Georg A. Raithel
Professor of Physics, University of Michigan
March 2015

http://www-personal.umich.edu/∼graithel/

http://cold-atoms.physics.lsa.umich.edu/

Contents

1 Education **2**

2 Professional Experience **2**

3 Professional Memberships and Service **2**

4 Grants and Awards **3**

5 Patents **5**

6 Publications in Refereed Journals **5**

7 Non-refereed Publications **11**

8 Talks and Seminars **13**

9 Department, College and University Service and Committees **21**

10 Teaching **22**

11 Dissertation Committees **24**

12 Research Group 2014 **25**

13 Participation in Special Programs for Undergraduates etc. **26**

1 Education

1987	M.A. (Diploma) of Physics, University of Munich
1990	Ph.D., Physics, University of Munich

2 Professional Experience

1981-82	Military Service
1988-95	Scientific assistant at the University of Munich
1995	Habilitation (qualification to lecture in physics)
1995-97	Guest Researcher, Experimental Atomic Physics at NIST, Gaithersburg, MD
1997-02	Assistant Professor, University of Michigan
2002-04	Associate Professor, University of Michigan
2004-	Professor, University of Michigan
2008-12	Director of FOCUS [NSF-PFC center]
2009-12	Assoc. Chair for Research, Physics Dept, U of M

3 Professional Memberships and Service

1989-	Member, German Physical Society
1997-	Member, American Physical Society
$\sim$ 1995 -	Reviewer for Phys. Rev. Lett., Phys. Rev. A, Nature, Optics Communications, J. Phys. B, JOSA B, The American Journal of Physics, The European Physical Journal D, Europhysics Letters, J. Phys. A., J. Chem. Phys., Optics Express, Science, New Journal of Physics
2000 -	Proposal reviewer for NSF, DoE, ARO, the CRDF (U.S. Civilian Research and Development Foundation), the Research Corporation, the GIF (German-Israeli Foundation), the CFI (Canadian Foundation for innovation CFI), the Foundation for Fundamental Research on Matter (FOM, Netherlands) http://www.fom.nl , NASA postdoc program.
1999	Program Committee member QELS 1999
2001	Program Committee QELS 2002 (chaired sub-committee)
2002	Program Committee member DAMOP 2003

2003	Program Committee member IQEC 2004
2004	Program Committee member DAMOP 2005
2005	NSF Panelist, experimental AMO program
2005	DFG (German Science Foundation) Panelist, experimental AMO program
2006	Program Committee member FIO 2006/LS XXII
2006,2007	Panelist, NSF/DOE Partnership in Basic Plasma Science and Engineering
2007	Panelist, "Excellence Initiative" of the DFG (German Science Foundation)
2009	Program Committee member IQEC 2009
2009	Co-organizer of ITAMP workshop "Engineering Rydberg Interactions in Atoms, Molecules and Plasmas," http://www.cfa.harvard.edu/itamp/RydbergSchedule.html
2008 - 2010	APS Fellowship Committee (DAMOP)
2008 - 2012	Director of FOCUS
2010 -	Member of the Editorial Board of New Journal of Physics
2010	Organizer for 2010 Midwest Cold Atom Workshop
2011	NSF Panelist, experimental AMO program
2011-2014	APS-DAMOP Secretary/Treasurer
2013	NSF Panelist, experimental AMO program
2013	Departmental Review, Physics Department, Nebrasca/Lincoln (Chair)
2014	NSF Panelist, experimental AMO program

4 Grants and Awards

1995-1997	Alexander von Humboldt Fellowship (Feodor-Lynen stipend).
1998-2000	Research Innovation Award, Research Corporation, Tucson(AZ), $35,000 over 2 years.
1999	University of Michigan Faculty Grant.
1999-2003	Career Grant "Traps for Rydberg Atoms," NSF, $500,000 over 4 years.
1999-2002	Contract "High-Angular Momentum Rydberg Atoms in Magnetic Plasma Environment," DoE, $317,581 over 3 years.

