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Citizenship: U.S.

## **I. EDUCATION:**

### **HARVARD UNIVERSITY**, Cambridge, MA

Ph.D. in Physics, March 1989.

Dissertation: " Measurement of the  $4^2S_{1/2} - 4^2F_{5/2}$  Three-Photon Transition in  $He^+$ :

A New Test of Q.E.D."

Thesis Advisor: Prof Francis M. Pipkin

### **YALE COLLEGE**, New Haven, CT

B.S. with Honors in Physics, May 1982.

Senior Thesis: "Aspects of the Search for Parity Nonconservation in Atomic Hydrogen"

Supervisor: Prof. Edward A. Hinds

## **II. SUMMARY OF WORK/RESEARCH EXPERIENCE:**

|  |           |
|--|-----------|
| Astronomy Dept. Chair  | 2022-     |
| Interim President of Williams College  | 2018      |
| Director of the Science Center ["Dean of Science"]                               | 2010-2021 |
| Barclay Jermain Professor of Natural Philosophy                                  | 2017-     |
| Professor of Physics   | 2006-     |
| Physics Department Chair   | 2003-2005 |
| Associate Prof. of Physics w/tenure, Williams College, Williamstown, MA          | 2001-2006 |
| Assistant Professor of Physics, Williams College, Williamstown, MA               | 1994-2001 |
| Research Assistant Professor, Physics Dept., Univ. of Washington, Seattle, WA    | 1993-1994 |
| Postdoctoral Research Associate, Physics Dept., Univ. of Washington, Seattle, WA | 1989-1993 |

## **III. AWARDS and GRANTS**

|  |             |
|--|-------------|
| <b>Nelson Bushnell '20 Prize for Teaching, Williams College</b>                    | <b>2023</b> |
| <b>APS Prize for a Faculty Member for Research at an Undergraduate Institution</b> | <b>2017</b> |
| <b>APS Fellow</b>  | <b>2007</b> |
| <b>Harvard Danforth Center (graduate student) Teaching Award</b>                   | <b>1985</b> |

**NSF-RUI Single PI grants:** 1997, 2001, 2005, 2009, 2014, 2019

Continuous funding, total awards: \$1.8M + College matching funds 1998-2024

**N.I.S.T. Precision Measurement Grant** (3-years/\$150,000) 1999-2002

**NSF-MRI Grant**, (w/Strait, Jones, Bolton, and Thoman, \$200K) 1997

**Research Corp.-Cottrell College Scholar Award** (\$50K) 1994-1997

#### **IV. RESEARCH INTERESTS / EXPERIENCE:**

Tests of fundamental physics and discrete symmetries using atoms and radiation. Measurements of parity violation in atoms as tests of electroweak physics. Diode laser spectroscopy and polarimetry of atoms. Precise Atomic structure tests in Group III & IV atoms. Diode laser stabilization and control. Techniques for low-noise, high-precision spectroscopy and signal detection. Stark effect and Faraday effect in atoms. High-flux atomic beam spectroscopy. Numerical and analytic modeling of atom-radiation interactions.

#### **V. PROFESSIONAL ACTIVITIES AND AFFILIATIONS:**

American Physical Society, ELECTED FELLOW 2007  
Member, DAMOP, GPMFC: 1982 - present  
    **Executive Committee of GPMFC, chair of nominating committee** 2002-2005  
    **Program Committee, Fellowship Committee of DAMOP** 2011 –  
    **Chair, Education Committee of DAMOP** 2014 – 2015

Journal Reviewer:  
    *A.P.S. Physical Review and Phys. Rev. Lett* 1993 - present

Grant / Program Reviewer:  
    **NSF Committee of Visitors (COV) for Physics Division** 2023  
    **NSF AMOP review panel participant** 2005, 2010, 2015  
    **NSF 'Precision Measurements' program *ad hoc* reviewer** 1998 - present  
    **Research Corporation** 1996 -  
    **NIST Precision Measurement Grant competition** 2003 –

Conference Chair  
    **Atomic Physics Gordon Conference: elected vice-chair (2007), chair (2009)**

External Department and Tenure reviews: **numerous**

#### **VI. INVITED SEMINARS (1994 - present)**

##### **2023**

Columbia University *AMO group seminar*

##### **2020**

Amherst College *Department colloquium*

##### **2018**

Yale Univ. *AMO group seminar*

##### **2017**

DAMOP / APS *APS Invited Prize talk*

##### **2015**

Smith College *Department colloquium*

##### **2014**

Hamilton College *Department colloquium*

**2013**

U. Maryland/JQI

*JQI seminar series***2012**

Bowdoin College

*Department colloquium***2011***Atomic Physics Gordon Research Conference*

Precision measurements session chair, speaker

**2010**

Williams College

*Department colloquium*

Bates College

*Department colloquium***2009**

Yale University

*AMO group seminar*

Siena College

*Department colloquium*

Univ. of Connecticut

*AMO group seminar*

Williams College

*Summer Science colloquium***2007**

Univ. of Delaware

*AMO seminar*

Old Dominion Univ.

