Christopher J. Billington

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Education

Doctor of Philosophy, Monash University, expected graduation April 2018.

Research area: Experimental cold-atom physics

Bachelor of Science Advanced with Honours, Monash University, completed 2010.

Majors: Physics, Mathematics.

Honours in: Physics.

Honours grade: 91 (H1)

Research

Faculty Assistant at the Joint Quantum Institute, NIST/University of Maryland, October 2016–present

Research area: Experimental cold atom physics

Principal Investigator: Prof. Ian Spielman

Visiting researcher at the Joint Quantum Institute, NIST/University of Maryland, August–December 2014

Research area: Experiment control systems, experimental cold atom physics

Supervisor: Prof. Ian Spielman

Exchange student at the Physikalisches Institut, Universität Tübingen, March–September 2013

Research area: Experiment control systems, experimental cold atom physics

Supervisor: Prof. József Fortágh

PhD candidature, Monash University School of Physics, February 2011–October 2016.

Thesis title: State-dependent forces in cold quantum gases

Supervisors: Prof. Kris Helmerson and Dr. Lincoln Turner.

Summer employment, dual-species Bose–Einstein condensation lab, Monash University, summer 2010–2011.

PHS4100 physics thesis project, Monash University, 2010

Thesis title: Particle Velocimetry of Vortices in Bose–Einstein Condensates

Supervisor: Prof. Kris Helmerson.

Summer employment, dual-species Bose–Einstein condensation lab, Monash University, summer 2009–2010.

PHS3360 physics project unit, Monash University, summer 2009–2010

Project title: Condensed atoms as tracer particles in two component Bose–Einstein condensates

Supervisor: Prof. Kris Helmerson.

PHS3350 physics project unit, Monash University, 2009

Project title: Bose–Einstein condensates in 'Magic' optical traps

Supervisors: Dr. Lincoln Turner, Prof. Kris Helmerson.

Summer research scholarship, Australian National University Research School of Astronomy and Astrophysics, summer 2008–2009.

Project title: Lunar orbital evolution: Causes and geological implications.

Supervisor: Dr. Charley Lineweaver.

Teaching Experience

Demonstrating in third year undergraduate teaching labs, Monash University School of Physics, semester 1, 2014.

Demonstrating in third year undergraduate teaching labs, Monash University School of Physics, semesters 1 and 2, 2012.

Demonstrating in second year undergraduate teaching labs, Monash University School of Physics, semesters 1 and 2, 2010.

Conference Presentations

5th annual Conference on Optics, Atoms and Laser Applications, contributed talk, December 2012.

Talk title: The automatic lab

Authors: C. J. Billington, P. T. Starkey, S. P. Johnstone, M. Jasperse, R. P. Anderson, L. D. Turner, K. Helmerson.

Inaugural Workshop on Quantum-Photonic Hardware, contributed talk, October 2012.

Talk title: The automatic lab: a better control and analysis system for quantum science experiments.

Authors: C. J. Billington, P. T. Starkey, S. P. Johnstone, M. Jasperse, R. P. Anderson, L. D. Turner, K. Helmerson.

4th annual Conference on Optics, Atoms and Laser Applications, poster presentation, December 2011.

Poster title: A modular control system for scripted BEC experiments

Authors: C. J. Billington, P. T. Starkey, S. P. Johnstone, M. Jasperse, R. P. Anderson, L. D. Turner, K. Helmerson.

3rd annual Conference on Optics, Atoms and Laser Applications, poster presentation, December 2010.

Poster title: Particle Velocimetry of Bose–Einstein Condensates.

Authors: C. J. Billington, K. Helmerson.

International Conference on Atomic Physics, poster presentation, July 2010.

Poster title: Particle Velocimetry of Bose–Einstein Condensates for Studies of Quantum Turbulence.

Authors: C. J. Billington, S. P. Johnstone, K. Helmerson.

Publications

P. T. Starkey, C. J. Billington, S. P. Johnstone, M. Jasperse, R. P. Anderson, L. D. Turner, K. Helmerson, A scripted control system for autonomous hardware-timed experiments, *Reviews of Scientific Instruments* **84**, 085111 (2013) doi:10.1063/1.4817213

L. M. Bennie, P. T. Starkey, M. Jasperse, C. J. Billington, R. P. Anderson, and L. D. Turner, A versatile high resolution objective for imaging quantum gases, *Optics Express* **21** 7, pp. 9011-9016 (2013) doi:10.1364/OE.21.009011

Particle velocimetry of vortices in Bose–Einstein condensates., Honours thesis, Monash University, 2010. C. J. Billington, L. D. Turner, K. Helmerson.

Professional Activities

Co-founder and treasurer, Monash Advanced Science and Science Scholars Society, 2007–2009.

Member, Australian Optical Society, 2010–Present.

Student Ambassador, Monash Jubilee Open Day 2008.

Honours, Awards, & Fellowships

High Academic Achievement Award, Monash University, 2007.

Highest Academic Performance Award, MTH2140 Real Analysis, Monash University, 2009.

Summer Research Scholarship, Australian National University, summer 2008–2009.

Highest Academic Performance Award, MTH3360 Fluid Dynamics, Monash University, 2009.

Dean's List Fellowship Award, Monash University 2009.

Dean's List Fellowship Award, Monash University 2010.

J. L. Williams Honours Scholarship, School of Physics, Monash University, 2010.

Monash Jubilee Honours Scholarship, Monash University, 2010.

Australian Postgraduate Award, Australian government, 2011.

J. L. Williams Postgraduate top-up scolarship, School of Physics, Monash University, 2011.

Software Development

SummaryRobot A Google Wave robot to administer anonymous peer review, developed for and used by students in the second year teaching labs in the School of Physics, Monash University, semester 2 2010.

labscript A language and compiler for describing precision-timing experiments in physics research laboratories. Developed at Monash University, 2011.

runmanager A graphical program for producing sequences of `labscript` experiments with varying input parameters, compiling and running them. Developed at Monash University, 2011.

BLACS (Better Lab Apparatus Control System), A graphical program for interfacing with hardware in the lab and executing `labscript` experiments. Developed at Monash University, 2011.

lyse An analysis program for performing real-time analysis of results from experiments. Developed at Monash University, 2011.

mise An optimisation program which creates new `labscript` experiments based on previous analysis results, optimising those results with the use of a genetic algorithm. Developed at Monash University, 2012.

zlock A network locking program/library for serialising access to shared resources. Developed at Monash University, 2012.

atom A Python module for computing details of atomic transitions in hydrogen-like atoms in magnetic fields. Developed at Monash University, 2012.

Miscellaneous

Laser safety training, Monash University, 2010.