Research Activities

Ultra-cold quantum gases: Quantum many-body physics, transport phenomena in multiply-connected superfluids, persistent currents, strongly interacting and low-dimensional quantum systems, unconventional superfluid phases, ring lattices.
Atom-photon interactions: Optical control of angular momentum states, cavity-based cold atom traps, ring bowtie cavities.

Education

Ph.D. Physics — University of Rochester, Rochester, NY (2009)
Stimulated Raman Interactions in a Spinor Bose-Einstein Condensate
Ph.D. Advisor: Nicholas P. Bigelow

B.S. Physics — Brigham Young University, Provo, UT (2000)

Appointments

Assistant Professor (2013-)
Department of Physics and Astronomy, Dartmouth College
Hanover, New Hampshire, USA

NRC Postdoctoral Research Fellow (2009-2012)
Joint Quantum Institute, NIST, and Univ. of Maryland
Gaithersburg, Maryland, USA
Supervisors: K. Helmerson, W. D. Phillips, G. K. Campbell

Graduate Research Assistant (2001-2009)
University of Rochester, Rochester, New York, USA
Thesis Advisor: Nicholas P. Bigelow

Graduate Teaching Assistant (2000-2001)
University of Rochester, Rochester, New York, USA

Awards and Honors

CAREER Award (2021)
National Science Foundation

National Research Council Postdoctoral Fellowship (2009)
JQI/NIST/UMD, Gaithersburg, Maryland, USA

Edward Peck Curtis Award for Excellence in Teaching (2001)
University of Rochester, Rochester, New York, USA

Colloquia and Seminars

"Matter-Wave Circuits of Ultracold Fermions" University of Rochester, Physics Colloquium, Rochester NY, 4/19/2023

"Matter-Wave Circuits of Ultracold Fermions" Lehigh University, Physics Colloquium, Bethlehem PA, 12/2/2021

Email: Kevin.Wright@dartmouth.edu **Tel:** 603-646-2751

"Persistent Currents in Rings of Ultracold Fermionic Atoms" Dartmouth College Physics and Astronomy, Quantum/Nano Seminar, Hanover NH, 5/6/2021

"Light at the Frontier of Quantum Materials" Light@Dartmouth Seminar, Hanover NH, 11/27/2018

"Shining a Light on the Mysterious World of Quantum Materials" Dartmouth Physics and Astronomy Colloquium, Hanover NH, 9/14/2018.

"Ultracold Atoms and Exotic Quantum Phases" University of Vermont, Physics Colloquium, Burlington, VT, 8/25/2017.

"Ultracold Atom Circuits and Quantum Phases of Matter" UC Merced, Physics Colloquium Merced, CA, 8/26/2016.

"Building the Coolest Circuits in the Universe" Amherst College, Physics Colloquium, Amherst, MA, 3/24/2015.

"Exploring Quantum Phases of Matter with Ultracold Gases" Dartmouth College, Physics and Astronomy Colloquium, Hanover, NH, 2/28/2014

"Building the Coolest Circuits in the Universe" Willamette University, Physics Colloquium, Salem, OR, 2/21/2014.

"Superfluid Circuits of Ultracold Atoms" Physics Colloquium, Ulm University, Ulm, Germany 2/7/2014.

"Building the Coolest Circuits in the Universe" Bates College, Physics Colloquium, Lewiston, ME, 1/9/2014.

"Superfluid Circuits of Ultra-cold Atoms" Los Alamos National Laboratory, Quantum Lunch Seminar, Los Alamos, NM, 1/31/13.

Conference Activities

Atomtronics 2022, Benasque, Spain, May 2022:
Control and Measurement Techniques for Rings of Ultracold Fermions

Atomtronics 2021, Dubai, UAE, June 2021:
Persistent Currents in Rings of Ultracold Fermionic Atoms

APS DAMOP Meeting, Portland, OR, June 2020:
Persistent Flow in Fermionic Superfluid Rings

APS DAMOP Meeting, Milwaukee WI, May 2019:
Persistent Flow in Fermionic Superfluid Rings

APS March Meeting, Boston MA, March 2019:
Trapping Ultracold Fermions in a Ring Cavity

APS DAMOP meeting, Sacramento CA, June 2017:
A monolithic glass bowtie cavity trap for ultracold atoms: Kevin Wright, Jesse Evans, Yanping Cai, Daniel Allman.