*Department colloquium***2006**

Adelphi University

*Department Colloquium*

Univ. of Maryland

*AMO seminar*

Union College

*Department Colloquium***2005**

Univ. of Montana

*OPTEC laser science conference, invited talk*

Univ. of Montana

*Department Colloquium***2003**

Amherst College

*Department Colloquium*

Yale University

*AMO seminar*

U. Connecticut

*AMO seminar***2002**

U.C. Berkeley

*AMO seminar*

Middlebury College

*Department Colloquium*

Colby College

*Department Colloquium***2001**

Harvard/ITAMP

*Fundamental Symmetries workshop, invited talk*

York Univ., Toronto

*AMO seminar*

Mt. Holyoke College

*Department Colloquium***2000**

Holy Cross College

*Department Colloquium***1999**

Colgate University

*Department Colloquium*

NIST/Gaithersburg

*AMO seminar*

## 1998

Williams College  
Harvard Univ.  
U. Connecticut

*Sigma Xi annual lecture series*  
*AMO seminar*  
*AMO seminar*

## 1997

Williams College  
SUNY/Stonybrook

*Department Colloquium*  
*AMO seminar*

## 1994

MIT  
Amherst College  
Williams College

Nuclear/Particle physics group seminar  
*Department Colloquium*  
*Department Colloquium*

## VII. CONFERENCE PRESENTATIONS - Majumder group @Williams

### [undergraduate student co-authors in bold]:

51. “High-Precision Measurements of Atomic Structure in Pb and other Multi-Valence Systems”, John H. Lacy, **Russell Blakey ’23**, **Abby Kinney ’24**, **Charles Yang ’24**, **Robin Wang ’24** and P.K. Majumder. Department of Physics, Williams College, Williamstown, Massachusetts 01267 USA. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Spokane WA, June 5-9, 2023.*

50. “High-Precision Measurements of Atomic Structure in Pb and other Multi-Valence Systems”, John H. Lacy, **Gabriel Patenotte ’21**, **Abby Kinney ’24**, **Charles Yang ’24**, and P.K. Majumder. Department of Physics, Williams College, Williamstown, Massachusetts 01267 USA. *Contributed poster at the International Conference on Atomic Physics (ICAP), Toronto, CA, July 18-22, 2022.*

49. “High-Precision Measurements of Atomic Lead Transition Amplitudes and Static Polarizabilities”, John H. Lacy, **Gabriel Patenotte ’22**, and P.K. Majumder. Department of Physics, Williams College, Williamstown, Massachusetts 01267 USA. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Orlando FL, May 30-June 3, 2022.*

48. “Transition Isotope Shifts (TIS) and Hyperfine Structure (HFS) Measurements in Low-Lying Transitions of Atomic Lead”, John H. Lacy, **Charlotte Jones ’22**, and P.K. Majumder. Department of Physics, Williams College, Williamstown, Massachusetts 01267 USA. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Orlando FL, May 30-June 3, 2022.*

47. “High-Precision Measurements of Atomic Lead Transition Amplitudes and Static Polarizabilities”, John H. Lacy, **Gabriel Patenotte ’21**, **Patric Postec ’21**, and P.K. Majumder. Department of Physics, Williams College, Williamstown, Massachusetts 01267 USA. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics (virtual) meeting, Fort Worth, TX, June 1-5, 2021.*

46. “High-Precision Transition Amplitudes and Static Polarizability Measurements in Atomic Lead using Faraday Rotation Spectroscopy”, John H. Lacy, **Abdullah Nasir ’20**, **Gabriel Patenotte ’21**, and P.K. Majumder. Department of Physics, Williams College, Williamstown, Massachusetts 01267 USA. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics (virtual) meeting, Portland OR, June 1-5, 2020.*

45. “Precise Measurements of Transition Amplitudes, Polarizabilities, and Isotope Shifts in Lead, Thallium, and Tin using Faraday Rotation Spectroscopy” Daniel L. Maser, **Gabriel Patenotte ’21**, **Sameer Khanbhai ’21**, P.K. Majumder Department of Physics, Williams College, Williamstown, Massachusetts 01267 USA. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Milwaukee, WI, May 27 – 31, 2019.*

44. “High-precision measurement of electric quadrupole amplitude in lead using Faraday Rotation Spectroscopy”. Daniel Maser, **Eli Hoenig ’17**, **Bingyi Wang ’18**, and P.K. Majumder. *Contributed talk at the APS Division of Atomic Molecular and Optical Physics meeting, Milwaukee, WI, May 27 – 31, 2019.*

43. “High-precision measurements and theoretical calculations of indium excited-state polarizabilities”. Daniel Maser, **Bingyi Wang ’18**, **Nathaniel Vilas ’17**, P.M. Rupasinghe, M. Safronova, U. Safronova, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Fort Lauderdale, FL, May 28 – June 1, 2018.*

42. “Measurement of the hyperfine structure and isotope shifts in the 8p excited states of thallium and the 7p excited states of indium using two-step laser spectroscopy”. Priyanka Rupasinghe, **Sauman Cheng ’16**, **Eli Hoenig ’17**, **Nathaniel Vilas ’17**, **Bingyi Wang ’18**, and P.K. Majumder. *Contributed talk at the APS Division of Atomic Molecular and Optical Physics meeting, Sacramento, CA, June 5-9, 2017.*

41. “High-precision atomic structure measurements in Lead”. **Eli Hoenig ’17**, Priyanka Rupasinghe, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Sacramento, CA, June 5-9, 2017.*

