Curriculum Vitae

Appointments & Education

Professor of Physics	College of the Holy Cross	2021 - Present
Associate Professor of Physics	College of the Holy Cross	2005 – 2021
Visiting Scientist	Universidad Autónoma de San Luis Potosí, Mexico	January-March 2020
Chair, Department of Physics	College of the Holy Cross	2009 – 2015
Visiting Researcher	Swinburne University Melbourne, Australia	January-April 2006
Assistant Professor of Physics	College of the Holy Cross	1999 – 2005
Postdoctoral Fellow	Harvard University	1995 – 1999
Ph.D., Physics	Yale University	1990 – 1995
M.A., Physics	Brandeis University	1988 – 1990
Device Development Engineer	Lasertron, Inc., Burlington, Mass.	1984 – 1988
B.S., Physics	Massachusetts Institute of Technology	1980 – 1984

Professional Activities & Memberships

Organizing Committee, Conference on Laboratory Instruction Beyond the First Year (BFY4) July 12-14, 2023 at California State University, Chico.

Regional Director, New England section of Advanced Lab Physics Association (ALPhA) (March 2019 – June 2020)

Organizer of 2019 Regional Meeting, New England section of ALPhA, 13 June 2019 at College of the Holy Cross, Worcester.

National Society of Black Physicists	2020 – present
Advanced Laboratory Physics Association	2015 – present
American Physical Society	1990 – present
American Association of Physics Teachers	2000 – present

Peer-Reviewed Publications (reverse chronological order)

18. Selection of a Raman beam waist in atomic gravimetry
J.M. Cervantes, M.A. Maldonado, J.A. Franco-Villafañe, T. Roach, V.M. Valenzuela, and E. Gomez.
OSA Continuum, Vol. 4, Issue 7, pp. 1996-2007 (2021).

17. Long-range density patterns in a six-beam optical lattice from polarization interference
Wilber Alfaro Castro, Patrick Connolly, and Timothy Roach
Journal of the Optical Society of America B, 38, 307-316 (2021).

16. Limits of Precision in the Balmer Lines Spectroscopy Lab
Timothy Roach
2018 BFY Proceedings, edited by Melissa Eblen-Zayas, Ernest Behringer, Marta Dark McNeese, and Elvis Geneston; 10.1119/bfy.2018.pr.013, (2018) 4pp.

15. Sequential Introduction of Data Analysis Methods in the Modern Lab
Timothy Roach
2015 BFY Proceedings, edited by Eblen-Zayas, Behringer, and Kozminski; available on Compadre.

14. Effect of magnetization inhomogeneity on magnetic microtraps for atoms
S. Whitlock, B. V. Hall, T. Roach, R. Anderson, M. Volk, P. Hannaford, and A. I. Sidorov
Physical Review A, Volume 75, Issue 4, 043602, (2007) 6pp.

13. A novel rubidium atomic beam with an alkali dispenser source
Timothy M. Roach and Dwayne Henclewood
Journal of Vacuum Science and Technology A, November/December (2004) pp 2384 – 2387.

12. Atom wave diffraction in an accelerating potential
Timothy M. Roach
Journal of Physics B: Atomic, Molecular and Optical Physics, Volume 37 (2004) pp 3351 – 3562.

11. First positron cooling of antiprotons
G. Gabrielse, J. Estrada, J.N. Tan, P. Yesley, N.S. Bowden, P. Oxley, T. Roach, C.H. Storry, M. Wessels, J. Tan, D. Grozonka,W. Oelert, G. Scheppers, T. Sefsick, W. Breunlich, M. Carngelli, H. Fuhrmann, R. King, R. Ursin, H. Zmeskal, H. Kalinowsky, C. Wesdorp, J. Walz, K. Eikema, and T. Haensch
Physics Letters B, Volume 507 (2001) pp 1 – 6.

10. Field Ionization of Strongly Magnetized Rydberg Positronium: A New Physical Mechanism for Positron Accumulation
J. Estrada, T. Roach, J.N. Tan, P. Yesley, and G. Gabrielse
Physical Review Letters, Volume 84 (2000) pp 859 – 862.