2000	Equipment supplement to "High-Angular Momentum Rydberg Atoms in Magnetic Plasma Environment," DoE, $70,000.
2001	Harold Early Award 2001, Physics Department, University of Michigan, $10,000.
2001-2010	Co-PI of the Frontiers in Optical Coherent and Ultrafast Science (FOCUS) Center, a NSF Physics Frontier Center at the University of Michigan and the University of Texas, Phaseout budget 2008/2009 $2,375,001 and 2009/2010 $1,700,000.
2002-2005	"Cold Rydberg Atom Gases and Plasmas in Strong Magnetic Fields," DoE, $390,000 over 3 years.
2002-2006	"Cw Atom Laser," ARO and ONR, $334,000 for 3 years.
2004	Supplemental grant to "Cw Atom Laser," ARO, $109,723.
2003	"Raman Optical Lattices," P. Berman and G. Raithel, $50,000 FOCUS seed funding for a new project on optical lattices.
2003-2006	"Cold Rydberg Atoms," NSF, $431,040 for 3 years.
2005-2009	"Interactions of cold Rydberg Atoms in a high-magnetic-field atom trap," DoE, $466,000 for 4 years.
2005	"BEC experiment," G. Raithel, $25,000 FOCUS seed funding for a new project.
2006	"Interactions of low-energy ions and electrons with BEC," G. Raithel, $30,000 FOCUS seed funding for a new project.
2006-2009	"Interactions of cold atoms in Rydberg states," NSF, $468,000 for 3 years.
2006-2010	"Continuous Atom Laser and Atom Interferometry in a Magnetic Guide," ARO, $356,700 for 4 years.
2007-2010	"Interactions of Low-Energy Ions and Electrons with Bose-Einstein Condensates," AFOSR, $300,000 for 4 years.)
2007	NSF REU supplement, $5,000.
2008	NSF REU supplement, $8,500.
2008-2011	"Continuous-wave atom lasers: a chip-based approach," NGIA, $240,000 for 2 years
2008	ARO supplement, about $120,000
2009	NSF REU supplement, $5,000.
2009-2012	"Many-body Rydberg systems," NSF, $516,000 for 3 years.
2010-2011	"DURIP: Chip-based Continuous-wave Atom Laser," AFOSR, $266,000.

2010	NSF REU supplement, $5,000.
2010	ARO supplement, $5,000
Feb. 2011-Feb. 2012	"Continuous-wave atom lasers: a chip-based approach," NGIA, $120,000 of new funds for a one-year extension.
2011	NSF REU supplement, $5,000.
2010 - 2014	"Interactions of ultracold impurity particles with Bose-Einstein condensates," AFOSR, $480,932.
2012	NSF REU supplement, $5,000.
2012 - 2015	"Rydberg-atom physics in ponderomotive traps and atomic imaging devices," NSF, $510,000 for 3a.
2012 - 2015	NIST Precision Measurement Grant "Measurement of the Rydberg constant in a magic-wavelength optical lattice," NIST, $150,000 for 3a.
2014 - 2019	"High-precision microwave spectroscopy of long-lived circular-state Rydberg atoms in microgravity," NASA, about $1,200,000 in total for 5a, awarded April 1st, 2014.
2014	APS-ITGAP Travel grant for collaboration with Shanxi University (Taiyuan, China), $2,000.

2007	APS Fellow
2012	Rackham Distinguished Faculty Achievement Award

5 Patents

2013-2014	Patent application filed by UM Tech Transfer, file number 2115-005973-US, "Miniature Mechanical Shutter"

6 Publications in Refereed Journals

1. "Quasi-Landau resonances in the spectra of rubidium Rydberg atoms in crossed electric and magnetic fields," G. Raithel, M. Fauth, H. Walther, Phys. Rev. **A 44**, 1898 (1991).
2. "Atoms in strong crossed electric and magnetic fields: evidence for states with large electric-dipole moments," G. Raithel, M. Fauth, H. Walther, Phys. Rev. **A 47**, 419 (1993).
3. "Circular Rydberg states with very large n," R. J. Brecha, G. Raithel, C. Wagner, H. Walther, Opt. Comm. **102**, 257 (1993).