40. “High-precision polarizability measurements in excited states of indium using two-step spectroscopy in an atomic beam,” **Nathaniel Vilas ’17**, Priyanka Rupasinghe, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Sacramento, CA, June 5-9, 2017.*

39. “Precise measurement of the  $8P_{1/2,3/2}$  state hyperfine splittings and isotope shift in  $^{203}\text{Tl}$  and  $^{205}\text{Tl}$  using two-step laser spectroscopy”. **Sauman Cheng ’16**, Priyanka Rupasinghe, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Providence, RI, May 23-27, 2016.*

38. “Precise Measurement of the Indium  $6p_{1/2}$ -state polarizability using an Atomic Beam”. **Allison Carter ’16**, **Ben Augebraun 15**, **Nathaniel Vilas ’17**, P.M. Rupasinghe, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Providence, RI, May 23-27, 2016.*

37. “High precision Stark shift measurements in excited states of indium using an atomic beam”. **Benjamin Augenbraun ’15**, Priyanka Rupasinghe, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Columbus, OH, June 8-12, 2015.*

36. “High-precision Stark shift measurements using FM spectroscopy in an indium atomic beam”. **Nathan Schine ’13**, **Nathan Bricault ’14**, **Benjamin Augenbraun ’15** Gambhir Ranjit, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Madison, WI, June 2-6, 2014.*

35. “Precise measurement of the  $7P_{1/2}$  and  $8P_{1/2}$  hyperfine splittings and isotope shift in  $^{203}\text{Tl}$  and  $^{205}\text{Tl}$  using two-step laser spectroscopy.” **David Kealhofer ’13**, **Gabrielle Vukasin ’14**, Gambhir Ranjit, and P.K. Majumder. *Contributed poster at the APS Division of Atomic Molecular and Optical Physics meeting, Madison, WI, June 2-6, 2014.*

34. “Precise atomic beam measurement of the Stark shift within the  $5P_{1/2} \rightarrow 6S_{1/2}$  transition in  $^{115}\text{In}$  using FM spectroscopy” P.K. Majumder, **N. Schine '13**, and G. Ranjit. *contributed talk*, APS Division of Atomic, Molecular, and Optical Physics Meeting, Quebec City, CA, June 3 – June 7, 2013.
33. “Measurement of the  $7P_{1/2}$ -state hyperfine structure and isotope shift in  $^{203}\text{Tl}$  and  $^{205}\text{Tl}$  using two-color spectroscopy” **D. Kealhofer '13**, G. Ranjit, and P.K. Majumder. *contributed poster*, APS Division of Atomic, Molecular, and Optical Physics Meeting, Quebec City, CA, June 3 – June 7, 2013.
32. “Precise atomic beam measurement of the Stark shift within the  $5P_{1/2} \rightarrow 6S_{1/2}$  transition in  $^{115}\text{In}$  using FM spectroscopy” Gambhir Ranjit, **A. Schneider '12**, **N. Schine '13**, and P.K. Majumder. *contributed poster*, APS Division of Atomic, Molecular, and Optical Physics Meeting, Anaheim, CA, June 4 – June 9, 2012.
31. “Measuring hyperfine structure and isotope shift in the thallium  $7S_{1/2} \rightarrow 7P_{1/2}$  transition using two-color spectroscopy” Gambhir Ranjit, **T. Siegel '12**, and P.K. Majumder. *contributed poster*, APS Division of Atomic, Molecular, and Optical Physics Meeting, Anaheim, CA, June 4 – June 9, 2012.
30. “Using AMO techniques to probe physics of the Standard Model (and beyond)”, *invited talk, session chair*, Atomic Physics Gordon Research Conference, Mt. Snow Resort, VT, June 26 – July 1, 2011.
29. “Precise atomic beam measurement of the Stark shift within the  $5P_{1/2} \rightarrow 6S_{1/2}$  transition in  $^{115}\text{In}$ ” Gambhir Ranjit, **A. Lorenzo '11**, and P.K. Majumder. *contributed poster*, Atomic Physics Gordon Research Conference, Mt. Snow Resort, VT, June 26 – July 1, 2011.
28. “Precise atomic beam measurement of the Stark shift within the  $5P_{1/2} \rightarrow 6S_{1/2}$  transition in  $^{115}\text{In}$ ” Gambhir Ranjit, **A. Lorenzo '11**, and P.K. Majumder. *contributed poster*, APS Division of Atomic, Molecular, and Optical Physics Meeting, Atlanta, GA, June 13-17, 2011.
27. “Precise measurements of hyperfine structure and atomic polarizability in indium and thallium using two-color diode laser spectroscopy” P. K. Majumder, **Huajie Cao '08**, **Scott Smedinghoff '09**, and M. Gunawardena, *contributed poster*, APS Division of Atomic, Molecular, and Optical Physics Meeting, Williamsburg, VA, May 19-23, 2009.
26. “Precise measurement of the hyperfine splittings within the  $6p_{3/2}$  level of atomic indium using two-color diode laser spectroscopy.” M. Gunawardena, **Huajie Cao '09**, **P.W. Hess '08**, and P.K. Majumder, *contributed talk*, APS Division of Atomic, Molecular, and Optical Physics Meeting, Williamsburg, VA, May 19-23, 2009.
25. “Precise measurements of hyperfine structure and atomic polarizability in indium and thallium”, P. K. Majumder, **P.W. Hess '08**, M. Gunawardena, *contributed poster*, International Conference on Atomic Physics, Storrs, CT, July 2008.
24. “Precise measurement of the hyperfine splittings within the  $6P_{3/2}$  level of atomic indium using two-color diode laser spectroscopy” **P.W. Hess '08**, M. Gunawardena, and P.K. Majumder. . [*Invited talk selected competitively for DAMOP ‘undergraduate research’ session*] APS Division of Atomic, Molecular, and Optical Physics Meeting, State College, PA, May 2008.
23. “Precise measurements of hyperfine structure and atomic polarizability in indium and thallium using two-color diode laser spectroscopy”, **P.W. Hess '08**, **J. Strait '07**, M. Gunawardena, P.K. Majumder, *contributed poster*, APS Division of Atomic, Molecular, and Optical Physics Meeting, State College, PA, May 2008.
22. “High precision two-step spectroscopy in atomic indium” P.K. Majumder, M. Gunawardena, **O. Simpson '07**, **J. Strait '07**, and **P. Hess '08**, , *contributed poster* - Gordon Research Conference in Atomic Physics, Tilton, NH. June 27-July 1, 2007.