9. Progress Toward Cold Antihydrogen
G. Gabrielse, J. Estrada, S. Peil, T. Roach, J.N. Tan and P. Yesley
Non-Neutral Plasma Physics III (AIP Conference Proceedings 498), edited by J.J. Bollinger, R.L. Spencer, R.C. Davidson, American Institute of Physics, Melville, New York, (1999) p 29.

8. The Ingredients of Cold Antihydrogen: Simultaneous Confinement of Antiprotons and Positrons at 4 K
G. Gabrielse, D.S. Hall, T. Roach, P. Yesley, A. Khabbaz, J. Estrada, C. Heimann, and H. Kalinowsky
Physics Letters B, Volume 455 (1999) pp 311 – 315.

7. Comparing the Antiproton and Proton and Progress Toward Cold Antihydrogen
G. Gabrielse, D.S. Hall, A. Khabbaz, T. Roach, P. Yesley, C. Heimann, H. Kalinowsky, W. Jhe and B. Brown; edited by H. Koch, M. Kunze and K. Peters
Nuclear Physics B (Proc. Suppl.), Volume 56A (1997) pp 326 – 335.

6. Atom Optics with Magnetic Surfaces: II. Microscopic Analysis of the 'Floppy Disk' Mirror
I.G. Hughes, P.A. Barton, T.M. Roach, and E.A. Hinds
Journal of Physics B, Volume 30 (1997) pp 2119 – 2132.

5. Atom Optics with Magnetic Surfaces: I. Storage of Cold Atoms in a Curved 'Floppy Disk'
I.G. Hughes, P.A. Barton, T.M. Roach, M.G. Boshier, and E.A. Hinds
Journal of Physics B, Volume 30 (1997) pp 647 – 658.

4. Cold Atom Reflection from Flat and Curved Magnetic Mirrors
T.M. Roach, H. Abele, M.G. Boshier, F. Gahbauer, H.L. Grossman, K.P. Zetie, and E.A. Hinds
Laser Spectroscopy, XIIth International Conference, edited by M. Inguscio, M. Allegrini, and A. Sasso, World Scientific (1995) pp 113-116.

3. Realization of a Magnetic Mirror for Cold Atoms
T. Roach, H. Abele, M.G. Boshier, H.L. Grossman, K.P. Zetie, and E.A. Hinds
Physical Review Letters, Volume 75 (1995) pp 629 – 632.

2. Electrostatic Microfocussing Limits for Positron Beams
T. Roach, A. Bakshi and K. F. Canter
Measurement Science and Technology, Volume 6 (1995) pp 496 – 501.

1. Positron Annihilation Microprobe Resolution Limits
K. F. Canter, G. R. Brandes, T. M. Roach and A. P. Mills, Jr.
Solid State Phenomena, Vols. 28 & 29 (1993) pp 341 – 346.

Talks & Presentations

20. Optical phase dependence and formation time for superlattice density patterns in a 6-beam σ^+- σ^- optical lattice
Poster presentation at Annual Meeting of the APS Division of Atomic, Molecular, and Optical Physics (virtual).
June 2, 2020.

19. Density patterns in laser-cooled atom clouds: resolving a 30-year old question
Talk given at Universidad Autónoma de San Luis Potosí, San Luis Potosí, Mexico.
February 14, 2020.