4. "Observation of wave packet motion along quasi-Landau orbits," J. A. Yeazell, G. Raithel, L. Marmet, H. Held, H. Walther, Phys. Rev. Lett. **70**, 2884 (1993).
5. "Ionization energy of rubidium Rydberg atoms in strong crossed electric and magnetic fields," G. Raithel, H. Walther, Phys. Rev. **A 49**, 1646 (1994).
6. "From coherent to noise-induced microwave ionization of Rydberg atoms," O. Benson, A. Buchleitner, G. Raithel, M. Arndt, R. N. Mantegna, H. Walther, Phys. Rev. **A 51**, 4862 (1995).
7. "Observation of quasi-Landau wave packets," L. Marmet, H. Held, G. Raithel, J. A. Yeazell, H. Walther, Phys. Rev. Lett. **72**, 3779 (1994).
8. "Rubidium Rydberg atoms in strong static fields," G. Raithel, H. Held, L. Marmet, H. Walther, J. Phys. **B 27**, 2849 (1994).
9. "Quantum jumps of the micromaser field - Dynamic behavior close to phase transition points," O. Benson, G. Raithel, H. Walther, Phys. Rev. Lett. **72**, 3506 (1994).
10. "Observation of high angular momentum states of rubidium Rydberg atoms in strong magnetic and weak electric fields," G. Raithel, M. Fauth, J. Phys. **B 28**, 1687 (1995).
11. "Atomic interference in the one-atom-maser," G. Raithel, O. Benson, H. Wather, Phys. Rev. Lett. **75**, 3446 (1995).
12. "Cooling and localization dynamics in optical lattices," G. Raithel, G. Birkl, A. Kastberg, W. D. Phillips, S. L. Rolston, Phys. Rev. Lett. **78**, 630 (1997).
13. "Compression and parametric drive of atoms in optical lattices," G. Raithel, G. Birkl, W. D. Phillips, S. L. Rolston, Phys. Rev. Lett. **78**, 2928 (1997).
14. "Enhanced laser cooling and state preparation in an optical lattice with magnetic field," D. L. Haycock, S. E. Hamann, G. Klose, G. Raithel, P. S. Jessen, Phys. Rev. **A 57**, R705 (1998).
15. "Magnetization and spin-flip dynamics of atoms in optical lattices," G. Raithel, S. L. Rolston, W. D. Phillips, Phys. Rev. **A 58**, R2660 (1998).
16. "Observation of level statistics and Heisenberg-time orbits in diamagnetic Rydberg spectra," H. Held, J. Schlichter, G. Raithel, H. Walther, Europhys. Lett. **43**, 392-397 (1998).
17. "Collapse and revivals of wave-packets in optical Lattices," G. Raithel, S. L. Rolston, W. D. Phillips, Phys. Rev. Lett. **81**, 3615 (1998).
18. "Tunneling Dynamics and gauge potentials in optical lattices," S. K. Dutta, B. K. Teo, G. Raithel, Phys. Rev. Lett. **83**, 1934 (1999).
19. "Enhancement of Sisyphus cooling using bichromatic optical lattices," S. K. Dutta, N. V. Morrow , G. Raithel, Phys. Rev. **A 62**, 035401 (2000).

20. "Tunneling and the Born-Oppenheimer-approximation optical lattices," S. K. Dutta, G. Raithel, J. Opt. B: Quantum Semiclass. Opt. **2**, 651-658 (2000).

21. "Ponderomotive optical lattice for Rydberg atoms," S. K. Dutta, J. R. Guest, D.Feldbaum, A. Waltz-Flannigan, G. Raithel, Phys. Rev. Lett. **85**, 5551 (2000).

22. "Loading mechanism for atomic guides," B. K. Teo, G. Raithel, Phys. Rev. **A 63**, R031402 (2001).

23. "High-angular-momentum Rydberg states in cold Rydberg gases", S. K. Dutta, D. Feldbaum, A. Walz-Flannigan, J. R. Guest, and G. Raithel, Phys. Rev. Lett. **86**, 3993 (2001).

24. "Tunneling resonances and coherence in an optical lattices", B. K. Teo, J. R. Guest, G. Raithel, Phys. Rev. Lett. **88**, 173001 (2002).

25. "Feedback control of atomic motion in an optical lattice", N. V. Morrow, S. K. Dutta, G. Raithel, Phys. Rev. Lett. **88**, 093003 (2002).

26. "Atom reflection in a tapered magnetic guide," B. K. Teo, G. Raithel, Phys. Rev. **A 65**, 051401 (2002).

27. "A slow and dark atomic beam," B. K. Teo, T. Cubel, G. Raithel, Optics Communications **212**, 307 (2002).

28. "Coulomb expansion of laser-excited ion plasmas," D. Feldbaum, N. V. Morrow, S. K. Dutta, G. Raithel, Phys. Rev. Lett. **89**, 173004 (2002).

29. "Magnetic behavior of atoms in gray optical lattices," J. R. Guest, B. K. Teo, N. V. Morrow, G. Raithel, JOSA **B 20**, 942 (2003).

30. "Decay rates of high-$|m|$ Rydberg states in strong magnetic fields," J. R. Guest, J.-H. Choi, G. Raithel, Phys. Rev. **A 68**, 022509 (2003).

31. "High-$|m|$ Rydberg states in strong magnetic fields," J. R. Guest, G. Raithel, J. R. Guest, G. Raithel, Phys. Rev. **A 68**, 052502 (2003).

