Curriculum Vitae *[updated 10/25]* **Protik Kumar Majumder**

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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. Interim Chair	2022-2024
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

Williams College, Nelson Bushnell ’20 Prize for Teaching	**2023**
APS Prize for a Faculty Member for Research at an Undergraduate Institution	**2017**
APS Fellow Election	**2007**

NSF-RUI Single PI grants:

1997, 2001, 2005, 2009, 2014, 2019, 2025

Continuous funding totaling $2.8M + College matching funds 1998-2028

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 Corporation: 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**
Elected to Chair line of GPMFC (Vice-chair for 2025-26)	**2025**
Chair, DAMOP Broida Prize selection committee	**2018**
Chair, DAMOP Education Committee	**2014-15**
Member, DAMOP Program Committee, Fellowship Committee	**2011-14**
Elected to GPMFC Executive Committee	**2002-05**

Journal Reviewer:

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

Grant / Program Reviewer:

NSF Quadrenniel Committee of Visitors (COV) for Physics Division (chair of AMO and QIS subcommittee) 2023

NSF AMO review panels - participant in multiple years 2005 - 2024

Research Corporation 1996 -

NIST Precision Measurement Grant competition 2003 –

Conference Chair

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

External Department reviews and Tenure reviews: **numerous**

VI. INVITED SEMINARS (1994 - present)

2025

Atomic Physics Gordon Research Conference

New applications of AMO physics session chair, speaker

2024

Univ. of Washington *AMO group seminar*

2023

Columbia University *AMO group seminar*

2020

Amherst College *Department colloqium*

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	*Sigma Xi annual lecture series*
Harvard Univ.	*AMO seminar*
U. Connecticut	*AMO seminar*

1997

Williams College	*Department Colloquium*
SUNY/Stonybrook	*AMO seminar*

1994

MIT	Nuclear/Particle physics group seminar
Amherst College	*Department Colloquium*
Williams College	*Department Colloquium*

VII. CONFERENCE PRESENTATIONS - Majumder group @Williams [undergraduate student co-authors in bold]:

55. "High-precision spectroscopy in Pb: Isotope shift and hyperfine structure measurements", J.H. Lacy, Carter Anderson '25, and P.K. Majumder. *Contributed poster to Atomic Physis Gordon Research Conference, June 15-19, 2025, Newport, RI.*

54. "High-precision atomic structure measurements in Pb and other multi-valence atomic systems", P.K. Majumder, J.H. Lacy, Robin Wang '24, and Abby Kinney '24. *Contributed poster to ICAP 2024, July 15-19, 2024, London, U.K.*

53. "Precise atomic structure measurements in Pb using vapor-cell and atomic-beam spectroscopy", John Lacy, Robin Wang '24, Abby Kinney '24, Charles Yang '24, and P.K. Majumder. *Contributed poster to DAMOP 2024, June 3-7, 2024, Ft. Worth, TX.*

52. "Precision transition amplitude measurements in Pb-208", John H. Lacy, Abby C. Kinney '24, and P.K. Majumder, *Contributed talk to DAMOP 20224, June 3-7, 2024, Ft. Worth, TX.*

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 '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 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 Want '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}Tl and ^{205}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}Tl and ^{205}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}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}Tl and ^{205}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}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 – July1, 2011.

29. "Precise atomic beam measurement of the Stark shift within the $5P_{1/2} \rightarrow 6S_{1/2}$ transition in ^{115}In" Gambhir Ranjit, **A. Lorenzo '11**, and P.K. Majumder. *contributed poster*, Atomic Physics Gordon Research Conference, Mt. Snow Resort, VT, June 26 – July1, 2011.

28. "Precise atomic beam measurement of the Stark shift within the $5P_{1/2} \rightarrow 6S_{1/2}$ transition in ^{115}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*. 18th 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.* 18th 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 Centenniel 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 Centenniel 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: 16th ICAP, Windsor, 1998 Contributed Abstracts.

