut, Stuttgart University, group of Pr. Dr. Tilman Pfau,  
Stuttgart, Germany  
Dipolar quantum gases team

**2011-2014 Graduate student researcher**  
Laboratoire Kastler-Brossel, ENS Paris, France  
Ultracold fermions team  
Advisors: Christophe Salomon and Frédéric Chevy

### TEACHING EXPERIENCE:

**2014-2018 Co-advising: 6 graduate students, 4 master students and several bachelor students as group leader in T. Pfau's research group**

**2014-2018 Stuttgart University physics department:**

Weekly exercise sections:

Atomic physics,  
Linear optics and non-linear optics

Lectures:

Atomic physics and quantum gases of bosons and fermions

**2011-2014 ENS Paris physics department:**

Experimental projects:

Atomic physics, quantum optics

Weekly exercise sections:

Special relativity and E&M

Examiner for ENS entrance exam:

Experimental examination (design of the setups, student assessment)

## EDUCATION:

- 2011-2014 Graduate Studies *Ecole Normale Supérieure, physics dept., Paris, France*  
Title: Mixtures of Bose and Fermi superfluids  
Obtained with "Félicitations du jury à l'unanimité"
- 2010-2011 Second year of Masters of Science in Physics at *Université Pierre et Marie Curie and Ecole Normale Supérieure, Paris, France*  
Quantum Physics program
- 2009-2010 First year of Masters of Science in Physics at the *University of California at Berkeley, Berkeley, CA*  
As part of the *Education Abroad Program*, exchange with UGA
- 2005-2009 Bachelor of science in Physics / Licence de Physique. *Université Grenoble Alpes (UGA), Grenoble, France*

## OUTREACH ACTIVITIES:

- 2015-2016 Preparation of hands-on experiments for the outreach activities of the PI5 in Stuttgart through "Spiel der Kräfte"
- 2011-2014 Organization and supervision of scientific weeks for high-school students in the Paris area offered by the association "Science Ouverte"

## AWARDS AND HONOURS:

Marie Skłodowska-Curie individual fellowship, MSCA Actions, European Union

Young Researcher Prize, "Prix Jeunes chercheurs"

IFRAF/GDR atomes froids, french cold atoms research network

Doctoral School PhD grant,

Government grant, delivered by the Île de France Physics doctoral school (EDPIF)

## REFEREE SERVICE:

Referee for scientific articles: *Science, Nature, Nature Physics, Physical Review Letters, Physical Review X, Physical Review A, New Journal of Physics, Optics Express, Europhysics Letters, Applied Physics B, Physics Letters A.*

Referee for scientific proposals: *Various national science academies.*

**SCIENTIFIC PUBLICATIONS:**

ResearcherID: J-8759-2016

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[Google Scholar](#)**Perspective pieces:**

- **Ultradilute quantum droplets**, Physics Today feature article  
[I. Ferrier-Barbut](#)  
*Physics Today* **72**, 4, 46 (2019)
- **Quantum liquids get thin**, perspective article about: *Science* **359**, 301 (2018)  
[I. Ferrier-Barbut](#) and T. Pfau  
*Science* **359**, 274 (2018)
- **Smashing magnets**, perspective article about: *New J. Phys.* **18**, 113004 (2016)  
[I. Ferrier-Barbut](#)  
*New J. Phys.* **18**, 111004 (2016)