21. “Atomic structure measurements and tests of fundamental symmetries in a thallium atomic beam”, P.K.Majumder, **D. Butts '06**, R. Uhl. . Contributed poster, APS Division of Atomic, Molecular, and Optical Physics Meeting, , Knoxville, TN May 16-20, 2006.
20. “ Differential Phase Shift Spectroscopy in a Thallium Atomic Beam”, P.K. Majumder, **D.Butts '06, J.A. Kerckhoff '05**, and R.Uhl. Contributed talk, APS Division of Atomic, Molecular, and Optical Physics Meeting, , Knoxville, TN May 16-20, 2006
19. “High-precision phase shift spectroscopy of the weak 1283 nm M1 transition in a thallium atomic beam”, P.K. Majumder, **C.D. Bruzewicz '05, J.A. Kerckhoff '05**, and R. Uhl., *contributed poster*: Atomic Physics Gordon conference, Tilton, NH 6/25-6/29 2005.
18. “High-precision phase shift spectroscopy of the weak 1283 nm M1 transition in a thallium atomic beam”, R. Uhl, **C.D. Bruzewicz '05, J.A. Kerckhoff '05** and P.K. Majumder, *contributed poster*: APS Division of Atomic, Molecular, and Optical Physics Meeting, Lincoln, NE, 5/22-5/25 2005.
17. “Search for long-range T-odd, P-even forces in atomic thallium”, P.K. Majumder, **J.A. Backusmayes '05, C.D. Bruzewicz '05** and R. Uhl, *contributed poster*: APS Division of Atomic, Molecular, and Optical Physics Meeting, Tucson, AZ, 5/25-5/29 2004.
16. “High-precision atomic structure measurements in thallium”, **M.A. Burkhardt '04, C.D. Holmes '03**, R. Uhl, and P.K. Majumder , *contributed poster*: APS Division of Atomic, Molecular, and Optical Physics Meeting, Tucson, AZ, 5/25-5/29 2004.
15. “Atomic Structure Measurements and Fundamental Symmetry Tests in a Thallium Atomic Beam”, **C.D. Holmes '03**, M.A. Green, and P.K. Majumder , *contributed poster*: APS Division of Atomic, Molecular, and Optical Physics Meeting, Boulder, CO, 5/29-6/1 2003.
14. “Atomic Structure Measurements and Fundamental Symmetry Tests in a Thallium Atomic Beam”, P.K. Majumder and **S.C. Doret '02**, , *contributed poster*: APS Division of Atomic, Molecular, and Optical Physics Meeting, Williamsburg, VA, 5/29-6/1 2002.
13. “Precise Measurement of the Stark Shift in the Thallium  $6P_{1/2} - 7S_{1/2}$  378 nm Transition”, **S.C. Doret '02**. [Invited talk selected competitively for DAMOP ‘undergraduate research’ session] APS Division of Atomic, Molecular, and Optical Physics Meeting, Williamsburg, VA, 5/29-6/1 2002.
12. “Atomic Beam Spectroscopy and Test of Tim-Reversal Symmetry in the Thallium  $6P_{1/2} - 6P_{3/2}$  M1 Transition”, P.K. Majumder, **S.C. Doret '02, C.D. Holmes '03**, and D.S. Richardson. *contributed poster*. 18<sup>th</sup> International Conference on Atomic Physics, Cambridge, MA, 7/28-8/2 2002.
11. “New Measurement of the Stark Shift in the Thallium  $6P_{1/2} - 7S_{1/2}$  378 nm Transition”, **S.C. Doret '02, P.D. Friedberg '01, A.J. Speck '00**, D.S. Richardson, and P.K. Majumder. *contributed poster*. 18<sup>th</sup> International Conference on Atomic Physics, Cambridge, MA, 7/28-8/2 2002.
10. “Precise Atomic Beam Spectroscopy Measurements in Thallium”, D.S. Richardson, **P.D. Friedberg '01**, P.K. Majumder, *contributed poster*: DAMOP 2001 Meeting, London, Ontario, CA; May 16-19, 2001.
9. “Precise Atomic Structure Measurements in Thallium at 378 nm using a Frequency-doubled Diode Laser”, P.K. Majumder, **R.N. Lyman ('99), P.D. Friedberg ('01)**, and D.S. Richardson, *contributed talk*: DAMOP 2001 Meeting, London, Ontario, CA; May 16-19, 2001.
8. “Precise Atomic Beam Spectroscopy Measurements in Thallium”, D.S. Richardson, **P.D. Friedberg '01**, P.K. Majumder, *contributed poster*: Atomic Physics Gordon Conference, Williams College; June 16-20, 2001.

