Andrew J. Speck

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Rowland Institute at Harvard
100 Edwin H. Land Boulevard
Cambridge, Massachusetts 02142

Education

Harvard University — Cambridge, MA
Ph.D. in Physics — 2005
A.M. in Physics — 2002

Williams College — Williamstown, MA
B.A. in Physics and Mathematics with Honors in Physics — 2000

Positions

Rowland Institute at Harvard
Junior Fellow — 2005 onwards
Terahertz Impulse Spectroscopy Group

Harvard University
Ph.D. Thesis Research — 2001-2005
Progress Towards Cold Trapped Antihydrogen
Advisor: Gerald Gabrielse

Williams College
Undergraduate Thesis Research — 1999-2000
Measuring the Stark shift in the Thallium $6P_{1/2}$ - $7S_{1/2}$ *378 nm Transition*
Advisor: Protik Majumder

Technical Skills

Optics & Lasers
Designed and built external cavity diode lasers with laser frequency stabilization for atom trapping. Implemented a Terahertz generation and detection system based on semiconductor photoconductive switches pumped by a femtosecond oscillator.

Electronics Development
Developed over 30 custom electronic circuits. These vary from embedded processors for data acquisition, several timing generators based on FPGA's, to analog signal processing designs.

Computer Programming and Data Analysis
Fluent in Labview, C, Mathematica, Origin, SQL.

Other Laboratory Skills
Designed and built several UHV vacuum systems including cryogenic systems.

Teaching Experience

Rowland Institute at Harvard
Mentor for Research Experience for Undergraduate Students — 2006, 2007, 2009

Harvard University
Teaching Assistant for:
Introductory Electromagnetism — 2001
Introductory Mechanics and Relativity — 2000

Williams College
Teaching Assistant for:

Waves and Optics	2000
Quantum Mechanics	1999
Number Theory	1998
Freshman Introduction to Physics	1997-1999

Awards & Honors

Harvard University:
Maurice and Gertrude Goldhaber Prize, 2004
for outstanding graduate achievement in experimental physics.

Williams College:
Associate Member Sigma Xi, scientific research society. 2000

Colloquiums

Manipulating Atoms and other Physical Systems with Half-Cycle Pulses
Williams College Physics Colloquia, Williamstown Massachusetts (2008).

Posters

State-Independent Control of Rydberg Atoms with Half-Cycle Pulses
Gordon Research Conference on Atomic Physics, Tilton, New Hampshire (2009).

De-Exciting Rydberg Atoms Using Half-Cycle THz Pulse Trains
33rd International Conference on Infrared, Millimeter, and Terahertz Waves, Pasadena, California (2008).

Progress Towards Efficient Broadband De-Excitation of Rydberg atoms with Half-Cycle Pulses
21st International Conference on Atomic Physics, Storrs, Connecticut (2008).

Progress Towards Efficient Broadband De-Excitation of Rydberg atoms with Half-Cycle Pulses
38th Annual Meeting of the Division of Atomic, Molecular, and Optical Physics, Calgary, Alberta (2007).

Papers & Publications

Antihydrogen Production within a Penning-Ioffe Trap
G. Gabrielse, P. Larochelle, D. Le Sage, B. Levitt, W. S. Kolthammer, R. McConnell, P. Richerme, J. Wrubel, A. Speck, M. C. George, D. Grzonka,W. Oelert, T. Sefzick, Z. Zhang, A. Carew, D. Comeau, E. A. Hessels, C. H. Storry, M. Weel, and J. Walz, Physical Review Letters **100**, 113001 (2008).

Single-component plasma of photoelectrons
B. Levitt, G. Gabrielse, P. Larochelle, D. Le Sage, W.S. Kolthammer, R. McConnell, J. Wrubel, A. Speck, D. Grzonka, W. Oelert, T. Sefzick, Z. Zhang, D. Comeau, M.C. George, E.A. Hessels, C.H. Storry, M. Weel, J. Walz, Physics Letters B **656**, 25-29 (2007).

Antiproton Confinement in a Penning-Ioffe Trap for Antihydrogen
G. Gabrielse, P. Larochelle, D. Le Sage, B. Levitt, W.S. Kolthammer, I. Kuljanishvili, R. McConnell, J. Wrubel, F.M. Esser, H. Glueckler, D. Grzonka, G. Hansen, S. Martin, W. Oelert, J. Schillings, M. Schmitt, T. Sefzick, H. Soltner, Z. Zhang, D. Comeau, M.C. George, E.A. Hessels, C.H. Storry, M. Weel, A. Speck, F. Nillius, J. Walz and T.W. Haensch, Physical Review Letters **98**, 113002 (2007).

Density and Geometry of Single Component Plasmas
A. Speck, G. Gabrielse, P. Larochelle, D. Le Sage, B. Levitt, W.S. Kolthammer, R. McConnell, J. Wrubel, D. Grzonka, W. Oelert, T. Sefzick, Z. Zhang, D. Comeau, M.C. George, E.A. Hessels, C.H. Storry, M. Weel, and J. Walz, Physics Letters B **650**, 119-123 (2007).

First Laser-Controlled Antihdyrogen Production
C.H. Storry, A. Speck, D. Le Sage, N. Guise, G. Gabrielse, D. Grozonka, W. Oelert, G. Scheppers, T. Sefzick, J. Walz, H. Pittner, M. Herrmann, T.W. Haensch, D. Comeau, E. A. Hessels, Physical Review Letters **93**, 263401 (2004).

Laser-controlled production of Rydberg positronium via charge exchange collisions
A. Speck, C.H. Storry, E.A. Hessels, G. Gabrielse, Physics Letters B **597**, 257 (2004).

First Measurement of the Velocity of Slow Antihydrogen Atoms
G. Gabrielse, A. Speck and C.H. Storry, D. Le Sage, N. Guise, D. Grzonka, W. Oelert, G. Schepers, T. Sefzick, H. Pittner, J. Walz, T.W. Haensch, D. Comeau, E.A. Hessels, Physical Review Letters **93**, 073401 (2004).

Aperture method to determine the density and geometry of antiparticle plasmas
P. Oxley, N.S. Bowden, R. Parrott, A. Speck, C.H. Storry, J.N. Tan, M. Wessels, G. Gabrielse, D. Grzonka, W. Oelert, G. Schepers, T. Sefzick, J. Walz, H. Pittner, T.W. Hnsch, E.A. Hessels, Physics Letters B **595**, 60 (2004).

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 et al., Nuclear Instruments And Methods B **214**, 22 (2004).

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, et al., Physical Review Letters **89**, 233401 (2002).

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, et al., Physical Review Letters **89**, 213401 (2002).

Stacking of Cold Antiprotons
G. Gabrielse, N.S. Bowden, P. Oxley, A. Speck, C.H. Storry, J.N. Tan, M. Wessels, et al., Physics Letters B **548**, 140 (2002).

Cold Antihydrogen and CPT
G. Gabrielse, J.N. Tan, N.S. Bowden, P. Oxley, C.H. Storry, M. Wessels, A. Speck, et al., Proceedings of the Second Meeting on CPT and Lorentz Symmetry, edited by V. Alan Kostelecky, World Scientific, Singapore, 2002, pp. 225-234.

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, et al., 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, 51-62 (2002).

Measurement of the Stark shift within the $6P_{1/2}$-$7S_{1/2}$ *378-nm transition in atomic thallium*
S. C. Doret, P. D. Friedberg, A. J. Speck, D. S. Richardson, and P. K. Majumder, Physical Review A **66**, 052504 (2002).