

Paul Oxley

(Resume September 2010)

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Physics Department
College of the Holy Cross
1 College St
Worcester, MA 01610, U.S.A.

CURRENT POSITION

College of the Holy Cross 2005-present
Assistant Professor, Department of Physics.

PREVIOUS POSITIONS

University of Minnesota 2003-2005
Research Associate, Department of Physics and Astronomy.

EDUCATION

Harvard University 1997-2003
Ph.D. in physics. Thesis title: '*Production of Slow Anti-hydrogen from Cold Antimatter Plasmas*', 2003
Harlech traveling scholarship, 1997-1998

New College, Oxford University, U.K. 1995-1997
Began Ph.D. in physics, withdrew to take scholarship to Harvard University.

Pembroke College, Oxford University, U.K. 1991-1994
B.A. Honors in physics, First Class, 1994

RESEARCH EXPERIENCE

College of the Holy Cross 2005-present
Assistant Professor.
Heading a research program to build a Rydberg atom source for fundamental atomic and plasma physics studies, and performing studies in the field of applied magnetism

University of Minnesota 2003-2005
Research Associate.
Measured optical and electrical properties of microwave detectors at 0.1 Kelvin.
Constructed an apparatus to test a new type of microwave detector at 0.3 Kelvin.
Studied the optical performance of an achromatic half wave plate polarimeter.

Harvard University 1997-2003
Ph.D. thesis research. Advisor: Professor G. Gabrielse.
Captured, cooled, and manipulated positrons and antiprotons in a cryogenic Penning trap at the CERN particle accelerator.
Created large numbers of slow antihydrogen atoms for tests of CPT symmetry.

RESEARCH EXPERIENCE, continued.New College, Oxford University, U.K.

1995-1997

Ph.D. thesis research. Advisor: Professor J. Silver.

Performed and analyzed ultra-violet, visible, and X-ray spectroscopy experiments on trapped highly-charged ion plasmas.

Made experimental progress towards laser spectroscopy of highly-charged silicon and argon as a test of Quantum Electrodynamics.

TEACHING EXPERIENCECollege of the Holy Cross

2005-present

Electricity and Magnetism in Real Life (PHYS 100)

Electromagnetic Theory (PHYS 351)

Quantum Mechanics (PHYS 353)

General Physics in Daily Life 1 (PHYS 115)

General Physics in Daily Life 2 (PHYS 116)

Optics Laboratory (PHYS 233)

General Research 1 (CHEM 405)

General Research 2 (CHEM 406)

Undergraduate Research (PHYS 472)

Supervised spring and summer research of undergraduates (2006 - 2010)

Supervised the Honors Thesis of Miguel Juarez (2009)

University of Minnesota

2003-2005

Supervised research of three graduate and two undergraduate students.

Supervised summer research project of visiting student.

Oxford University

1995-1997

Taught classes:

Classical Mechanics

Quantum Mechanics

Atomic Physics

Advanced Atomic and Molecular Physics

PROFESSIONAL EXPERIENCEFurukawa Research and Engineering Europe Ltd.

1994-1995

Research Scientist.

Created and studied novel microscopic filters in fiber optic cables.

Integrated filters into fiber laser systems.

Investigated filter applications in wavelength division multiplexing systems and as stress, strain and temperature sensors.

Began an ongoing effort to achieve commercial success with these devices.

RECENT SERVICE

Member of the Health Professions Advisory Committee. Advised students applying to medical and dental schools and reviewed application materials of about 80 students. Compiled letters of reference to accompany student medical and dental school applications.	2006-2010
Member of the Physics Department Committee on Assessment. Responsible for designing and implementing an assessment plan for the physics major.	2009-2010
Physics Department Society of Physics Students Faculty Organizer. Arranged the induction of new members to the student honors physics society, Sigma Pi Sigma.	2008-2010
College representative to the national Council For Undergraduate Research. Alerted faculty to opportunities to further undergraduate participation in research and lobbied Members of Congress and the Senate for recognition of the importance of undergraduate research.	2008-2010
Reviewer for <i>Choice Magazine</i>	2009-2010
Reviewer for <i>Journal of Materials Science</i>	2009
Physics Department Graduate Studies Advisor. Advised students applying for graduate studies and alternative careers in physics.	2006-2007
Organized the New England Section of the American Physical Society and American Association of Physics Teachers meeting with four other faculty. Chaired a session and presented research at the meeting.	2006
Co-organizer of the 2006 Undergraduate Summer Research Symposium at Holy Cross. Organized nearly all aspects of the poster meeting where 70 students presented the research they had completed during the summer of 2006.	2006

AWARDS AND HONORSHoly Cross College

Research and Publications Awards:

‘ <i>A Laser Interferometer for Laser Wavelength Analysis</i> ’	2009
‘ <i>An Electronic Device For Controlling Magnetism in Magnetic Materials</i> ’	2008
‘ <i>Lithium Atomic Beam Apparatus</i> ’	2006

Research Corporation Cottrell College Science Award (total value \$82,000) 2006-2008

New College, Oxford University, U.K. 1997-1998

Harlech Traveling Scholarship to Harvard University (2 awarded each year).

