

GAEL REINAUDI

Permanent resident

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Education

- Sep 2004-Aug 2008 • **Ph.D. in physics, *École Normale Supérieure de Paris***
Atom Optics Group led by Claude Cohen-Tannoudji (Nobel Laureate)
Ph.D. thesis published as a book
- Sep 2001-Aug 2005 • ***École Normale Supérieure de Paris*** (Admission through competitive exams)

Skills

Quantitative:

- Numerical methods, probability, basic knowledge of financial mathematics
- Highly logical and curious, rigorous analysis as well as back-of-the-envelope calculation

Programming:

- C++, data structures, class hierarchy design, design patterns, algorithms, optimization
- Tools/IDE: Python, iPython, git, Fabric, Django, LogStash, Visual Studio, Eclipse, Linux
- Competitor in the TopCoder and Google CodeJam algorithm competitions

Computer Driven Optimization:

- Numerical libraries: NLOpt, AlgLib, GaLib & Evolving Objects (genetic optimization)
- Completed course by Andrew Ng (machine learning) and by G. Hinton (neural networks)
- Keen interests: disruptive design for evolutionary optimization

Professional Experience

Trading:

- Apr 2014-present • **Global Trading System (New York):** Lead Trading Model Developer
Optimization and signal discovery through simulation and trading data analysis
 - ◊ Searching/reusing tools to gain intuition about underlying market data
 - ◊ Simulations to motivate production code design, defining unbiased A/B tests
 - ◊ Original coding for lowering the latency and a leaner way to test new ideas
- Apr 2013-Apr 2014 • **Global Trading System (New York):** Trading Model Developer
High frequency market-making client on CME and BrokerTec
 - ◊ Redesigning, developing, minimizing latency (low-level optim, branches,...)
 - ◊ Obtained the first successful derivatives strategy at GTS
 - ◊ Responsible for the trading logic implementation of two successful strategies

Framework for controlling laboratory experiments:

- 2007-2013 • Project *single-handedly* designed and coded
Used in Columbia University atom-optics experiments
 - ◊ C++, object-oriented, Qt-based gui, multi-threaded, 30k+ lines
 - ◊ 29 existing plugins, coded by users through the exposed API & plugin wizard
 - ◊ Interfaces for numerical optimizations (gradient, non-gradient based and genetic)
 - ◊ Interface for image processing and shape fitting
 - ◊ Can be seen on vimeo.com/32183792 and vimeo.com/31039111

Scientific Research:

- Mar 2011-Apr 2013 • **Columbia University (New York):** Associate Research Scientist in atomic physics
Precision metrology in atomic and molecular physics
- Sep 2008-Mar 2011 • **Columbia University (New York):** Postdoc in atomic physics
Building of an experiment for the production of ultra-cold molecules
- Sep 2004-Aug 2008 • **École Normale Supérieure de Paris:** Ph.D. in the Laboratoire Kastler-Brossel
Evaporative cooling of atomic clouds for the production of a matter-wave in the degenerate regime

Teaching:

- Sep 2006-Jun 2008 • Scientific expert demonstrator at the *Palais de la Découverte* (scientific museum) in Paris
- Sep 2004-Sep 2005 • Examiner in preparatory classes for the Grandes Écoles
- Scientific guide in the *Atom Optics Group, École Normale Supérieure*

Additional information

Languages

- Fluent in French and English, knowledge of German

Hobbies

- Avid rock climber (7.12d), Electronics, making and flying model airplanes and helicopters, guitar, motorcycling