3. "Precise Measurement of the Electric Quadrupole Amplitude within the 1.283 mm 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]:

22. "High-precision measurements of electric-dipole-transition amplitudes in excited states of ^{208}Pb using Faraday rotation spectroscopy", J. H. Lacy**, A. C. Kinney '24**, and P. K. Majumder*, Phys. Rev. A 111,* 042808 (2025*).*

21. "Broadband High-Precision Faraday Rotation Spectroscopy with Uniaxial Single Crystal CeF_3 Modulator" J. H. Lacy, **G. E. Patenotte '21, A. C. Kinney '24**, and P. K. Majumder*, Photonics 11, 303 (2024).*

20. "High-precision measurement and *ab initio* calculation of the $(6s^26p^2)$ $^3P_0 \rightarrow {}^3P_2$ electric-quadrupole-transition amplitude in ^{208}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}Tl and ^{205}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}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 acoust0-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}Tl and ^{205}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}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 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 He^+ using Separated Oscillatory Fields," H.A. Klein, E.W. Hagley, P.K. Majumder, M.E. Poitszch, and F.M. Pipkin, Phys. Rev. A **36**, 3494 (1987).

IX. RESEARCH TRAINING AND SUPERVISION

- >90 undergraduate research students supervised (1995-2025)
- 45 undergraduate senior honors theses supervised (1995-2025)

List of senior honors students, thesis titles, and current activities

2026

Gautam Ramasamy

"Isotope shift and Hyperfine structure measurements in lead using Doppler-free, two-step laser spectroscopy"

Applying to Physis Ph.D. programs fall 2025

Charlene Peng (jointly supervised by Ben Augenbraun)

"Development of a Frequency-doubled 368 nm laser source for atomic beam spectroscopy and laser cooling of lead"

Applying to Physis Ph.D. programs fall 2025

Elena Deegan-Krause (jointly supervised by Ben Augenbraun)

"Atomic Beam Fluorescence detection and optical cycling in the $(6p^2)\ ^3P_1$ - $(6p7s)\ ^3P_0$ excited-state transition in lead"

2025

Carter Anderson

"Isotope shift and Hyperfine structure measurements in lead using Doppler-free, two-step laser spectroscopy"

U. TORONTO Physics Ph.D. program

2024

Abby Kinney

"Precise measurement of the transition amplitude of the Pb $(6p^2)\ ^3P_1 - (6p7s)\ ^3P_0$ 368 nm transition using Faraday rotation spectroscopy and a uniaxial CeF_3 crystal"

U. CHICAGO Physics Ph.D. program

Robin Wang

"Measurement of the scalar polarizability of the Pb $(6p^2)\ ^3P_1 - (6p7s)\ ^3P_0$ transition using two-step spectroscopy in an atomic beam"

HARVARD UNIV. Quantum Sci and Eng. Ph.D. program

Charles Yang

"Doppler-free Spectroscopy of the Pb $(6p^2)\ ^3P_2 - (6p7s)\ ^3P_1$ 406 nm transition using two-step excitation and high-frequency lock-in detection"

RICE UNIVERSITY Physics Ph.D. program

2023

Russell Blakey

"Towards measurement of the Pb $(6p^2)\ ^3P_1 - (6p7s)\ ^3P_0$ 368 nm E1 transition amplitude using Faraday Rotation Spectroscopy"

HRL LABORATORIES, Malibu CA Research Assistant

2022

Charlotte Jones

"Spectroscopy of the Pb $(6p^2)\ ^3P_2 - (6p7s)\ ^3P_1$ transition at 406 nm, and transition isotope measurements in Pb"

MIT LINCOLN LABS Research Assistant in the Laser development group

2021

Gabriel Patenotte

"Transition Polarizability and Amplitude Measurement of the Lead $6p^2\ 3P_1 \rightarrow 6p7s\ ^3P_0$ Transition using Faraday Rotation and Absorption Spectroscopy"

HARVARD UNIV. Physics Ph.D. program (*Group of K.K, Ni*)

Patric Postec

"Towards Measurement of Faraday Polarimetry of the $6p^2\ ^3P_0 \rightarrow 6p^2\ ^1D_2$ Forbidden E2 Transitions in Lead Using a Heat Pipe Oven"