Pembroke College, Oxford University, U.K. 1992-1993

Pembroke College scholarship for academic excellence (2 awarded each year).

- TALKS/PRESENTATIONS** (Presenting author in bold, Holy Cross students underlined)
- ‘Plasma Physics and the Promise of Free Energy’*
Paul Oxley, Holy Cross Summer Research Seminar Series (oral presentation). June 2010
- ‘Spectroscopy of low Rydberg np states of ${}^7\text{Li}$ ’*
Paul Oxley and Pat Collins, Division of Atomic, Molecular, and Optical Physics Conference, Houston, TX (oral presentation). May 2010
- ‘High accuracy potential calculations for atom-ion chambers’*
Jacob Golde, Janine Shertzer, and **Paul Oxley** Division of Atomic, Molecular, and Optical Physics Conference, Charlottesville, VA (oral presentation). May 2009
- ‘Optical Sidebands in Extended Cavity Diode Lasers’*
Timothy Roach, Josh Ryor, and Paul Oxley, Division of Atomic, Molecular, and Optical Physics Conference, Charlottesville, VA (poster presentation). May 2009
- ‘The Use of a Lock-In Amplifier to Stabilize the Frequency of a Diode Laser’*
Miguel Juarez and Paul Oxley, Boston University Society of Physics Students Zone 1 Meeting, Boston University, Boston, MA (poster presentation). March 2009
- ‘Diode Laser Excitation of Rydberg Lithium Atoms for Collision Studies’*
Paul Oxley and James Daly, Division of Atomic, Molecular, and Optical Physics Conference, State College, PA (poster presentation). May 2008
- ‘Coherent Elliptical State Atoms For Collision Studies’*
Paul Oxley, York University, Toronto, Canada (invited talk). March 2008
- ‘Atom Smashers: How the World’s Largest Machines Study the Universe’s Smallest Particles’*
Paul Oxley, Center for Talented Youth Conference, Holy Cross College. 2007
- ‘Charge Exchange Collisions Using Coherent Elliptical State Atoms’*
Paul Oxley, Stonybrook University, New York (invited talk). 2007
- ‘Apparatus for Laser Excitation of Lithium Atoms’*
James Daly, **Suzy Flaherty**, and Paul Oxley, New England Section of the American Physical Society and American Association of Physics Teachers meeting (poster presentation) 2006
- ‘TES Bolometers for Microwave Detection’*
Paul Oxley, York University, Toronto (invited talk) 2006
- ‘Creating and Studying Slow Antihydrogen’*
Paul Oxley, University of Kentucky (invited talk) 2005

PAPERS AND PUBLICATIONS(Holy Cross students underlined, my name in bold font)

1. *Frequency Stabilization of Multiple Lasers and Rydberg Atom Spectroscopy.*
Paul Oxley and Patrick Collins, Applied Physics B: Lasers and Optics, DOI: 10.1007/s00340-010-4154-z (2010).
2. *Measurement of the Lithium 10p Fine Structure Interval and Absolute Energy*
Paul Oxley and Patrick Collins, Physical review A 81, 024501 (2010).
3. *Apparatus for Magnetization and Efficient Demagnetization of Soft Magnetic Materials*
Paul Oxley, IEEE Transactions on Magnetics 45, pp. 3274-3283 (2009).
4. *Magnetic properties of stainless steels at room and cryogenic temperatures*
Paul Oxley, Jennifer Goodell, Robert Molt, Journal of Magnetism and Magnetic Materials 321, pp. 2107-2114 (2009).
5. *Finite element solution of Laplace's equation for ion-atom chambers*
Jacob Golde, Janine Shertzer, and **Paul Oxley**, The American Journal of Physics 77, pp. 81-86 (2009).
6. *Finite element solution of Laplace's equation for ion-atom chambers*
Jacob Golde, Janine Shertzer, and **Paul Oxley**, selected for publication in the Virtual Journal of Ultra-Fast Science which reports frontier research (Vol. 8, Issue 1, 2009).
7. *Development of a Cryogenic Induction Motor for use with a Superconducting Magnetic Bearing*
T. Matsumura, S. Hanany, J.R. Hull, B. Johnson, T. Jones, **P. Oxley**, Physica C Vol. 426-431, pp. 746-751, (2005).
8. *A Millimeter-Wave Achromatic Half Wave Plate*
S. Hanany, H. Hubmayr, B. Johnson, T. Matsumura, **P. Oxley**, M. Thibodeau, Applied Optics 44, pp. 4666-4670 (2005).
9. *The EBEX Experiment*
P. Oxley, P. Ade, C. Baccigalupi, P. deBernardis, H-M. Cho, M.J. Devlin, S. Hanany, B.R. Johnson, T. Jones, A.T. Lee, T. Matsumura, A.D. Miller, M. Milligan, T. Renbarger, H.G. Spieler, R. Stompor, G.S. Tucker, M. Zaldarriaga, Earth Observing Systems IX. Edited by W.L. Barnes and J.J. Butler, Proceedings of the SPIE 5543, pp. 320-331 (2004).
10. *Aperture Method to Determine the Density and Geometry of Antiparticle Plasmas*
P. Oxley, N.S. Bowden, R. Parrott, A. Speck, C. Storry, J.N. Tan, M. Wessels, G. Gabrielse, D. Grzonka, W. Oelert, G. Schepers, T. Sefzick, J. Walz, H. Pittner, T.W. Haensch, E.A. Hessels, Physics Letters B 595, 60 (2004).
11. *Observations of Cold Antihydrogen*
J.N. Tan, N.S. Bowden, G. Gabrielse, **P. Oxley**, A. Speck, C.H. Storry, M. Wessels, D. Grzonka, W. Oelert, G. Schepers, T. Sefzick, J. Walz, H. Pittner, T.W. Haensch, E.A. Hessels, Nuclear Instruments and Methods in Physics Research B 214, pp. 22-30 (2004).