**Peer-reviewed:**

- **Dilute dipolar quantum droplets beyond the extended Gross-Pitaevskii equation**  
F. Böttcher, M. Wenzel, J.-N. Schmidt, M. Guo, T. Langen, [I. Ferrier-Barbut](#), T. Pfau, R. Bombin, J. Sánchez-Baena, J. Boronat and F. Mazzanti.  
*Phy. Rev. Res.* **1**, 033088 (2019)
- **A fermionic impurity in a dipolar quantum droplet**  
M. Wenzel, T. Pfau and [I. Ferrier-Barbut](#)  
*Physica Scripta* **113**, 104004 (2018)
- **Anisotropic superfluid behavior of a dipolar Bose-Einstein condensate**  
M. Wenzel, F. Böttcher, J. N. Schmidt, M. Eisenmann, T. Langen, T. Pfau and [I. Ferrier-Barbut](#)  
*Phys. Rev. Lett.* **121**, 030401 (2018)
- **Scissors mode of a dipolar quantum droplet of dysprosium atoms**  
[I. Ferrier-Barbut](#), M. Wenzel, F. Böttcher, T. Langen, M. Isoard, S. Stringari and T. Pfau  
*Phys. Rev. Lett.* **120**, 160402 (2018)
- **Onset of a modulational instability in trapped dipolar Bose-Einstein condensates**  
[I. Ferrier-Barbut](#), M. Wenzel, M. Schmitt, F. Böttcher, T. Pfau  
*Phys. Rev. A* **97**, 011604(R) (2018)
- **Striped states in a many-body system of tilted dipoles**  
M. Wenzel, F. Böttcher, T. Langen, [I. Ferrier-Barbut](#) and T. Pfau  
*Phys. Rev. A* **96**, 053630 (2017)
- **Self-bound droplets of a dilute magnetic quantum liquid**  
M. Schmitt, M. Wenzel, F. Böttcher, [I. Ferrier-Barbut](#) and T. Pfau  
*Nature* **539**, 259 (2016)  
subject of a **News & Views** article by B. Laburthe-Tolra
- **Liquid quantum droplets of ultracold magnetic atoms**  
[I. Ferrier-Barbut](#), M. Schmitt, M. Wenzel, H. Kadau and T. Pfau,  
*J. Phys. B.* **49**, 214004 (2016)
- **Observation of quantum droplets in a strongly dipolar Bose gas**  
[I. Ferrier-Barbut](#), H. Kadau, M. Schmitt, M. Wenzel, and T. Pfau,  
*Phys. Rev. Lett.* **116**, 215301 (2016)  
subject of a **Physics Viewpoint** by L. D. Carr & B. L. Lev
- **Observing the Rosensweig instability of a quantum ferrofluid**  
H. Kadau, M. Schmitt, M. Wenzel, C. Wink, T. Maier, [I. Ferrier-Barbut](#) and T. Pfau  
*Nature* **530**, 194 (2016)

- **Universal loss dynamics in a unitary Bose gas**

U. Eismann, L. Khaykovich, S. Laurent, [I. Ferrier-Barbut](#), B. S. Rem, A. T. Grier, M. Delehaye, F. Chevy, C. Salomon, L.-C. Ha and C. Chin  
*Phys. Rev. X* **6**, 021025 (2016)

- **Critical velocity and dissipation of an ultracold Bose-Fermi counterflow**

M. Delehaye, S. Laurent, [I. Ferrier-Barbut](#), S. Jin, F. Chevy, and C. Salomon  
*Phys. Rev. Lett.* **115**, 265303 (2015)

- **Broad universal Feshbach resonances in the chaotic spectrum of dysprosium atoms**

T. Maier, [I. Ferrier-Barbut](#), H. Kadau, M. Schmitt, M. Wenzel, C. Wink, T. Pfau, K. Jachymski, and P. S. Julienne  
*Phys. Rev. A* **92**, 060702 (2015)

- **Emergence of chaotic scattering in ultracold Er and Dy**

T. Maier, H. Kadau, M. Schmitt, M. Wenzel, [I. Ferrier-Barbut](#), T. Pfau, A. Frisch, S. Baier, K. Aikawa, L. Chomaz, M. J. Mark, F. Ferlaino, C. Makrides, E. Tiesinga, A. Petrov, and S. Kotochigova  
*Phys. Rev. X* **5**, 041029 (2015)

- **The Landau critical velocity for a particle in a Fermi superfluid**

Y. Castin, [I. Ferrier-Barbut](#), C. Salomon  
*Comptes Rendus Physique* **16**, 241 (2015) ([link to french version](#))