18. Speed of light using a pulsed diode laser
Workshop given at Third Conference on Laboratory Instruction Beyond the First Year of College (BFY3), Baltimore, MD, July 25, 2018. https://advlabs.aapt.org/bfyiii/Detail.cfm?id=7488

17. Density variations with mm-scale periodicity in optical molasses
Oral presentation at the Annual Meeting of the APS Division of Atomic, Molecular, and Optical Physics, Ft. Lauderdale, Florida.
May 30, 2018

16. Periodic density variations in clouds of laser-cooled atoms
Poster presentation at the New England Section Spring Meeting of the American Physical Society, Boston, Massachusetts.
March 16, 2018

15. Compact spectrometer for precision studies of multimode behavior in an extended-cavity diode laser
Poster presentation at the Annual Meeting of the APS Division of Atomic, Molecular, and Optical Physics, Providence, Rhode Island.
May 25, 2016

14. Sequential Introduction of Data Analysis Methods in the Modern Lab
Poster presentation at BFYII (Conference on Lab Instruction Beyond the 1st Year of College), College Park, Maryland.
July 23, 2015

13. Interactions of cold rubidium atoms with a magnetic reflector
Poster presentation at the 45th Annual Meeting of the APS Division of Atomic, Molecular, and Optical Physics, Madison, Wisconsin.
June 3, 2014

12. Slow atom scattering from magnetic media
Poster presentation at the annual meeting of the Division of Atomic, Molecular and Optical Physics of the American Physical Society, Quebec City, Quebec, Canada.
June 6, 2013.

11. Current tuning behavior of an extended-cavity diode laser: experiment and model
Poster presentation at the 42nd Annual Meeting of the Division of Atomic, Molecular and Optical Physics of the American Physical Society, Atlanta, Georgia.
June 14, 2011.

10. Variation of optical sideband intensity with current tuning in an extended cavity diode laser
Poster presentation at annual meeting of the Division of Atomic, Molecular and Optical Physics of the American Physical Society, Houston, Texas.
May 26, 2010.

9. Optical Sidebands in Extended Cavity Diode Lasers
Poster presentation at annual meeting of the Division of Atomic, Molecular and Optical Physics of the American Physical Society, Charlottesville, Virginia.
May 20, 2009.

8. Modeling gravitational distortion in atom optics experiments
Optics Seminar, University of Melbourne, Melbourne, Australia
Tuesday, May 2, 2006

7. Manipulation of cold atom clouds: gravitational effects & magnetic media
CAOUS Seminar, Swinburne University, Melbourne, Australia
Thursday 23 February 2006

6. Magnetic Media for Atomic Diffraction
Poster presentation at annual meeting of the Division of Atomic, Molecular and Optical Physics of the American Physical Society, Lincoln, Nebraska.
May 18, 2005.

5. Atom optics in the presence of gravity
Worcester Polytechnic Institute Physics Colloquium
January 24, 2005.

4. Simple Rubidium Atomic Beam Apparatus
Poster presentation at the Annual Meeting of the American Physical Society DAMOP Section, Boulder, CO.
May 2003

3. Extracting the 'wave' of wave-particle-duality using laser-cooled atoms
Wesleyan University Physics Colloquium
April 10, 2003.

2. Improved resolution of diffractive atom optics due to gravity
Poster presentation at the Annual Meeting of the American Physical Society DAMOP Section, Williamsburg, VA.
May 31, 2002

1. Manipulating atomic waves with micro-patterned magnets
Clark University Physics Colloquium
February 22, 2001.

Grants & Fellowships

Kresge Fund Award, College of the Holy Cross, 2010
Mode competition in a frequency modulated, extended cavity diode laser ($1973)

Committee on Fellowships, Research, and Publication, College of the Holy Cross, 2007
High Speed Imaging of Baseball Aerodynamics ($1,200, co-PI with Prof. Matthew Koss)

Petroleum Research Fund Grant, American Chemical Society, 2003-2009
Atom optics with microscopic permanent magnets ($50,000)

Summer Faculty Fellowship, College of the Holy Cross, 2003
Atom scattering from microscopic permanent magnets ($3,200)

Cottrell College Science Award, Research Corporation, 2001-2003
Atomic wave diffraction from magnetically patterned surfaces ($34,382)

Committee on Fellowships, Research, and Publication, College of the Holy Cross, 2002
Investigation of a magnetic reflector for a thermal beam of rubidium atoms ($1,500)

Batchelor (Ford) Foundation Summer Fellowship, College of the Holy Cross, 2000
Laser Cooling and Atom Optics ($3,200)