7. "Precise Atomic Structure Measurements in Thallium and Tests of Fundamental Symmetries", P.K. Majumder, *invited talk*: Harvard University, ITAMP Workshop on "Tests of Fundamental Symmetries using Atoms and Molecules", 30 Nov.-1 Dec 2001.
6. "Atomic Structure Measurements in Thallium using a 378 nm Frequency-doubled Diode Laser ", P.K. Majumder, **R.N. Lyman ('99)**, and D.S. Richardson, *contributed poster*: 1999 APS Centennial Meeting, Atlanta, GA; March 20-26, 1999.
5. " Proposed Test of Long-Range T-Violating Forces in Atomic Thallium ", P.K. Majumder, *contributed poster*: 1999 APS Centennial Meeting, Atlanta, GA; March 20-26, 1999.
4. "Atomic Structure Measurements and Tests of Fundamental Symmetries within the Thallium  $6P_{1/2} - 6P_{3/2}$  1283 nm Transition", P.K. Majumder, **Leo L. Tsai ('98)**, and **P.C. Nicholas ('98)**. ICAP 16, Windsor, Ontario, Canada; 3-7 Aug. 1998. Appears in: 16<sup>th</sup> ICAP, Windsor, 1998 Contributed Abstracts.
3. "Precise Measurement of the Electric Quadrupole Amplitude within the 1.283 nm line of Atomic Thallium", P.K. Majumder and **Leo L. Tsai ('98)**. Contributed paper: DAMOP annual meeting, Santa Fe, NM; 27-30 May, 1998.
2. "Atomic Structure and Fundamental Symmetry Measurements in a Thallium Atomic Beam" P.K. Majumder and **Peter C. Nicholas ('98)**. Contributed paper: DAMOP annual meeting, Santa Fe, NM; 27-30 May, 1998.
1. "Precise Measurements of Electric Quadrupole and Dipole Amplitudes in Atomic Thallium," P.K. Majumder. Contributed paper: DAMOP annual meeting, Wash. DC; 18-21 April, 1997

### **VIII. JOURNAL PUBLICATIONS [undergraduate student co-authors in bold]:**

20. "High-precision measurement and *ab initio* calculation of the  $(6s^26p^2) ^3P_0 \rightarrow ^3P_2$  electric-quadrupole-transition amplitude in  $^{208}\text{Pb}$ ", D.L. Maser, **Eli Hoenig '17**, **Bingyi Wang '18**, P.M. Rupasinghe, S.G. Porsev M.S. Safronova, and P.K. Majumder, *Phys. Rev. A* **100**, 052506 (2019).
19. " High-precision measurements and theoretical calculations of indium polarizabilities", **N.B Vilas '17**, **Bingyi Wang '18**, P.M. Rupasinghe, D.L. Maser, M.S. Safronova, U.I. Safronova, and P.K. Majumder, *Phys Rev. A* **97** 022507 (2018).
18. " Measurement of the scalar polarizability of the indium  $6p_{1/2}$  state using two-step atomic-beam spectroscopy", **Benjamin L. Augenbraun '15**, **Allison Carter '16**, P.M. Rupasinghe, and P.K. Majumder, *Phys Rev. A* **94**, 022515 (2016).
17. " Measurement of  $7p_{1/2}$ -state hyperfine structure and  $7s_{1/2}$ - $7p_{1/2}$  transition isotope shift in  $^{203}\text{Tl}$  and  $^{205}\text{Tl}$ ", G. Ranjit, **D. Kealfhofer '13**, **G.D. Vukasin '14**, and P.K. Majumder, *Phys Rev. A* **89**, 012511 (2014). [*Editors' choice*]
16. " Thallium  $7p$  lifetimes derived from experiment and *ab initio* calculations of scalar polarizabilities", M.S. Safronova and P.K. Majumder, *Phys. Rev. A* **87**, 042502 (2013).
15. " Measurement of the scalar polarizability within the  $5P_{1/2}$ - $6S_{1/2}$  410-nm transition in atomic indium", G. Ranjit, **N.A. Schine '13**, **A.T. Lorenzo '11**, **A.E. Schneider '12**, and P.K. Majumder, *Phys. Rev. A* **87**, 032506 (2013).