- **A mixture of Bose and Fermi superfluids**

[I. Ferrier-Barbut](#), M. Delehaye, S. Laurent, A. T. Grier, M. Pierce, B. S. Rem, F. Chevy, and C. Salomon  
*Science* **345**, 1035 (2014)

- **$\Lambda$ -enhanced sub-Doppler cooling of lithium atoms in D1 gray molasses**

A. T. Grier, [I. Ferrier-Barbut](#), B. S. Rem, M. Delehaye, L. Khaykovich, F. Chevy, and C. Salomon  
*Phys. Rev. A* **87**, 063411 (2013)

- **Lifetime of the Bose Gas with resonant interactions**

B. S. Rem, A. Grier, [I. Ferrier-Barbut](#), U. Eismann, T. Langen, N. Navon, L. Khaykovich, F. Werner, D. S. Petrov, F. Chevy, and C. Salomon  
*Phys. Rev. Lett.* **110**, 163202 (2013)

## INVITED LECTURES:

- International school on quantum gases (3x60min lectures)  
Chlef, Algeria (2018)
- Granada quantum matter summer school (2x90min lectures)  
Granada, Spain (2017)

## INVITED TALKS IN INTERNATIONAL CONFERENCES:

- XXII conference on few-body problems in physics  
Caen, France (2018)
- Workshop on long-range interactions in atomic systems  
São Carlos, Brazil (2017)
- From few to many, exploring quantum systems one atom at a time  
Oberurgl, Austria (2017)
- 47th colloquium on the physics of quantum electronics PQE2017  
Snowbird, Utah (2017)
- Gauge field dynamics with ultracold gas systems 2016  
Bad Honnef, Germany (2016)
- Long-range interactions in the ultracold workshop 2016  
Ercolano, Italy (2016)

- Quantum gases and quantum coherence BEC 2016  
Salerno, Italy (2016)
- Ultracold quantum gases, current trends and perspectives Quo Vadis BEC 2016  
Bad Honnef, Germany (2016)
- Quantum Optics 2016  
Oberurgl, Austria (2016)
- Workshop: Advanced atomic sources and extreme cooling of atoms and molecules 2016  
Les Houches, France (2016)
- Synthetic Quantum Magnetism International Workshop 2015  
Dresden, Germany (2015)
- 2015 International Symposium on Quantum Fluids and Solids QFS2015  
Niagara Falls, NY (2015)

### CONTRIBUTED TALKS:

- 7th colloquium of the CNRS research network “quantum engineering, foundations and applications” (2016)  
Paris, France
- Quantum technologies conference V  
Krakow, Poland (2014)
- Laser Physics international workshop LPHYS13  
Prague, Czech Republic (2013)

### SEMINARS:

- LPTMS, Orsay, France (2019)
- FEMTO-ST Time & Frequency Department, Besançon, France (2019)
- Syddansk University, Odense, Denmark (2018)
- Institute of Photonic Sciences, Barcelona, Spain (2017)
- Weizmann Institute of Science, Rehovot, Israel (2017)
- Institut d’Optique Graduate School, Palaiseau, France (2016)
- Leibnitz Universität Hannover, seminar series of the research training group 1991, Hannover, Germany (2016)
- Heidelberg University, Heidelberg, Germany (2016)
- Toronto University, Toronto, Canada (2015)
- Néel Institut, Grenoble, France (2014)
- Heidelberg University, Kirchhoff Institute, Heidelberg, Germany (2014)
- Cambridge University, Cavendish Laboratory, Cambridge, UK (2014)
- University of Stuttgart in the 5. Physikalisches Institut, Stuttgart, Germany (2014)

### MISCELLANEOUS:

- 1st prize of Applied Physics B poster prizes at ICOLS 2017 conference Arcachon, France
- 2017 publication prize, Stuttgart Universität faculty of physics and mathematics