

# ROCKSON CHANG

GitHub: [rocksonchang](#)

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Physicist specializing in quantum, many-body systems of ultracold gases. Motivated by complex problems demanding technical yet creative solutions. Experienced with research-oriented programming in Python and Matlab for numerical simulation, user interfaces, data treatment and analysis. Strong project management and communication skills with 10 years of experience working in small-to-mid sized teams.

## Personal details

**Nationality:** Canadian.

**Date of Birth:** July 10<sup>th</sup>, 1982.

## Education

2006-2013 **Doctor of Philosophy.**

Department of Physics, University of Toronto, Canada

Thesis: *Exploring matter-wave dynamics with a Bose-Einstein condensate*

Supervisor: Aephraim M. Steinberg

2005-2006 **Master of Science.**

Department of Physics, University of Toronto, Canada

Thesis: *An optical-dipole trap for experiments with Bose-Einstein condensates*

Supervisor: Aephraim M. Steinberg

2001-2005 **Bachelor of Engineering Science.**

Major in Engineering Physics with first class honours, Queen's University, Canada

4th year thesis: *Single-electron transistors*

## Selected Research Experience

2013- **Post-doctoral fellow.**

present Atom Optics group, Laboratoire Charles Fabry, l'Institut d'Optique Graduate School, France  
Researcher studying many-body correlations that arise in strongly-interacting ultracold gases.

2005-2013 **Research assistant.**

Department of Physics, University of Toronto, Canada

Experimental research studying matter-wave dynamics with Bose-Einstein condensates.

2005 **Research assistant, NSERC undergraduate research award.**

D-Wave Systems, Canada

Design of a cold-finger for mounting a prototype for a 4-qubit, superconducting quantum computer.

## Refereed Publications

2016 R. Chang et al. *Momentum-resolved observation of quantum depletion in an interacting Bose gas*, In preparation.

2015 F. Nogrette et al. *Characterization of a detector chain using a FPGA-based time-to-digital converter to reconstruct the three-dimensional coordinates of single particles at high flux*, Review of Scientific Instruments, **86**, 113105, 19 November 2015. Pre-print: [arXiv:1507.03816](#).

2015 Q. Bouton et al. *Fast production of Bose-Einstein condensates of metastable helium*, Physical Review A, **91**, 061402(R), 9 June 2015. Pre-print: [arXiv:1504.06197](#).

2014 R. Chang et al. *Three-dimensional laser cooling at the Doppler limit*, Physical Review A, **90**, 063407, 1 December 2014. Pre-print: [arXiv:1409.2519v2](#). Selected as an *Editor's suggestion*.

- 2014 A. Hayat et al. *Enhanced coherence between condensates formed resonantly at different times*, Optics Express, **22**, pp. 30559-30570, 1 December 2014.
- 2014 R. Chang et al. *Observing the onset of effective mass*, Physical Review Letters, **112**, 170404, 2 May 2014. Pre-print: [arXiv:1303.1139](https://arxiv.org/abs/1303.1139). See also [Phys.org](http://Phys.org)'s feature story on the work.
- 2013 R. Chang et al. *Observation of transient momentum-space interference during scattering of a condensate from an optical barrier*, Physical Review A, **88**, 053634, 26 November 2013. Pre-print: [arXiv:1303.1137](https://arxiv.org/abs/1303.1137).

## Selected Awards

- 2012 Van Krandendonk teaching award, for teaching assistants at the University of Toronto.
- 2008 Ontario Centre for Excellence, travel award to CASTU Frontiers of Degenerate Gases in Beijing.
- 2007-2010 University of Toronto Fellowship, for Doctoral studies.
- 2005-2006 E. F. Burton Fellowship, for Master's studies.
- 2005 NSERC Industrial undergraduate research award with D-Wave Systems.

## Selected Teaching Experience

- 2014-2015 **Lab demonstrator**, *Master 2 « Optique, Matière à Paris », Université Paris Sud*.  
Tutorial and lab demonstration on an ultracold atoms experiment for Master students. Teaching in French.
- 2013 **Teaching Assistant**, *PHY335 - Quantum Mechanics for ECE, University of Toronto*.  
Tutorial leader for introduction to quantum mechanics for electrical and computer engineering students.
- 2011-2012 **Teaching Assistant**, *PHY224/324 - Practical Physics, University of Toronto*.  
Demonstrator for intermediate level-undergraduate labs for physics specialist students. Python based.

## Computer competencies

**Python:** extensive numerical simulation, image treatment and analysis, development of GUIs with Tkinter, experience with iPython notebook.

**Matlab:** numerical simulation, image treatment and analysis, development of GUIs with *GUIDE*, extensive experience with data treatment and analysis, figure generation for scientific communication.

**Additional programming languages:** Maple, Labview, HTML

**Technical design software:** OSLO, SPICE, Solidworks

**Office software:** L<sup>A</sup>T<sub>E</sub>X, Microsoft Office Suite, Apache Open Office

*Some of my projects can be found on [GitHub](https://github.com/rocksonchang) (username: rocksonchang)*

## Languages

Native English speaker.

International French as a second language – professional working proficiency (ILR scale).

## Personal Interests

**Sports:** Sports: Avid climber, with a love of both sport climbing and bouldering.

**Currently reading:** *The Looking Glass War*, John le Carré