32. "Autler-Townes spectroscopy of the $5S_{1/2} - 5P_{3/2} - 44D$ cascade of cold ^{85}Rb atoms," B. K. Teo, D. Feldbaum, T. Cubel. J. R. Guest, P. R. Berman, G. Raithel, Phys. Rev. **A 68**, 053407 (2003).

33. "Time Averaging of Multi-mode Optical Fiber Output for a Magneto-Optical Trap," A. P. Povilus, J. R. Guest, S. E. Olson, R. R. Mhaskar, B. K. Teo, G. Raithel, JOSA **B 22**, 311 (2005).

34. "Cold Rydberg Gas Dynamics," A. Walz-Flannigan, J. R. Guest, J.-H. Choi, G. Raithel, Phys. Rev. **A 69**, 063405 (2004).

35. "Atom interference in a gray optical lattice," N. V. Morrow and G. Raithel, Phys. Rev. **A 70**, 051601 (2004).

36. "Laser cooling and magnetic trapping at several Tesla," J. R. Guest, J.-H. Choi, E. Hansis, A. P. Povilus and G. Raithel, Phys. Rev. Lett. **94**, 073003 (2005).

37. "A simple pressure-tuned Fabry-Perot interferometer," E. Hansis, T. Cubel, J.-H. Choi, J. R. Guest, and G. Raithel Rev. Sci. Instrum. **76**, 033105 (2005).

38. "Wave-packet interference in an optical lattice," N. V. Morrow and G. Raithel, Laser Physics Vol. **15**, 74-81 (2005).

39. "Laser cooling in an optical lattice that employs Raman transitions," R. Zhang, N. V. Morrow, P. R. Berman, and G. Raithel, Phys. Rev. A 72, 043409 (2005).

40. "Sub-Doppler cooling in reduced-period optical lattice geometries," P. R. Berman, G. Raithel, R. Zhang, and V. S. Malinovsky, Phys. Rev. **A 72**, 033415 (2005).

41. "Coherent population transfer of ground-state atoms into Rydberg states", T. Cubel, B. K. Teo, V. S. Malinovsky, J. R. Guest, A. Reinhard, B. Knuffman, P. R. Berman, and G. Raithel Phys. Rev. **A 72**, 023405 (2005).

42. "Time dependence and Landau quantization in the ionization of cold, magnetized Ryberg atoms," J.-H. Choi, J. R. Guest, E. Hansis, A. P. Povilus, and G. Raithel, Phys. Rev. Lett. **95**, 253005 (2005).

43. "Magnetic trapping of long-lived cold Rydberg atoms," J.-H. Choi, J. R. Guest, A. P. Povilus, E. Hansis, and G. Raithel, Phys. Rev. Lett. **95**, 243001 (2005).

44. "Atom counting statistics in ensembles of interacting Rydberg atoms," T. Cubel Liebisch, A. Reinhard, P. R. Berman, and G. Raithel, Phys. Rev. Lett. 95, 253002 (2005). (Erratum published in March 2007.)

45. "Continuous propagation and energy filtering of a cold atomic beam in a long high-gradient magnetic atom guide Spencer E. Olson, Rahul R. Mhaskar, and Georg Raithel, Phys. Rev. **A**, Phys. Rev. **A 73**, 033622 (2006).

46. "Emission of fast atoms from a cold Rydberg gas," B. Knuffman and G. Raithel, Phys. Rev. **A 73**, 020704(R) (2006).

47. "Magnetic Trapping of Strongly-Magnetized Rydberg Atoms," J.-H. Choi, J. R. Guest, G. Raithel, European Physics Journal **D 40**, 19 (2006).

48. "Open-channel fluorescence imaging of atoms in high-gradient magnetic fields," Rahul R. Mhaskar, Spencer E. Olson, and Georg Raithel, European Physics Journal **D 41**, 221227 (2007).

49. "Transition of laser cooling between standard and Raman optical lattices," R. Zhang, R. E. Sapiro, N. V. Morrow, G. Raithel, Phys. Rev. **A 74**, 33404 (2006).

50. "Level shifts of rubidium Rydberg states due to binary interactions," A. Reinhard, T. Cubel Liebisch, B. Knuffman, and G. Raithel, Phys. Rev. A 75, 032712 (2007).

51. "Multipole transitions of Rydberg atoms in modulated ponderomotive potentials," B. Knuffman and G. Raithel, Phys. Rev. **A 75**, 053401 (2007).

