James V. Porto

Work Address
Joint Quantum Institute
National Institute of Standards and Technology
100 Bureau Dr. Stop 8424
Gaithersburg, MD 20899-8424
(301) 975-3238, trey@nist.gov

Home Address
1348 N. Lynnbrook Dr.
Arlington, VA 22201
(703) 741-0418

Education

CORNELL UNIVERSITY — Ithaca, NY
Ph.D., Physics, August 1996
Thesis: Superfluidity of ^{3}He in aerogel
Thesis Adviser: Professor J. M. Parpia

UNIVERSITY OF NORTH CAROLINA — Chapel Hill, NC
Bachelor of Science (Highest Honors) in Physics, Jun 1990
Honors Thesis: Exciton Binding Energies in $Ga_{1-x}In_xSe$.
Thesis Advisor: Professor L. E. McNeil

Research Positions

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY — Gaithersburg, MD

2000-present *Research Physicist- Laser Cooling and Trapping group*
Research on Bose-Einstein condensates in optical lattices and the use of trapped neutral atoms for quantum computing.

1998-2000 *National Research Council Fellow-EBIT group*
Research on atomic physics of highly charged ions in an electron beam ion trap (EBIT) and ion cloud dynamics within the trap.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY — Cambridge, MA

1996-1998 *Research Physicist- D. E. Pritchard's group*
Single trapped ion mass spectrometry. Performed metrological atomic mass measurements of ^{23}Na, ^{85}Rb, ^{87}Rb and ^{133}Cs to an accuracy of 2 parts in 10^{10}.

CORNELL UNIVERSITY — Ithaca, NY

1992-1996 *Graduate Research Assistant- J. M. Parpia's group*
Research on quantum fluids and the effects of disorder on phase transitions. Measured the properties of superfluid ^{3}He and ^{3}He/^{4}He mixtures contained within dilute silica aerogel.

UNIVERSITY OF NORTH CAROLINA — Chapel Hill, NC

1989-1990 *Undergraduate Physics Research Project*
Studied Indium doping in excition binding energies of $Ga_{1-x}In_xSe$.

INDIANA UNIVERSITY — Bloomington, IN

Summer 1989 *NSF funded Research Experience for Undergraduate Students*
Experimental and theoretical investigations of chaotic strange attractors in simple physical systems.

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Teaching Experience

2005 **UNIVERSITY OF MARYLAND** College Park, MD
Lecturer- Department of Physics
Co-taught graduate atomic physics with Dr. W. D. Phillips.

1998 **MASSACHUSETTS INSTITUTE OF TECHNOLOGY** Cambridge, MA
Teaching Assistant – Department of Physics
Taught advanced undergraduate mechanics and assisted in developing exams.

CORNELL UNIVERSITY Ithaca, NY

1992-1996 *Teaching Assistant Training Program – Department of Physics*
Responsible for training and advising individual teaching assistants. Involved classroom observation (and filming) and subsequent consultation with each incoming teaching assistant.

1993-1996 *Department of Education Fellow*
The GANN fellowship was designed "to sustain and enhance the capacity for teaching and research in areas of national need." Participation involved one semester of bi-weekly seminars on current research in education.

1992-1994 *Organizer, New Teaching Assistant Seminar – Department of Physics*
Assisted in the development and administration of yearly 5-day workshops to train new physics teaching assistance.

1990-1992 *Teaching Assistant – Department of Physics*
Taught undergraduate mechanics in a classroom environment and in non-lecture self-paced laboratory environment. Received Clark Teaching award in 1991 for excellence in teaching.

Fellowships & Honors

Bronze Medal, Department of Commerce	2006
Presidential Early Career Award in Science and Engineering	2006
Sigma Xi Award, NIST	2004
National Research Council Fellow	1998-2000
Department of Education Fellow	1993-1996
Clark Teaching Award, Cornell University	1991
Johnson Undergraduate in Physics Award, UNC	1990

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Publications

39. **Mott insulator transition in a two-dimensional Atomic Bose gas.**
IB Spielman, WD Phillips and JV Porto
Accepted for publication, Phys. Rev. Lett. (Jan 2007).

38. **Controlled atom dynamics in a double-well optical lattice.**
M Anderlini, J Sebby-Strabley, J Krus, JV Porto and WD Phillips
J. Phys. B: At. Mol. Opt. Phys. **39,** S199-S210 (2006).

37. **Lattice of double wells for manipulating pairs of cold atoms.**
J. Sebby-Strabley, M. Anderlini, PS Jessen and JV Porto
Phys. Rev. A **73**, 033605 (2006).