14. " Measurement of hyperfine structure within the  $6P_{3/2}$  excited state of  $^{115}\text{In}$ ", Mevan Gunawardena, **Huajie Cao '09, Paul W. Hess '08**, and P.K. Majumder, *Phys. Rev. A* **80**, 032519 (2009).
13. " A frequency stabilization technique for diode lasers based on frequency-shifted beams from an acousto-optic modulator ", Mevan Gunawardena, **Paul W. Hess '08, Jared Strait '07**, and P.K. Majumder, *Rev. Sci. Instrum.* **79**, 103110 (2008).
12. "A frequency stabilization method for diode lasers utilizing low-field Faraday polarimetry", **J.A. Kerckhoff '05, C.D. Bruzewicz '05**, R. Uhl, and P.K. Majumder, *Rev. Sci. Instrum.*, **76**, 093108 (2005).
11. "Measurement of the Stark Shift within the  $6P_{1/2} - 7S_{1/2}$  378 nm Transition in Atomic Thallium", **S.C. Doret '02, P.D. Friedberg '01, A.J. Speck '00**, D.S. Richardson, and P.K. Majumder, *Phys. Rev. A* **66**, 052504 (2002).
10. " Hyperfine splitting and isotope shift measurements within the 378 nm  $6P_{1/2} - 7S_{1/2}$  transition in  $^{203}\text{Tl}$  and  $^{205}\text{Tl}$ ," D.S. Richardson, **R.N. Lyman ('99)**, and P.K. Majumder, *Phys. Rev. A* **62**, 012510 (2000).
9. " Measurement of the electric quadrupole amplitude within the 1283 nm  $6P_{1/2} - 6P_{3/2}$  transition in atomic thallium," P.K. Majumder and **Leo L. Tsai ('98)**, *Phys. Rev. A* **60**, 267 (1999).
8. "Optical-rotation technique used for high-precision measurement of parity nonconservation in atomic lead," D.M. Meekhof, P.A. Vetter, P.K. Majumder, S.K. Lamoreaux, and E.N. Fortson, *Phys. Rev. A* **52**, 1895 (1995).
7. "High-Precision Measurements of Atomic Parity Nonconservation in Lead and Thallium," P.K. Majumder, *Proc. 5th Int. Conf. Intersec. Nucl. Part. Phys.*, edited by S.J. Seestrom, AIP Press, NY (1995).
6. "Precise Test of Electroweak Theory from a Measurement of Parity Nonconservation in Atomic Thallium," P. Vetter, D.M. Meekhof, P.K. Majumder, S.K. Lamoreaux, and E.N. Fortson, *Phys. Rev. Lett.* **74**, 2658 (1995).
5. "High-Precision Measurement of Parity Nonconserving Optical Rotation in Atomic Lead," D.M. Meekhof, P. Vetter, P.K. Majumder, S.K. Lamoreaux, and E.N. Fortson, *Phys. Rev. Lett.* **71**, 3442 (1993).
4. "Search for a Coupling of the Earth's Gravitational Field to Nuclear Spins in Atomic Mercury," B.J. Venema, P.K. Majumder, S.K. Lamoreaux, B.R. Heckel, and E.N. Fortson, *Phys. Rev. Lett.* **68**, 135 (1992).
3. "Test of the Linearity of Quantum Mechanics using Optically Pumped  $^{201}\text{Hg}$ ," P.K. Majumder, B.J. Venema, S.K. Lamoreaux, B.R. Heckel, and E.N. Fortson, *Phys. Rev. Lett.* **65**, 2931 (1990).
2. "New Test of QED from a Measurement of the  $4^2S_{1/2} - 4^2F_{5/2}$  Three Photon Transition in  $\text{He}^+$ ," P.K. Majumder and F.M. Pipkin, *Phys. Rev. Lett.* **63**, 372 (1989).
1. "Phase-Variation Technique for Measurement of the  $n=2$  Lamb Shift in  $\text{He}^+$  using Separated Oscillatory Fields," H.A. Klein, E.W. Hagley, P.K. Majumder, M.E. Poitzsch, and F.M. Pipkin, *Phys. Rev. A* **36**, 3494 (1987).



NIST/BOULDER  
U. CHICAGO

fiber laser development research group  
Physics Ph.D. program

## **2016**

### Allison Carter

“Atomic beam measurement of the Stark shift in the In  $6S_{1/2} - 7P_{1/2}$  transition using two-step spectroscopy”  
U. MARYLAND / JQI Physics Ph.D. program (*Group of C. Monroe*)  
NIST/BOULDER Postdoc in Ion Storage Group

### Sau-Man Cheng

“Hyperfine structure and Isotope shift measurements in the  $8p_{1/2}$  and  $8p_{3/2}$  states of atomic thallium”  
U. COLORADO Mech. Eng. Ph.D. program

## **2015**

### Benjamin Augenbraun

“Atomic beam measurement of the Stark shift in the In  $6S_{1/2} - 7P_{1/2}$  transition using two-step spectroscopy”  
HARVARD UNIV. Physics Ph.D., Postdoc. (*Group of J. Doyle*)  
WILLIAMS COLLEGE Asst. Prof. of Chemistry (Physical Chemistry)  
**APS LeROY APKER AWARD WINNER - 2015**

## **2014**

### Nathan Bricault

“Atomic beam measurement of the Stark shift in the In  $6S_{1/2} - 7P_{1/2}$  transition using two-step spectroscopy”  
CAMBRIDGE UNIV. Machine Learning M. Phil. program

### Gabrielle Vukasin

“Hyperfine structure and isotope shift measurements of the  $7P_{1/2}$  state of thallium using two-step laser spectroscopy”  
TUFTS UNIV. Mech Eng. M.S.  
STANFORD UNIV. Mech. Eng. Ph.D. program