52. "Analysis of atomic density distributions in optical lattices using an optical mask," R. Zhang, N. V. Morrow, R. Sapiro, P. R. Berman, G. Raithel, Optics Communications **275**, 311-17 (2007).

53. "Effects of static and random magnetic fields on atoms in a gray optical lattice," N. V. Morrow, S. K. Dutta, and G. Raithel, Laser Physics **17**, 948955 (2007).

54. "Trapping and evolution dynamics of ultracold two-component plasmas," J.-H. Choi, B. Knuffman, X. Zhang, A. P. Povilus, and G. Raithel, Phys. Rev. Lett. **100**, 175002-1-4 (2008).

55. "Rydberg-Rydberg collisions: resonant enhancement of state mixing and penning ionization," A. Reinhard, T. Cubel Liebisch, K. C. ounge, P. R. Berman, G. Raithel, Phys. Rev. Lett. **100**, 123007-1-4 (2008).

56. "Double-Resonance Spectroscopy of Interacting Rydberg-Atom Systems," A. Reinhard, K. C. Younge, T. Cubel Liebisch, B. Knuffman, P. R. Berman, and G. Raithel, Phys. Rev. Lett. **100**, 233201 (2008).

57. "Observation of Superfluorescent Emissions from Laser-Cooled Atoms," E. Paradis, B. Barrett, and A. Kumarakrishnan, Department of Physics and Astronomy, York University, R. Zhang and G. Raithel, University of Michigan, Phys. Rev. **A 77**, 043419 (2008).

58. "Bose-Einstein condensate inside a Bragg-reflecting atom cavity," R. Zhang, R. E. Sapiro, N. V. Morrow, R. R. Mhaskar, and G. Raithel, Phys. Rev. **A 77**, 063615 (2008).

59. "Role of the mean field in Bloch oscillations of a Bose-Einstein condensate in an optical lattice and harmonic trap," R. Zhang, R. E. Sapiro, R. R. Mhaskar, and G. Raithel, Phys. Rev. **A 78**, 053607-1-7 (2008).

A figure from Number 59 was selected for the 2008 Physical Review Kaleidoscope (http://pra.aps.org/kaleidoscope/November2008).

60. "Effect of Förster resonances on the excitation statistics of many-body Rydberg systems," A. Reinhard, K. C. Younge, and G. Raithel, Phys. Rev. **A 78**, 060702(R)-1-4 (2008).

61. "Reversible loss of superfluidity of a Bose-Einstein condensate in a 1D optical lattice," R. E. Sapiro, R. Zhang and G. Raithel, New J. Phys. **11**, 013013 (10pp) (2009).

62. "Rotary Echo Tests of Rydberg Atom Coherence," Kelly Cooper Younge and Georg Raithel, New J. Phys. **11**, 043006 (11pp) (2009).

63. "Atom interferometry using Kapitza-Dirac scattering in a magnetic trap," R. E. Sapiro, R. Zhang, and G. Raithel, Phys. Rev. **A 79**, 043630-6 (2009).

64. "Mesoscopic Rydberg ensembles: Beyond the pair-wise interaction approximation," K. C. Younge, A. Reinhard, T. Pohl, P. R. Berman, and G. Raithel, Phys. Rev. **A 79**, 043420-5 (2009).

65. "Adiabatic Potentials for Rydberg Atoms in Optical Lattices," K. C. Younge, S. Anderson, and G. Raithel, New J. Phys. **12**, 023031 (2010).

66. "Ion imaging in a high-gradient magnetic guide," Varun Vaidya, Mallory Traxler, Cornelius Hempel, Rahul Mhaskar, and G. Raithel, Rev. Sci. Instr. **81**, 043109 (2010).

67. "State-dependent Energy Shift of Rydberg Atoms in a Ponderomotive Optical Lattice," K. C. Younge, S. Anderson, and G. Raithel, Phys. Rev. Lett. **104**, 173001 (2010).

68. "Trapping Rydberg atoms in optical lattices," G. Raithel, K. C. Younge, S. E. Anderson, B. Knuffman, Proceedings of the SPIE **7993**, 799313 (2010).

69. "Rydberg-atom Trajectories in a Ponderomotive Optical Lattice," K. C. Younge, S. E. Anderson and G. Raithel, New Journal of Physics **12** 113036 (15 pp.) (2010).

70. "Three-dimensional arrays of sub-micron particles generated by a four-beam optical lattice," B. N. Slama-Eliau and G. Raithel, Phys. Rev. **E 83**, 051406 (2011).