36. **The role of interactions, tunneling, and harmonic confinement on the adiabatic loading of bosons in an opticall lattice.** AM Rey, G Pupillo and JV Porto.
Phys. Rev. A **73**, 023608 (2006).

35. **Collisional deexcitation in a quasi-two-dimensional degenerate bosonic gas.**
IB Spielman, PR Johnson, JH Huckans, CD Fertig, SL Rolston, WD Phillips and JV Porto.
Phys. Rev. A **73**, 020702 (2006).

34. **Strongly inhibited transport of a degenerate 1D Bose gas in lattice.**
CD Fertig, KM ~O'Hara, JH Huckans, SL Rolston, WD Phillips and JVPorto.
Phys. Rev. Lett. **94**, 120403 (2005).

33. **Study of a 1D interacting quantum Bose gas.**
B Laburthe Tolra, KM O'Hara, JH Huckans, M Anderlini, JV Porto, SL Rolston and WD Phillips,
Journal De Physique IV **116**: 227 (2004).

32. **Observation of reduced three-body recombination in a Correlated 1D Bose gas.**
B. Laburthe Tolra, KM O'Hara, J Huckans, SL Rolston, WD Phillips and JVPorto.
Phys. Rev. Lett. **92**, 190401 (2004).

31. **Experimental Study of a Bose Gas in One Dimension.**
B Laburthe Tolra, KM O'Hara, J Huckans, SL Rolston, WD Phillips and JV Porto.
in Laser Spectroscopy: Proceedings of the 16th International Conference on
Laser Spectroscopy, World Scientific eds. P. Hannaford, A. Sidorov, H. Bachor and
K. Baldwin (2004), p.124.

30. **Adiabatic loading of bosons into optical lattices.**
PB Blakie and JV Porto.
Phys. Rev. A **69**, 013603 (2004).

29. **Quantum information with neutral atoms as qubits.**
JV Porto, S Rolston, B Laburthe-Tolra, CJ Williams, and WD Phillips.
Philos. Trans. R. Soc. Lond. Ser. A **361**, 1808, p.1417-1427 (2003).

28. **Patterned loading of a Bose-Einstein condensate into an optical lattice.**
S Peil, JV Porto, B Laburthe-Tolra, JM Obrecht, BE King, M Subbotin, S Rolston,
and WD Phillips.
Phys. Rev. A **67**, 051603 (2003).

27. **Precise measurements of the masses of Cs, Rb and Na –**
A new route to the fine structure constant.
S Rainville, MP Bradley, JV Porto, JK Thompson, and DE Pritchard.
Hyperfine Interactions **132**, 1-4, 177 (2001).

26. **Series solution for the image charge fields in**
arbitrary cylindrically symmetric Penning traps.
JV Porto
Phys. Rev. A **6402**, art. no.-023403 (2001).

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Publications (cont.)

25. **Analysis of broadband x-ray spectra of highly charged krypton from a microcalorimeter detector of an electron-beam ion trap.**
I Kink, JM Laming, E Takacs, JV Porto, JD Gillaspy, E Silver, H Schnopper, SR Bandler, M Barbera, N Brickhouse, S Murray, N Madden, D Landis, J Beeman, EE Haller
Phys. Rev. E **6304**, 046409 (2001).
24. **Microcalorimeter/EBIT measurements of X-ray spectra of highly charged ions.**
I Kink, JM Laming, E Takacs, JV Porto, JD Gillaspy, ESilver, H Schnopper, SR Bandler, M Barbera, N Brickhouse, S Murray, N Madden, D Landis, J Beeman, and EE Haller,
Physica Scripta **T92**, 454 (2001).
23. **Scaling properties of superfluid ^{3}He in aerogel.**
G Lawes, SCJ Kingsley, A Golov, N Mulders, JV Porto, JM Parpia,
J. Low Temp. Phys. **121**, 5-6 567 (2000).
22. **Emission-line intensity ratios in Fe XVII observed with a microcalorimeter on an electron beam ion trap,**
JM Laming, I Kink, E Takacs, JV Porto, J Gillaspy, E Silver, H Schnopper, S Bandler, N Brickhouse, SS Murray, M Barbera, AK Bhatia, GA Doschek, N Madden, D Landis, J Beeman, and EE Haller,
Astrophys. J. **545**, 2 L161 (2000).
21. **Direct Imaging of Highly Charged Ions in an Electron Beam Ion Trap,**
JV Porto, I Kink and JD Gillaspy,
Rev. Sci. Instrum. **71**, 3050 (2000).
20. **Laboratory Astrophysics Survey of Key Diagnostic Lines Using a Microcalorimeter on an Electron Beam Ion Trap,**
E Silver, H Schnopper, S Bandler, N Brickhouse, S Murray, M Barbera, E Takacs, JD Gillaspy, JV Porto, I Kink, JM Laming, N Madden, D Landis, J Beeman, and E Haller,
Astrophys. J. **541**, 1 495 (2000).
19. **Laboratory Astrophysics and Microanalysis with NTD-Germanium-based X-ray Microcalorimeters,**
E Silver, H Schnopper, S Bandler, S Murray, N Madden, D Landis, J Beeman, E Haller, M Barbera, G Tucker, JD Gillaspy, E Takacs, and JV Porto,
NIM A **444** (2000) 156-160.
18. **UV light from the ground term of Ti-like ytterbium, tungsten and bismuth,**
JV Porto, I Kink and JD Gillaspy,
Phys. Rev. A. **61**, 4501 (2000).
17. **^{3}He superfluidity in the presence of aerogel,**
A Golov, JV Porto, DA Geller, N Mulders, GJ Lawes, JM Parpia,
Physica B **280**: (1-4) 134-139 (2000).
16. **Penning trap measurements of the masses of ^{133}Cs, ^{85,87}Rb, and ^{23}Na**
MP Bradley, JV Porto, S Rainville, JK Thompson and DE Pritchard,
Phys. Rev. Lett. **83**, 4510 (1999).
15. **Correlated disorder in a p-wave superfluid,**
JV Porto and JM Parpia.
Phys. Rev. B **59**, 14583 (1999).
14. **^{3}He in aerogel - an inhomogeneously disordered unconventional superfluid,**
A Golov, JV Porto and JM Parpia,
J Low Temp Phys. **113**: (3-4), 329 (1998).