## **2013**

Nathan Schine “Precise measurement of Stark shift within the indium  $5P_{1/2}-6S_{1/2}$  transition at 410 nm”

U. CHICAGO Physics Ph.D. program  
U. COLORADO/JILA NRC Postdoc, Kaufman group  
U. MARYLAND/JQI Asst. Prof. of Physics

**2013 Apker Award Finalist**

### David Kealhofer

“Hyperfine structure and isotope shift measurements of the  $7P_{1/2}$  state of thallium using two-step laser spectroscopy”  
U. C. SANTA BARBARA Physics Ph.D. program  
E.T.H. ZURICH Postdoc

## **2012**

Anders Schneider "Precise measurement of Stark shift within the indium  $5P_{1/2}$ - $6S_{1/2}$  transition at 410 nm"

U. PENN

Comp. Sci. MS/Ph.D. program

GOOGLE

Software Engineer

Taryn Siegel

"Hyperfine structure and isotope shift measurements of the  $7P_{1/2}$  state of thallium using two-step laser spectroscopy"

Epic Software Systems

JET Program (Teaching English in Japan)

## **2011**

Antonio Lorenzo "Atomic beam measurement of the Stark shift in indium at 410 nm using FM spectroscopy"

U. ARIZONA

Optical Sciences Ph.D.

## **2010**

Anne O'Leary "Optical system development for high precision atomic beam spectroscopy of indium and thallium"

PRINCETON

Geophysics Ph.D. program

UNIV. WASHINGTON

postdoc in Ocean geochemistry

ST. OLAF COLLEGE

Asst. prof. of physics and environmental science

## **2009**

Huajie Cao "Precise measurement of the  $6P_{3/2}$  hyperfine structure in  $^{115}\text{In}$  using two-step diode laser spectroscopy"

PRINCETON

Physics Ph.D.

GOLDMAN-SACHS

Financial modeling

## **2008**

Paul Hess "Measurement of the indium  $6P_{3/2}$  hyperfine structure using two-step excitation"

HARVARD

Physics Ph.D. program (*group of Gabrielse/DeMille*)

JQI/University of Maryland

postdoc (*group of C. Monroe*)

MIDDLEBURY COLLEGE

Asst. Prof. of Physics

## **2007**

Jared H. Strait "Vapor cell spectroscopy of Indium using a 410 nm diode laser system"

CORNELL UNIVERSITY

Elec. Eng./Optics Ph.D. program

NIST, Gaithersburg

Staff Scientist

Owen Simpson "Two-color spectroscopy of thallium and indium using two-tone RF spectroscopy"

PRINCETON UNIVERSITY

Physics Ph.D. program

Toby E. Schneider "Precise phase shift spectroscopy in thallium using an in-vacuum ring cavity"

MIT/WOODS HOLE

Mech./Ocean Eng. Ph.D.

## **2006**

David Butts "Differential phase shift spectroscopy of the  $6P_{1/2} \rightarrow 6P_{3/2}$  1283 nm transition in atomic thallium"

MIT

Aero./Astro. Eng. Ph.D. program

DRAPER LAB

Staff Scientist

## **2005**

Joseph A. Kerckhoff

“Measurement of a T-odd, P-even Interaction in the  $6P_{1/2} - 6P_{3/2}$  1283 nm Transition in Atomic Thallium”

|                     |  |
|---------------------|--|
| STANFORD UNIVERSITY | Physics Ph.D. program ( <i>group of H. Mabuchi</i> ) |
| U. COLORADO/JILA    | NRC postdoc ( <i>group of K. Lehnert</i> )           |
| HRL LABORATORIES    | Research Scientist                                   |

Colin D. Bruzewicz

“Phase Shift Spectroscopy of the  $6P_{1/2} - 6P_{3/2}$  M1 Transition in a Thallium Atomic Beam”

|                 |  |
|-----------------|--|
| YALE UNIVERSITY | Physics Ph.D. program ( <i>group of D. DeMille</i> ) |
| LINCOLN LABS    | Research Scientist                                   |

## **2004**

Mark A. Burkhardt

“Measuring the two-step  $6P_{1/2} \rightarrow 7S_{1/2} \rightarrow 7P_{1/2}$  378 nm / 1301 nm transition in atomic thallium”

|                     |  |
|---------------------|--|
| STANFORD UNIVERSITY | Physics Ph.D. program ( <i>group of J. Stohr</i> ) |
| HITACHI CORP.       |  |

## **2003**

Christopher D. Holmes

“ Frequency modulation spectroscopy of the forbidden M1/E2 1283 nm transition in thallium”

|                    |  |
|--------------------|--|
| HARVARD UNIVERSITY | Atmospheric Sci. Ph.D. program                   |
| U.C. IRVINE        | postdoc  |
| FLORIDA ST. UNIV.  | Asst. Professor of Earth, Ocean, and Atmos. Sci. |

## **2002**

S. Charles Doret

“ A Precise Measurement of the Stark shift in the Thallium  $6P_{1/2} - 7S_{1/2}$  378 nm Transition”

|                    |   |
|--------------------|---|
| HARVARD UNIVERSITY | Physics Ph.D. (2009) ( <i>group of J. Doyle</i> ) |
| GTRI               | Postdoc   |
| WILLIAMS COLLEGE   | Assoc. Professor of Physics w/tenure              |