71. "Imaging Spatial Correlations of Rydberg Excitations in Cold Atom Clouds," A. Schwarzkopf, R. E. Sapiro, and G. Raithel, Phys. Rev. Lett. **107**, 103001 (2011).

72. "Trapping Rydberg atoms in an optical lattice," S. E. Anderson, K. C. Younge, and G. Raithel, Phys. Rev. Lett. **107**, 263001 (2011).

73. "Characterization of laser cooling in a high-magnetic-field atom trap," E. Paradis, S. Zigo, K. Z. Hu, and G. Raithel, Phys. Rev. **A 86**, 023416 (2012).

74. "Guiding of Rydberg atoms in a high-gradient magnetic guide," M. Traxler, R. E. Sapiro, C. Hempel, K. Lundquist, E. P. Power, and G. Raithel, Phys. Rev. **A 86**, 023414 (2012).

75. "Dependence of Rydberg-Atom Optical Lattices on the Angular Wave Function," S. E. Anderson and G. Raithel, Phys. Rev. Lett. **109**, 023001 (2012).

76. "Highly polar states of Rydberg atoms in strong magnetic and weak electric fields," E. Paradis, S. Zigo, and G. Raithel, Phys. Rev. **A 87**, 012505 (2013).

77. "Coupled internal-state and center-of-mass dynamics of Rydberg atoms in a magnetic guide," M. Traxler, R. E. Sapiro, K. Lundquist, E. P. Power, and G. Raithel, Phys. Rev. **A 87**, 053418 (2013).

78. "Bragg scattering and Brownian motion dynamics in optically induced crystals of sub-micron particles," R. E. Sapiro, B. N. Slama, and G. Raithel, Phys. Rev. **E 87**, 052311 (2013).

79. "Spatial correlations between Rydberg atoms in an optical dipole trap," A. Schwarzkopf, D. A. Anderson, N. Thaicharoen, and G. Raithel Phys. Rev. **A 88**, 061406(R) (2013; Editor's suggestion).

80. "Ionisation of Rydberg atoms by standing-wave light fields," Sarah E. Anderson and G. Raithel," Nature Communications **4**, Article number 2967 (2013).

81. "Production and trapping of cold circular Rydberg atoms," D. A. Anderson, A. Schwarzkopf, R. E. Sapiro, and G. Raithel Phys. Rev. **A 88**, 031401(R) (2013); Editor's suggestion).

82. "Photoassociation of long-range nD Rydberg molecules," D. A. Anderson, S. A. Miller, and G. Raithel, Phys. Rev. Lett. **112**, 163201 (2014).

83. "Atom trapping and spectroscopy in cavity-generated optical potentials," Yun-Jhih Chen, Stefan Zigo, and Georg Raithel, Phys. Rev. **A 89**, 063409 (2014).

84. "Sub-Wavelength Imaging and Field Mapping via EIT and Autler-Townes Splitting In Rydberg Atoms," C. L. Holloway, J. A. Gordon, A. Schwarzkopf, D. A. Anderson, S. A. Miller, N. Thaicharoen and G. Raithel, Appl. Phys. Lett. **104**, 244102 (2014).

85. "Millimeter wave detection via Autler-Townes splitting in rubidium Rydberg atoms," J. A. Gordon, C. L. Holloway, A. Schwarzkopf, D. A. Anderson, S. Miller, N. Thaicharoen, G. Raithel, Appl. Phys. Lett. **105**, 024104 (2014).

86. "Angular-momentum couplings in long-range Rb_2 Rydberg molecules," D. A. Anderson, S. A. Miller, G. Raithel, Phys. Rev. **A 90**, 062518 (2014).

87. "Two-photon microwave transitions and strong-field effects in a room-temperature Rydberg-atom gas," D. A. Anderson, A. Schwarzkopf, S. A. Miller, N. Thaicharoen, G. Raithel, J. A. Gordon, C. L. Holloway, Phys. Rev. **A 90**, 043419 (2014).

88. "Autler-Townes spectroscopy with interaction-induced dephasing," H. Zhang, L. Zhang, L. Wang, S. Bao, J. Zhao, S. Jia, G. Raithel, Phys. Rev. **A 90**, 043849 (2014).

89. "Broadband Rydberg Atom-Based Electric-Field Probe for SI-Traceable, Self-Calibrated Measurements," C. L. Holloway, J. A. Gordon, S. Jefferts, A. Schwarzkopf, D. A. Anderson, S. A. Miller, N. Thaicharoen, G. Raithel, IEEE Trans. Antennas Propag. **62**, 6169 (2014).

