

CURRICULUM VITÆ

Dr. Leticia Tarruell

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born on April 12th 1981 in Madrid, Spain
Spanish and French citizen



Academic positions

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|-----------------|--|
| since 06/2013 | Junior Group leader (NEST fellow), Ultracold Quantum Gases
ICFO – The Institute of Photonic Sciences, Castelldefels (Barcelona), Spain |
| 01/2012–05/2013 | Junior CNRS researcher (Chargée de recherche de 2 ^{eme} classe)
Group of Dr. Philippe Bouyer
Laboratoire Photonique, Numérique et Nanosciences,
Institut d’Optique d’Aquitaine, Bordeaux, France |
| 07/2008–09/2012 | Post-doctoral researcher
"Fermi-Hubbard physics, artificial graphene and quantum magnetism with ultracold fermions in optical lattices"
Group of Prof. Tilman Esslinger
ETH Zurich, Switzerland |

Education

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| 10/2004–06/2008 | PhD thesis, Université Pierre et Marie Curie–Paris 6, France
"Superfluidity in an ultracold Fermi gas"
Group of Dr. Christophe Salomon
Laboratoire Kastler Brossel, Ecole Normale Supérieure, Paris, France |
| 09/2003–06/2004 | Master in Quantum Physics, Ecole Normale Supérieure, Paris, France
Master thesis: "Interactions in an ultracold Fermi gas"
Group of Dr. Christophe Salomon
Laboratoire Kastler Brossel, Ecole Normale Supérieure, Paris, France |
| 09/2002–07/2003 | Erasmus student, Université Denis Diderot–Paris 7, France
Research internship: "Collective oscillations of a classical gas.
Construction of a Zeeman slower"
Group of Dr. David Guéry-Odelin and Dr. Jean Dalibard
Laboratoire Kastler Brossel, Ecole Normale Supérieure, Paris, France |
| 09/1999–07/2002 | Undergraduate studies in physics, Universidad Complutense de Madrid, Spain |

Awards and scholarships

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| 2013 | NEST Fellowship, CELLEX Foundation |
| 2012 | Poster prize of the International Conference on Atomic Physics – ICAP 2012 |
| 2004–2007 | Allocation de Recherche of the French Ministry of Research for the PhD thesis |
| 2003–2004 | Scholarship of the French Ministry of Education for the Master studies |
| 2002–2003 | Erasmus scholarship for a one-year exchange at Université Paris 7, France |
| 1999 | Premio Extraordinario de Bachillerato |

Research talks

Invited talks at conferences

- **CLEO Symposium on "Quantum Simulators"**
San José, USA (2013): *Simulating graphene with ultracold fermions in a honeycomb optical lattice*
- **Symposium on "Topological Quantum Information"**
Benasque, Spain (2013): *Engineering Dirac points with ultracold fermions in a tunable honeycomb optical lattice*
- **KITP program on "Quantum Dynamics in Far from Equilibrium Thermally Isolated Systems"**
Santa Barbara, USA (2012): *Engineering Dirac points with ultracold fermions in optical lattices*
- **Session plénière, Groupe de Recherche "Physique Mésoscopique"**
Aussois, France (2012): *Engineering Dirac points with ultracold fermions in optical lattices*
- **Workshop on "Quantum Simulations with Ultracold Atoms"**
ICTP, Trieste, Italy (2012): *Engineering Dirac points with ultracold fermions in optical lattices*
- **Workshop on "Theory of Quantum Gases and Quantum Coherence"**
ENS Lyon, France (2012): *Engineering Dirac points with ultracold fermions in optical lattices*
- **Winter conference on "New directions in Ultracold Atoms"**
Aspen, USA (2012): *Creating, moving and merging Dirac points with a Fermi gas in a tunable honeycomb lattice*
- **Workshop on "Ultracold atoms/molecules"**
National Tsing-Hua University, Hsinchu, Taiwan (2011): *Studying the metal-Mott insulator transition with ultracold fermions in an optical lattice*
- **Workshop on "Ultrafast Dynamics in Strongly Correlated Systems"**
ETH Zurich, Switzerland (2011): *Non-equilibrium dynamics of ultracold fermions in optical lattices*
- **Workshop on "Ultracold Quantum Gases Beyond Equilibrium"**
Natal, Brazil (2010): *Equilibrium and out of equilibrium physics with ultracold fermions in optical lattices*
- **Workshop on "Time-dependent dynamics and non-equilibrium quantum systems"**
Budapest, Hungary (2010): *Equilibrium and out of equilibrium physics with ultracold fermions in optical lattices*
- **Workshop on "Quantum Simulation with Cold Atoms and Molecules"**
Aspen, USA (2009): *Exploring the Fermi-Hubbard model with atoms in optical lattices*
- **International School on "Ultracold Fermi Gases"**
Varenna, Italy (2006): *Expansion of ^6Li in the BEC-BCS crossover*