Protocols for dynamically probing topological edge states and dimerization with fermionic atoms in optical potentials: Mekena Metcalf, Chen-Yen Lai, Kevin Wright, and Chih-Chun Chien.

Ring and ring lattice trapping potentials for quantum many-body experiments with lithium: Daniel Allman, Yanping Cai, Kevin Wright.

Progress toward simultaneous sub-Doppler cooling of ^6Li and ^7Li using a single laser frequency: Yanping Cai, Daniel Allman, Kevin Wright.

APS DAMOP meeting, Providence RI, June 2016:
A 2DMOT design optimized for dual-species ^6Li-^7Li experiments: Yanping Cai, Jesse Evans, Kevin Wright

ACM HotMobile, St. Augustine FL, 2016:
Lighting Up the Internet of Things with DarkVLC: Zhao Tian, Kevin Wright, and Xia Zhou,

APS DAMOP meeting, Columbus OH, June 2015:
Towards measuring the transport properties of 1D superfluids in ring traps

Wetterhahn Symposium, Dartmouth, May 2015:
Designing a High Finesse Bowtie Cavity for Experiments with Ultracold Atoms

OSA Frontiers in Optics/Laser Science, Orlando, FL, Oct. 9, 2013:
Superfluid Circuits of Ultracold Atoms Invited Talk

APS March Meeting, Baltimore, MD, March 19, 2013:
Driving Phase Slips in a Neutral-Atom analog of an RF-SQUID

APS DAMOP Meeting, Orange County, CA, June 4–8, 2012:
textitDriving Phase Slips in an Annular BEC

APS DAMOP Meeting, Atlanta GA, June 13–17, 2011:
Dynamical Excitations in a Toroidal BEC

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Dartmouth Service
Radiation Safety Committee
Arts and Sciences Shop Committee

Department Service
Undergraduate Curriculum Committee
Graduate (Admissions, Curriculum, and Assessment) Committees
Colloquia and Public Lectures
Instructional Equipment
Faculty Search Committee, 2022

Teaching

PHYS 101 Classical Mechanics	(2020, 21)
PHYS 76 Methods of Experimental Physics	(2013–18, 21, 22)
PHYS 47 Optics	(2013–2019)
PHYS 24 Quantum Physics of Matter	(2014)
PHYS 14 Introductory Physics II (E&M)	(2015,16,18,20,21,22)

Research Advising

Graduate Research Advisor

- Pradipta Debnath (2021-)
- Parth Sabharwal (2016-)
- Daniel Allman (2016-)
- Yanping Cai (2014-2020)
- Jesse Evans (2014-2017)
- Alexander Camps (2013-14)
- Samuel Wheeler (2013-14)

Undergraduate Research Advisor

- Jack Duranceau (2022-)
- Annie Woronecki (2018)
- Kaleigh Mentzer (2017-18)
- Alexander Goss (2015-16)
- Lucas Bezerra (2015-16)
- Natalia Drozdoff (2014)
- Sarah Khatry (Crute Award — 2014-15) (2013-2016)
- Kelsey Justis (2013-2016)

Professional Service

Grant Proposal Review
NSF: Program (AMO-E), Division (Physics PFC) and NSF-wide (CAREER).
NASA (Cold Atom Laboratory)
European QuantERA (QTREX)

Manuscript Review
Physical Review Letters, Physical Review X, Physical Review A
Review of Scientific Instruments
Nature Communications
Optics Letters, Optics Express
Journal of the Optical Society of America B
Journal of Low Temperature Physics

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Publications

Mitigating heating of degenerate fermions in a ring-dimple atomic trap
Daniel G.Allman, Parth Sabharwal, and Kevin C. Wright
Physical Review A, 107, 043322 (2023)

Persistent currents in rings of ultracold fermionic atoms.
Yanping Cai, Daniel G. Allman, Parth Sabharwal, and Kevin Wright
Physical Review Letters, 128, 150401 (2022)