90. "Pressure-driven evaporative cooling in atom guides," S. E. Olson, G. Raithel, A. J. Christlieb, Phys. Rev. **A 90**, 043612 (2014).

91. "Forbidden atomic transitions driven by an intensity-modulated laser trap," K.. R. Moore, S. E. Anderson, G. Raithel, Nature Communications **6** (2015).

7 Non-refereed Publications

– "Spektroskopie an Rydbergatomen in gekreuzten elektrischen und magnetischen Feldern," Diploma Thesis, University of Munich, 1987.

– "Spektroskopie an Rydbergatomen in gekreuzten elektrischen und magnetischen Feldern," Dissertation, University of Munich, 1990.

1. "Rydberg atoms in crossed electric and magnetic fields," G. Raithel, M. Fauth, H. Walther, in *Quantum Chaos*, eds. H. A. Cedeira, R. Ramaswamy, M. C. Gutzwiller, G. Casati (World Scientific, Singapore, 1991), p. 409.

2. "Rubidium Rydberg atoms in strong external fields," G. Raithel, H.Walther, in *Tenth International Conference on Laser Spectroscopy*, eds. M. Ducloy, E. Giacobino, G. Camy (World Scientific, Singapore, 1992), p. 437.

3. "Rubidium Rydberg atoms in strong fields," O. Benson, G. Raithel, H.Walther, in *Quantum Chaos*, eds. G. Casati, B. V. Chirikov (Cambridge University Press, Cambridge, 1995), p. 247.

4. "The micromaser: a proving ground for quantum physics," G. Raithel, C. Wagner, H. Walther, L. M. Narducci, M. O. Scully, in *Cavity Quantum Electrodynamics*, ed. P. R. Berman (Academic Press, Inc., New York, 1994), p. 57.

5. "Superluminale Eigenschaften von Wellenpaketen," G. Raithel, Phys. Bl. **50 / 12**, 1149 (1994).

6. "Dynamics of the micromaser field," G. Raithel, O. Benson, H. Walther, in *Electron Theory and Quantumelectrodynamics: 100 Years later*, ed. J. P. Dowling (Plenum Press, New York, 1997), p. 93.

7. "Dynamics of the micromaser field," G. Raithel, O. Benson, H. Walther, Laser Physics (Russia) **6 / 2**, 354 (1996).

8. "From micromaser to microlaser," O. Benson, G. Raithel, H. Walther, in *Photonic Band Gap Materials*, ed. C.M. Soukoulis (Kluwer Academic, London, 1996).

9. "Quantum jumps and Ramsey interferometry in the micromaser," O. Benson, G. Raithel, H. Walther, in *Laser Spectroscopy, XII International Conference*, eds. M Inguscio, M. Allegrini, A. Sasso (World Scientific, Singapore, 1996).

10. "Photonenzählen im Resonator," O. Benson, G. Raithel, H. Walther, Phys. Bl. **52 / 12**, 653 (1996).

11. "Atomic interference in the micromaser and statistical properties of the micromaser field," O. Benson, M. Weidinger, G. Raithel, H. Walther, J. Mod. Opt. **44**, 2011 (1997).

12. "Decay of Atomic Wave-Packet Motion in Optical Lattices," G. Raithel, W. D. Phillips, S. L. Rolston, Fortschritte der Physik **46**, 791 (1998).

13. "Schneller als Licht, na und ? ," G. Raithel, Phys. Bl. **56 / 9**, 13 (2000).

14. "l-Changing Collisions in Cold Rydberg Gases", A. Walz-Flannigan, D. Feldbaum, S. K. Dutta, J. R. Guest, G. Raithel, in Photonic, Electronic and Atomic Collisions (XXII ICPEAC Proceedings), eds. J. Burgdoerfer, J. S. Cohen, S. Datz and C. R. Vane (Rinton Press, Princeton 2002).

15. "Spectroscopy of Rydberg Atoms is Non-neutral Cold Plasmas", D. Feldbaum, N. V. Morrow, S. K. Dutta, G. Raithel, in Non-Neutral Plasma Physics IV, eds. F. Anderegg, L. Schweikhard, C. F. Driscoll (AIP Conference Proceedings, Volume 606, New York 2002).
16. "Atom Manipulation in Optical Lattices", N. V. Morrow, G. Raithel, in Advances in Atomic, Molecular and Optical Physics vol. 53, p. 187-225, eds. M. Scully and G. Rempe (Elsevier, 2006).
17. "Cold Rydberg Atoms", J.-H. Choi, B. Knuffman, T. Cubel Liebisch, A. Reinhard, G. Raithel, in Advances in Atomic, Molecular and Optical Physics vol. 54, p. 131-202, eds. E. Arimondo and P. Berman (Elsevier, 2007).
18. "Atoms and Plasmas in a High-Magnetic-Field Trap", G. Raithel, B. Knuffman, M. H. Shah, C. Hempel, E. Paradis, R. Mhaskar, X. Zhang, J.-H. Choi, A. P. Povilus, J. R. Guest, in AIP Conference Proceedings **1037**, 178 - 193, eds. Y. Kanai and Y. Yamazaki (AIP, 2008).