Contributed talks at conferences

- **Journées de la Matière Condensée – Société française de physique**
Montpellier, France (2012): *Engineering Dirac points with ultra-cold fermions in optical lattices*
- **Congrès général de la Société française de physique**
Bordeaux, France (2011): *Probing nearest-neighbor correlations of ultra-cold fermions in an optical lattice*
- **Congrès général de la Société française de physique**
Grenoble, France (2007): *Superfluidité dans un gaz de fermions ultra-froids.*
- **Program and Conference on "Recent progress in the studies of quantum gases"**
Institut Henri Poincaré, Paris, France (2007): *p-wave Feshbach resonances of ultra-cold ^6Li*
- **Workshop on "Quantum engineering with photons, atoms and molecules"**
Les Houches, France (2005): *p-wave Feshbach resonances of ultra-cold ^6Li*

Seminars

- Institute of Theoretical Physics, Georg-August University, Goettingen, Germany (2013): *Engineering synthetic quantum materials with ultracold fermions in a tunable-geometry optical lattice*
- Goethe University, Frankfurt, Germany (2013): *Engineering artificial materials with ultracold fermions in a tunable-geometry optical lattice*
- Max Planck Institute for the Physics of Complex Systems, Dresden, Germany (2012): *Engineering Dirac points with ultracold fermions in optical lattices*
- Laboratoire Photonique, Numérique et Nanosciences, Institut d'Optique, Bordeaux, France (2012): *Engineering Dirac points with ultracold fermions in optical lattices*
- ICTP, Trieste, Italy (2012): *Engineering Dirac points with ultracold fermions in optical lattices*
- Journée de l'Institut de Physique Fondamentale, Bordeaux, France (2011): *Observation et manipulation de points de Dirac dans un gaz de fermions ultra-froids*
- Atelier de Physique Théorique, Université de Genève, Switzerland (2011): *Creating, moving and merging Dirac points with a Fermi gas in a tunable honeycomb lattice*
- Ultracold Atoms Group, University of Nottingham, United Kingdom (2011): *Probing nearest-neighbor correlations of ultra-cold fermions in an optical lattice*
- Institute of Atomic and Subatomic Physics, Vienna University of Technology, Austria (2011): *Simulating strongly correlated materials with ultracold fermions in optical lattices*
- Institute of Photonic Sciences, Barcelona, Spain (2011): *Simulating strongly correlated materials with ultracold fermions in optical lattices*
- Centre de Physique Moléculaire, Optique et Hertzienne, Université Bordeaux 1, France (2010): *Transition métal-insulant de Mott avec des fermions ultra-froids piégés dans un réseau optique*
- University of Kaiserslautern, Germany (2010): *Equilibrium and out of equilibrium physics with ultra-cold fermions in optical lattices*
- University of Stuttgart, Germany (2009): *Equilibrium and out of equilibrium physics with ultracold fermions in optical lattices*
- Laboratoire Charles Fabry, Institut d'Optique, Palaiseau, France (2009): *Fermions en interaction dans un réseau optique : isolant de Mott et physique hors équilibre*
- Laboratoire Agrégats-Collisions-Réactivité, Université Paul Sabatier, Toulouse, France (2008): *Systèmes fortement corrélés avec des fermions ultra-froids : de la superfluidité à l'isolant de Mott fermionique*
- Ultracold Atoms and Quantum Gases Group, University of Innsbruck, Austria (2007): *Superfluidity in an ultra-cold Fermi gas*
- Ultracold Atoms Group, University of Mainz, Germany (2007): *Superfluidity in an ultra-cold Fermi gas*
- Quantum Optics Group, ETH Zurich, Switzerland (2007): *Superfluidity in an ultra-cold Fermi gas*
- Ultracold Atoms Group, Kirchhoff Institute for Physics, University of Heidelberg, Germany (2007): *Experimental study of fermionic lithium in the BEC-BCS crossover*