Publications

- 2012**
- G. Reinaudi, C. B. Osborn, M. McDonald, S. Kotochigova & T. Zelevinsky
Optical Production of Stable Ultracold Sr88 Molecules
Phys. Rev. Lett., **109**, 115303 (2012)
 - G. L. Gattobigio, A. Couvert, G. Reinaudi, B. Georgeot & D. Guéry-Odelin
Optically guided beam splitter for propagating matter waves
Phys. Rev. Lett., **109**, 030403 (2012)
Selected for the *American Physical Society "Spotlighting exceptional research"*
- 2011**
- G. Reinaudi, C. B. Osborn, K. Bega, & T. Zelevinsky
Dynamically configurable and optimizable Zeeman slower using permanent magnets and servomotors
J. Opt. Soc. Am. B, 160242 (2011)
- 2010**
- G. Reinaudi, book publication of the Ph.D. Thesis
Manipulation d'atomes ultra-froids: vers un laser à atomes continu (Manipulation of ultra cold atoms: towards a continuous atom laser)
Editions Universitaires Européennes, ISBN 978-613-1-50940-7 (2010)
- 2008**
- A. Couvert, M. Jeppesen, T. Kawalec, G. Reinaudi, R. Mathevet, & D. Guéry-Odelin
Quasi-monomode guided atom laser
Eur. Phys. News **39-Highlights**, 6-14 (2008)
 - A. Couvert, M. Jeppesen, T. Kawalec, G. Reinaudi, R. Mathevet, & D. Guéry-Odelin
A quasi-monomode guided atom-laser from an all-optical Bose-Einstein condensate
Europhys. Lett. **83**, 50001 (2008)
Selected for the "**Highlights**" section in Eur. Phys. News **39**
 - G. Reinaudi & D. Guéry-Odelin
A Maxwell's demon in the generation of an intense and slow guided beam
Phys. Rev. A **78**, 015401 (2008)
 - A. Couvert, T. Kawalec, G. Reinaudi & D. Guéry-Odelin
Optimal transport of ultracold atoms in the non-adiabatic regime
Europhys. Lett. **83**, 13001 (2008)
- 2007**
- G. Reinaudi, T. Lahaye, Z. Wang & D. Guéry-Odelin
Strong saturation absorption imaging of dense clouds of ultracold atoms
Opt. Lett. **32**, 3143 (2007)
 - G. Reinaudi, A. Sinatra, A. Dantan & M. Pinard
Squeezing and entangling nuclear spins in ^3He
J. Mod. Opt. **54**, 675-695 (2007)
 - G. Reinaudi, Z. Wang, A. Couvert, T. Lahaye & D. Guéry-Odelin
A mirror to generate a beam
Eur. Phys. News **38-Highlights**, 3-17 (2007)
- 2006**
- G. Reinaudi & D. Guéry-Odelin
The atom lasers
DGA Edition, Bulletin bibliographique Prospective Oriented Group on Lasers and Optronics (POLOQ)
n°2006-1, p. 165-172
 - G. Reinaudi, Z. Wang, A. Couvert, T. Lahaye & D. Guéry-Odelin
A moving magnetic mirror to slow down a bunch of atoms
Eur. Phys. J. D **40**, 405-410 (2006)
Selected for the "**Highlights**" section in Eur. Phys. News **38**
 - T. Lahaye, G. Reinaudi, Z. Wang, A. Couvert & D. Guéry-Odelin
Transport of Atom Packets in a Train of Ioffe-Pritchard Traps
Phys. Rev. A **74**, 033622 (2006)
 - G. Reinaudi, T. Lahaye, A. Couvert, Z. Wang & D. Guéry-Odelin
Evaporation of an atomic beam on a material surface
Phys. Rev. A **73**, 035402 (2006)
- 2005**
- T. Lahaye, Z. Wang, G. Reinaudi, S.P. Rath, J. Dalibard & D. Guéry-Odelin
Evaporative cooling of a guided rubidium atomic beam
Phys. Rev. A **72**, 033411 (2005)
 - T. Aichele, V. Zwiller, M. Scholz, G. Reinaudi, J. Persson & O. Benson
Multiplexed quantum cryptography with single InP quantum dots
Proceedings of SPIE **5722**, 30-44 (2005)
 - A. Dantan, G. Reinaudi, A. Sinatra, F. Laloë, E. Giacobino & M. Pinard
Long lived quantum memory with nuclear atomic spins
Phys. Rev. Lett. **95**, 123002 (2005)
- 2004**
- T. Aichele, G. Reinaudi & O. Benson
Separating cascaded photons from a single quantum dot: Demonstration of multiplexed quantum cryptography
Phys. Rev. B **70**, 235329 (2004)