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Publications (cont.)

13. **^{3}He in 99.5% porous aerogel at the normal-superfluid transition,**
    SCJ Kingsley, G Lawes, A Golov, JV Porto, EN Smith, N Mulders,
    MHW Chan, and JM Parpia,
    J Low Temp Phys **113**: (3-4), 357 (1998).
12. **Suppression of ^{3}He superfluidity by aerogel.**
    JV Porto, A Golov, K Matsumoto, RD Biggar and JM Parpia.
    J Non-Cryst Solids **225**: (1), 205 (1998).
11. **Superfluidity of ^{3}He in aerogel covered with a thick ^{4}He film,**
    A Golov, JV Porto and JM Parpia.
    Phys. Rev. Lett. **80**, 4486 (1998).
10. **Superfluidity of pure ^{3}He and mixtures of ^{3}He and ^{4}He in aerogel,**
    A Golov, JV Porto, K Matsumoto, L Pollack, EN Smith, RD Biggar, TL Ho, and Parpia.
    J Low Temp Phys **110**: (1-2), 515 (1998).
9. **Capillary condensation of phase separated liquid ^{3}He-^{4}He mixtures in aerogel,**
    A Golov, JV Porto and JM Parpia.
    J Low Temp Phys **110**: (1-2), 591 (1998).
8. **Quantum phase transition of ^{3}He in aerogel at a nonzero pressure,**
    K Matsumoto, JV Porto, L Pollack, EN Smith, TL Ho, and JM Parpia.
    Phys Rev Lett **79** 253 (1997).
7. **Aerogel: Impurities in superfluid ^{3}He?,**
    JV Porto and JM Parpia
    Czech J Phys **46**: 2981 Suppl. 6 (1996).
6. **The effect of surface He-4 on superfluid He-3 in aerogel,**
    JV Porto and JM Parpia,
    Czech J Phys **46**: 123-124 Suppl. 1 (1996).
5. **An experiment to measure the effect of magnetic fields on the superfluid fraction and transition temperature of He-3 in aerogel,**
    JV Porto, L Pollack, K Matsumoto, EN Smith, and JM Parpia.
    Czech J Phys **46**: 125-126 Suppl. 1 (1996).
4. **Superfluid ^{3}He in aerogel**
    JV Porto and JM Parpia
    Phys. Rev. Lett. **74**, 4667, (1995).
3. **Superfluid ^{3}He in aerogel,**
    JV Porto, L Pollack, K Matsumoto, EN Smith, and JM Parpia
    J Low Temp Phys **101**: (3-4), 397 (1995).
2. **Two methods of fabricating reliable superconducting joints with multifilamentary Nb-Ti wire**,
    S. Phillips, J.V. Porto and J.M. Parpia
    J. Low Temp. Phys. **101**, 581, (1995).
1. **Diffusion welds between copper and silver alloys,**
    JV Porto and JM Parpia,
    Physica B, **194-196**, 857 (1994).