Poster presentations

- **International Conference in Atomic physics ICAP 2012**, Palaiseau, France (2012): *Engineering Dirac points with ultracold fermions in an optical lattice*– ICAP poster prize 2012
- **Conference on "Bose Einstein Condensation 2011"**, Sant Feliu de Guixols, Spain (2011): *Ultracold fermions in a tunable honeycomb optical lattice*
- **Conference on "Frontiers of Ultracold Atoms and Molecules"**, Santa Barbara, USA (2010): *Quantitative study of the metal-Mott insulator transition with ultracold fermions in optical lattices*
- **Workshop on "Theory of Quantum Gases and Quantum Coherence"**, Grenoble, France (2008): *A new experimental setup for the study of superfluidity in ultracold Fermi gases*
- **Conference on "Bose Einstein Condensation 2007"**, Sant Feliu de Guixols, Spain (2007):

Expansion of a lithium gas in the BEC-BCS crossover

- **Summer School on "Coherence and interactions in atomic and condensed matter physics"**, Boulder, USA (2004): *Experimental study of strongly interacting lithium 6*

Teaching experience

- Development of demonstration and laboratory experiments: "single-photon interference", "entangled photons", "atom-photon interaction" (3rd-4th year)
Prize of the ETH physics department for the advanced physics laboratory 2012
ETH Zurich (2008-2012)
- Exercise classes and substitute lecturer, "Quantum gases 1&2" (5th year)
ETH Zurich (2010-2011)
- Exercise classes, "Physics 1&2" for physicists and non physicists (1st year)
Université Pierre et Marie Curie-Paris 6 (2004-2006) and ETH Zurich (2009-2010)
- Exercise classes and laboratory experiments, "Lasers" for chemists (3rd year)
École Normale Supérieure Paris (2006-2008)
- Supervisor of five experimental internships (3rd-5th year)
University of Zurich (2008), ETH Zurich (2009-2012) and Université Bordeaux 1 (2012).
- Co-supervisor of six PhD students
ETH Zurich (2008-2012) and Université Bordeaux 1 (2012-2013)

Other scientific activities

- Referee for Physical Review Letters and Physical Review A
- Co-organizer with T. Esslinger, L. Pollet and M. Troyer of the CECAM workshop "Modeling materials with cold gases through simulations", November 9-11, 2011, Zurich
- Member of the ETH administrative team for the conference "Bose-Einstein Condensation 2011" organized by T. Esslinger and E. Altman, September 10-16, 2011, Sant Feliu de Guixols