**APS LeROY APKER AWARD WINNER - 2002**

## **2001**

Paul D. Friedberg “Measuring the Stark shift in the  $6P_{1/2} - 7S_{1/2}$  378 nm Transition in Atomic Thallium”

|                |                          |
|----------------|--------------------------|
| U.C. BERKELEY  | Elec. Eng. Ph.D. program |
| SYNOPSIS, INC. | Applications Engineer    |

## **2000**

Andrew J. Speck “Measuring the Stark shift in the Thallium  $6P_{1/2} - 7S_{1/2}$  378 nm Transition”

|                    |   |
|--------------------|---|
| HARVARD UNIVERSITY | Physics Ph.D. (2005) ( <i>group of G. Gabrielse</i> ) |
|--------------------|---|

ROWLAND INST./HARVARD  
SCHLUMBERGER

Junior Fellow (2005 - 2011)  
Research Scientist

## **1999**

Robert N. Lyman " Precise Spectroscopy of the Thallium  $6P_{1/2} - 7S_{1/2}$  378 nm Transition "

U. WASHINGTON  
U. VIRGINIA

M.S. in physics (2001)  
Law school

## **1998**

Leo L. Tsai

" Precise measurement of the electric quadrupole amplitude in the  $6P_{1/2} - 6P_{3/2}$  transition of atomic thallium"

HARVARD/MIT  
BETH ISRAEL HOSPITAL

M.D./Ph.D. (2008) (*group of R. Walsworth*)  
Staff Radiologist

Peter C. Nicholas, " Design and construction of an atomic beam for precise spectroscopy of thallium"

U.N.C.  
DUKE UNIV MED SCHOOL

M.D./Ph.D. (2008) (medical imaging research)  
Ophthalmology Fellowship

## **1997**

Julie R. Rapoport, " The Design, Construction, and Application of an Atomic Beam Apparatus"

NORTHWESTERN U.  
EXPONENT, INC.  
CALSTAR, INC.  
APPLE  
GOOGLE

Materials/Civil Eng. Ph.D. (2003)  
Engineering consulting firm (2004 - )  
Chief Scientist and V.P.  
sustainability group  
Director of Sustainability

## **1996**

Kyle F. Downey

" An atom-laser interaction region and electromagnetic structure measurements in atomic thallium"

SELF-EMPLOYED

Computer programmer/consultant

Paul F. Boerner,

" Construction of an optical system for use in precise measurements of thallium atomic structure"

STANFORD UNIVERSITY  
LOCKHEED MARTIN ADV. TECH. CENTER  
GOOGLE

Physics Ph.D. (2004) (*group of A. Walker*)  
Solar physicist  
Satellite development

## **X. Postdoctoral Research Associates Supervised**

|  |               |
|--|---------------|
| Dr. David Richardson, Ph.D. U. Birmingham, UK<br>[currently: Faculty member at NW Missouri St. Univ.]                | 11/98 – 6/01  |
| Dr. Michael Green, Ph.D. U. Adelaide, Aus.<br>[currently: research in medical physics imaging lab, Sydney Australia] | 11/02 – 12/03 |
| Dr. Ralph Uhl, Ph.D. Hohenheim Univ., Germany.<br>[currently: employed in technical R&D company, Frankfurt, Germany] | 1/04 – 12/05  |
| Dr. Mevan Gunawardena, Ph.D. Purdue Univ.<br>[currently: tenured faculty @ Stonehill College, N. Easton, MA]         | 12/06 – 7/09  |
| Dr. Gambhir Ranjit, Ph.D. Old Dominion Univ.<br>[currently: Software Engineer, Microsoft Inc.]                       | 1/11 – 9/13   |
| Dr. Priyanka Rupasinghe, Ph.D. Univ. of Oklahoma<br>[currently: tenure-track Assistant Prof. @ SUNY-Oswego]          | 1/15 – 8/17   |
| Dr. Daniel Maser, Ph.D. Univ. of Colorado<br>[currently: tenure track Assistant Prof. @ Connecticut College]         | 10/17 – 8/19  |
| Dr. John Lacy, Ph.D. U. Sussex, U.K.   | 10/19         |

## **XI. TEACHING EXPERIENCE**

### **Williams College courses taught:**

Physics 109 (Sound, Light, and Perception – non majors introductory course);  
Physics 131-132 (Algebra-based mechanics, E&M, waves, modern physics + labs);  
Physics 141 (Calculus-based mechanics + labs);  
Physics 142 & 151 (Modern Physics + labs);  
Physics 201 (Electricity and Magnetism + labs);  
Physics 202 (Waves and Optics + labs);  
Physics 301 (Introductory Quantum Mechanics + modern physics lab);  
Physics 302 (Thermal and Statistical Physics);  
Physics 402T (Advanced Quantum Mechanics tutorial).  
1 month ‘Winter Study’ courses in Holography; Electronics; Musical Sound.

### **Univ. of Washington, Research Assoc. and Res. Asst. Professor (1989 - 1994)**

While atomic physics research associate, worked with Prof. Lillian McDermott and the UW Physics Education Group during development of introductory physics "tutorials" (now published as Physics By Inquiry, JW Wiley, 1996, and Tutorials in Introductory Physics, Prentice Hall, 1997).