Monolithic bowtie cavity traps for ultracold gases.
Yanping Cai, Daniel G. Allman, Parth Sabharwal, and Kevin Wright
JOSA B, 37, 3596-3603 (2020)

Topology, edge states, and zero-energy states of ultracold atoms in one-dimensional optical superlattices with alternating on-site potentials or hopping coefficients.
Yan He, Kevin Wright, Said Kouachi, and Chih-Chun Chien, Physical Review A, 97, 023618 (2018)

Protocols for dynamically probing topological edge states and dimerization with Fermionic atoms in optical potentials
Mekena Metcalf, Chen-Yen Lai, Kevin C. Wright, Chih-Chun Chien
Europhysics Letters, 118, 56004, Jun. 2017

The DarkLight Rises: Visible Light Communication in the Dark
Zhao Tian, Kevin Wright, and Xia Zhou
MobiCom 2016 Conference Paper, Oct. 2016

Threshold for creating excitations in a stirred superfluid ring
K. C. Wright, R. B. Blakestad, C. J. Lobb, W. D. Phillips, and G. K. Campbell
Physical Review A, 88, 063633 (2013)

Driving phase slips in a superfluid atom circuit with a rotating weak link
K. C. Wright, R. B. Blakestad, C. J. Lobb, W. D. Phillips, and G. K. Campbell
Physical Review Letters, 110, 025302 (2013)

Probing the circulation of ring Bose-Einstein condensates, N. Murray, M. Krygier, M. Edwards, K. C. Wright, G. K. Campbell, and C. W. Clark,
Physical Review A, **88**, 053615 (2013)

Partial-transfer absorption imaging: A versatile technique for optimal imaging of ultracold gases
Anand Ramanathan, Sérgio R. Muniz, Kevin C. Wright, Russell P. Anderson, William D. Phillips, Kristian Helmerson, and Gretchen K. Campbell
Review of Scientific Instruments 83, 083119 (2012)

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Superflow in a toroidal Bose-Einstein condensate: An atom circuit with a tunable weak link
A. Ramanathan, K. C. Wright, S. R. Muniz, M. Zelan, W. T. Hill, III, C. J. Lobb, K. Helmerson, W. D. Phillips, and G. K. Campbell
Physical Review Letters 106, 130401 (2011)

Phase fluctuations in anisotropic Bose-Einstein condensates: From cigars to rings
L. Mathey, A. Ramanathan, K. C. Wright, S. R. Muniz, W. D. Phillips, and Charles W. Clark Physical Review A, 82, 033607 (2010)

Sculpting the vortex state of a spinor BEC
K. C. Wright, L. S. Leslie, A. Hansen, and N. P. Bigelow
Physical Review Letters 102, 030405 (2009)

Creation and detection of Skyrmions in a Bose-Einstein condensate
L. S. Leslie, A. Hansen, K. C. Wright, B. M. Deutsch, and N. P. Bigelow
Physical Review Letters 103, 250401 (2009)

Raman fingerprints on a spinor BEC
L. S. Leslie, K. C. Wright, and N. P. Bigelow
Laser Physics 19, 1-6 (2009)

Raman coupling of Zeeman sublevels in an alkali-metal Bose-Einstein condensate
K. C. Wright, L. S. Leslie, and N. P. Bigelow
Physical Review A 78, 053412 (2008)

Optical control of the internal and external angular momentum of a Bose-Einstein condensate
K. C. Wright, L. S. Leslie, and N. P. Bigelow
Physical Review A 77, 041601 (R) (2008)

Channel competition between metastable and dissociated states of doubly ionized NO in strong laser fields
Chunlei Guo and Kevin Wright
Physical Review A 71, 021404 (R) (2005)

Spectral responsitivity and efficiency of metal-based femtosecond autocorrelation technique
Qiang Lin, Kevin Wright, Govind P. Agrawal, and Chunlei Guo
Optics Communications 242, 279-283 (2004)

Surface transformation and photoinduced recovery in CdSe nanocrystals
B. C. Hess, I. G. Okhrimenko, R. C. Davis, B. C. Stevens, Q. A. Schulzke, K. C. Wright, C. D. Bass, C. D. Evans, and S. L. Summers
Physical Review Letters 86, 3132 (2001)