DUKE UNIVERSITY Materials Science Ph.D. program

2020

Abdullah Nasir

"Spectroscopy of Lead in an atomic beam using Faraday polarimetry"

HARVARD UNIV. Physics Ph.D. program (*Group of J. Doyle*)

2018

Bingyi Wang

"Polarizability and Transition Amplitude Measurements in Indium and Lead"

STANFORD UNIV. *(Knight-Hennessey Scholar*). Physics Ph.D. program → Neuroscience Ph.D. (*Palankar Group*)

2017

Nathaniel Vilas

"Atomic beam measurement of the indium 7p polarizabilities using two-step atomic-beam spectroscopy"

Cambridge Univ, UK *Hershel Smith Fellowship (M.Phil. in physics)*

HARVARD UNIV. Physics Ph.D. program (*Group of J. Doyle*)

Eli Hoenig

"Hyperfine structure and Isotope shift measurements in the $8p_{1/2}$ and $8p_{3/2}$ states of atomic thallium"

NIST/BOULDER fiber laser development research group

U. CHICAGO Physics Ph.D. program, Ph.D. molecular Eng.

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 Permanent staff member: 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

APS Jaskunas Thesis prize in Chemical Physics 2022

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}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 (*group of H. Mabuchi*)
U. COLORADO/JILA	NRC postdoc (*group of K. Lehnert)*
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 (*group of D. DeMille*)
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 (*group of J. Stohr*)
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) (*group of J. Doyle*)
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) (*group of G. Gabrielse*)
ROWLAND INST./HARVARD	Junior Fellow (2005 - 2011)
SCHLUMBERGER	Research Scientist

1999

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

U. WASHINGTON	M.S. in physics (2001)
U. VIRGINIA	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	M.D./Ph.D. (2008) (*group of R. Walsworth*)
BETH ISRAEL HOSPITAL	Staff Radiologist

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

U.N.C.	M.D./Ph.D. (2008) (medical imaging research)
DUKE UNIV MED SCHOOL	Opthalmology Fellowship

1997

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

NORTHWESTERN U.	Materials/Civil Eng. Ph.D. (2003)
EXPONENT, INC.	Engineering consulting firm (2004 -)
CALSTAR, INC.	Chief Scientist and V.P.
APPLE	sustainability group
GOOGLE	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 pecise measurements of thallium atomic structure"

STANFORD UNIVERSITY	Physics Ph.D. (2004) (*group of A. Walker*)
LOCKHEED MARTIN ADV. TECH. CENTER	Solar physicist
GOOGLE	Satellite development

X. Postdoctoral Research Associates Supervised

Dr. David Richardson, Ph.D. U. Birmingham, UK 11/98 – 6/01
[currently: Faculty member at NW Missouri St. Univ.]

Dr. Michael Green, Ph.D. U. Adelaide, Aus. 11/02 – 12/03
[currently: research in medical physics imaging lab, Sydney Australia]

Dr. Ralph Uhl, Ph.D. Hohenheim Univ., Germany. 1/04 – 12/05
[currently: employed in technical R&D company, Frankfurt, Germany]

Dr. Mevan Gunawardena, Ph.D. Purdue Univ. 12/06 – 7/09
[currently: tenured faculty @ Stonehill College, N. Easton, MA]

Dr. Gambhir Ranjit, Ph.D. Old Dominion Univ. 1/11 – 9/13
[currently: Software Engineer, Microsoft Inc.]

Dr. Priyanka Rupasinghe, Ph.D. Univ. of Oklahoma 1/15 – 8/17
[currently: Tenured faculty @ SUNY-Oswego]

Dr. Daniel Maser, Ph.D. Univ. of Colorado 10/17 – 8/19
[currently: tenure track Assistant Prof. @ Connecticut College]

Dr. John Lacy, Ph.D. U. Sussex, U.K. 10/19

XII. TEACHING EXPERIENCE

Williams College courses taught:

Physics 108 (Energy science and technology)
Physics 109 (Sound, Light, and Perception – non majors introductory course);
Physics 205 (Introduction to Electronics)
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 + advanced/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).