PAPERS AND PUBLICATIONS, continued.

12. *Driven Production of Cold Antihydrogen and the First Measured Distribution of Antihydrogen States*
G. Gabrielse, N.S. Bowden, **P. Oxley**, A. Speck, C.H. Storry, J.N. Tan, M. Wessels, D. Grzonka, W. Oelert, G. Schepers, T. Seifick, J. Walz, H. Pittner, T.W. Haensch, E.A. Hessels, Physical Review Letters 89, 233401 (2002).
13. *Background-Free Observation of Cold Antihydrogen and a Field-Ionization Analysis of Its States*
G. Gabrielse, N.S. Bowden, **P. Oxley**, A. Speck, C.H. Storry, J.N. Tan, M. Wessels, D. Grzonka, W. Oelert, G. Schepers, T. Seifick, J. Walz, H. Pittner, T.W. Haensch, E.A. Hessels, Physical Review Letters 89, 213401 (2002).
14. *Stacking of Cold Antiprotons*
G. Gabrielse, N.S. Bowden, **P. Oxley**, A. Speck, C.H. Storry, J.N. Tan, M. Wessels, D. Grzonka, W. Oelert, G. Schepers, T. Seifick, J. Walz, H. Pittner, T.W. Haensch, E.A. Hessels, Physics Letters B 548, 140 (2002).
15. *Cold Antihydrogen and CPT*
G. Gabrielse, J.N. Tan, N.S. Bowden, **P. Oxley**, C.H. Storry, M. Wessels, A. Speck, J. Estrada, P. Yesley, D. Grzonka, W. Oelert, G. Schepers, T. Seifick, J. Walz, Proceedings of the Second Meeting on CPT and Lorentz Symmetry, edited by V. Alan Kostelecky, World Scientific, Singapore, pp. 225-234 (2002).
16. *Cold Antimatter Plasmas, and Aspirations for Cold Antihydrogen*
G. Gabrielse, J.N. Tan, N.S. Bowden, **P. Oxley**, C.H. Storry, M. Wessels, A. Speck, J. Estrada, P. Yesley, T. Squires, D. Grzonka, W. Oelert, G. Schepers, T. Seifick, J. Walz, Non-Neutral Plasma Physics IV, AIP Conference Proceedings, volume 606, edited by F. Anderegg, L. Schweikhard, C.F. Driscoll, American Institute of Physics, Melville, NY, pp. 51-62 (2002).
17. *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. Grzonka, W. Oelert, G. Schepers, T. Seifick, W. Breunlich, M. Carnegelli, H. Fuhrmann, R. King, R. Ursin, H. Zmeskal, H. Kalinowsky, C. Wesdorp, J. Walz, K.S.E. Eikema, T.W. Haensch, Physics Letters B 507, 1 (2001).
18. *Recent Research Using the Oxford Electron Beam Ion Trap*
H.S. Margolis, J. Asada, T.V. Back, D.J. Bieber, F.J. Currell, E.G. Myers, N. Nakamura, S. Ohtani, **P.K. Oxley**, M. Sakurai, J.D. Silver, H. Watanabe, Hyperfine Interactions 115, 139 (1998).
19. *Laser Spectroscopy of the $1s^2 2s 2p^3 P_2 - ^3 P_1$ Transition in Beryllium-like Argon Using the Oxford EBIT*
T.V. Back, H.S. Margolis, **P.K. Oxley**, J.D. Silver, E.G. Myers, Hyperfine Interactions 114, 203 (1998).
20. *Laser Spectroscopy of the 2s Lamb Shift in Hydrogen-like Silicon Using an EBIT*
T.V. Back, P.D. Groves, H.S. Margolis, **P.K. Oxley**, J.D. Silver, Physica Scripta T73, 62 (1997).

PAPERS AND PUBLICATIONS, continued.

21. *Studies of Magnetic Dipole Transitions in Highly Charged Argon and Barium Using an EBIT*
D.J. Bieber, H.S. Margolis, **P.K. Oxley**, J.D. Silver, Physica Scripta T73, 64 (1997).
22. *Studies of the Ionization Balance in an Electron Beam Ion Trap*
H.S. Margolis, P.D. Groves, **P.K. Oxley**, J.D. Silver, A.J. Varney, Physica Scripta T73, 375 (1997).