SCIENTIFIC PUBLICATIONS

Research articles

- D. Greif, T. Uehlinger, G. Jotzu, L. Tarruell and T. Esslinger
Short-range quantum magnetism of ultracold fermions in an optical lattice
Science **340**, 1307 (2013) [Selected for a Science "Perspective"]
- T. Uehlinger, D. Greif, G. Jotzu, L. Tarruell, T. Esslinger, L. Wang and M. Troyer
Double transfer through Dirac points in a tunable honeycomb optical lattice
Eur. Phys. J. Special Topics **217**, 121 (2013) [Selected as cover of the issue]
- L. Tarruell, D. Greif, T. Uehlinger, G. Jotzu and T. Esslinger
Creating, moving and merging Dirac points with a Fermi gas in a tunable honeycomb lattice
Nature **483**, 302 (2012) [Selected as cover of the issue, and for a Nature "News and Views"]
- D. Greif, L. Tarruell, T. Uehlinger, R. Jördens and T. Esslinger
Probing nearest-neighbor correlations of ultracold fermions in an optical lattice
Phys. Rev. Lett. **106**, 145302 (2011)
- R. Sensarma, D. Pekker, E. Altman, E. Demler, N. Strohmaier, D. Greif, R. Jördens, L. Tarruell, H. Moritz and T. Esslinger
Lifetime of double occupancies in the Fermi-Hubbard model
Phys. Rev. B **82**, 224302 (2010)
- R. Jördens, L. Tarruell, D. Greif, T. Uehlinger, N. Strohmaier, H. Moritz, T. Esslinger, L. De Leo, C. Kollath, A. Georges, V. Scarola, L. Pollet, E. Burovski, E. Kozik and M. Troyer
Quantitative Determination of Temperature in the Approach to Magnetic Order of Ultracold Fermions in an Optical Lattice
Phys. Rev. Lett. **104**, 180401 (2010)
- N. Strohmaier, D. Greif, R. Jördens, L. Tarruell, H. Moritz, T. Esslinger, R. Sensarma, D. Pekker, E. Altman and E. Demler
Observation of elastic doublon decay in the Fermi-Hubbard model
Phys. Rev. Lett. **104**, 080401 (2010)
- S. Nascimbène, N. Navon, K. Jiang, L. Tarruell, M. Teichmann, J. McKeever, F. Chevy and C. Salomon
Collective Oscillations of an Imbalanced Fermi Gas: Axial Compression Modes and Polaron Effective Mass
Phys. Rev. Lett. **103**, 170402 (2009)
- F. Werner, L. Tarruell and Y. Castin
Number of closed-channel molecules in the BEC-BCS crossover
Eur. Phys. J. B **68**, 401 (2009)
- F. Chevy, E. G. M. van Kempen, T. Bourdel, J. Zhang, L. Khaykovich, M. Teichmann, L. Tarruell, S. J. J. M. F. Kokkelmans and C. Salomon
Resonant scattering properties close to a p-wave Feshbach resonance
Phys. Rev. A **71**, 062710 (2005)

- J. Zhang, E. G. M. van Kempen, T. Bourdel, L. Khaykovich, J. Cubizolles, F. Chevy, M. Teichmann, L. Tarruell, S. J. J. M. F. Kokkelmans and C. Salomon
P-wave Feshbach resonances of ultra-cold ^6Li
Phys. Rev. A **70**, 030702 (2004)
- T. Bourdel, L. Khaykovich, J. Cubizolles, J. Zhang, F. Chevy, M. Teichmann, L. Tarruell, S. J. J. M. F. Kokkelmans and C. Salomon
Experimental Study of the BEC-BCS Crossover Region in Lithium 6
Phys. Rev. Lett. **93**, 050401 (2004)

Conference proceedings

- C. Guerlin, K. Baumann, F. Brennecke, D. Greif, R. Jördens, S. Leinss, N. Strohmaier, L. Tarruell, T. Uehlinger, H. Moritz and T. Esslinger
Synthetic Quantum Many-Body Systems
LASER SPECTROSCOPY: Proceedings of the XIX International Conference on Laser Spectroscopy ICOLS 2009. World Scientific, pp. 212-221 (2010)
- L. Tarruell, M. Teichmann, J. McKeever, T. Bourdel, J. Cubizolles, L. Khaykovich, J. Zhang, N. Navon, F. Chevy and C. Salomon
Expansion of an ultra-cold lithium gas in the BEC-BCS crossover
Proceedings of the International School on Physics Enrico Fermi 2006, Ultracold Fermi Gases (eds. Inguscio, M., Ketterle, W. and Salomon, C.), pp. 845-855. IOS Press, Amsterdam (2007)
- J. Zhang, E.G.M. Van Kempen, T. Bourdel, L. Khaykovich, J. Cubizolles, F. Chevy, M. Teichmann, L. Tarruell, S. J. J. M. F. Kokkelmans and C. Salomon
Expansion of a lithium gas in the BEC-BCS crossover
ATOMIC PHYSICS 19: XIX International Conference on Atomic Physics ICAP 2004. AIP Conference Proceedings, Volume 770, pp. 228-237 (2005)