8 Talks and Seminars

Contributed talk, European Quantum Electronics Conference, Hannover, Germany (1988).

Atomic physics seminar, Technische Hochschule Darmstadt, Germany (1989).

Atomic physics seminar, Universität Ulm, Germany, (1989).

Invited talk, Adriatico Research Conference on Quantum Chaos, Trieste, Italy (1990).

Invited talk, Tenth International Conference on Laser Spectroscopy, Font-Romeu, France (1991).

Atomic physics seminar, Ecole Normale Superieure, Paris, France (1993).

Contributed talk, 4th European Quantum Electronics Conference, Florence, Italy (1993).

Special seminar, Cornell University, Ithaca, NY (1993).

Atomic physics seminar, University of Rochester, Rochester, NY (1993).

Atomic physics seminar, Universität Ulm, Germany (1994).

Atomic physics seminar, University of Rochester, Rochester, NY (1994).

Atomic physics seminar, Massachusetts Institute of Technology, Cambridge, MA (1994).

Atomic physics seminar, University of Connecticut, Storrs, CT (1994).

Atomic physics seminar, Penn State University, College Park, PA (1994).

Invited talk, 5th European Quantum Electronics Conference, Amsterdam, Netherlands (1994).

Invited talk, NATO Advanced Study Institute Electron Theory and Quantumelectrodynamics, Edirne, Turkey (1994).

Invited talk, International Symposium "Modern Problems of Laser Physics", Novosibirsk, Russia (1995).

Atomic physics seminar, College of William and Mary, Williamsburg, VA (1995).

Atomic physics seminar, Georgia Institute of Technology, Atlanta, GA (1996).

Special seminar, Harvard University, Cambridge, MA (1996).

Special seminar, Max-Planck-Institut fr Quantenoptik, Garching, Germany (1996).

Atomic physics seminar, University of Arizona, Tucson, AZ (1996).

Poster presentation, ZICAP, Amsterdam, Netherlands (1996).

Two atomic physics seminars, University of Rochester, Rochester, NY (1996).

Contributed talk, DAMOP, Ann Arbor, MI (1996).

Atomic physics seminar, State University of New York at Stony Brook, NY (1996).

Poster presentation, International workshop on "Atoms and Electrons in Periodic and Quasiperiodic Potentials", Les Houches, France (1997).

Special seminar, University of Maryland, MD (1997).

Special seminar, Georgia Institute of Technology, Atlanta, GA (1997).

Atomic physics seminar, University of Michigan, Ann Arbor, MI (1997).

Atomic physics seminar, Massachusetts Institute of Technology, Cambridge, MA (1997).

Invited talk, workshop on "Quantum Control of Atomic States of Motion", Albuquerque, NM (1997).

Contributed talk, DAMOP, Washington, DC (1997).

Contributed talk, QELS, Baltimore, MD (1997).

Invited talk, workshop on "Fundamental Problems in Quantum Mechanics", University of Maryland, MD (1997).

Atomic physics seminar, University of Toronto, Canada (1998).

Contributed talk, DAMOP, Santa Fe, NM (1998).

Invited talk, workshop on "Quantum Control of Atomic States of Motion", Albuquerque, NM (1998).

Poster presentation, ICAP, Windsor, Canada (1998).

Contributed talk, QELS, Baltimore, MD (1999).

Contributed talk, DAMOP, Atlanta, GA (1999).

Atomic physics seminar, Penn State University, College Park, PA (1999).

Special seminar, University of Hamburg, Germany (1999).

Atomic physics seminar, University of Michigan, Ann Arbor, MI (1999).

Invited talk, Cross Border Workshop on Laser Science, University of Michigan, Ann Arbor, MI (2000).

One invited talk, two contributed talks and two post-deadline posters, DAMOP, University of Connecticut, Storrs, CT (2000).

Invited talk, DoE BES contractors meeting, Airlie, VA (2000).

Invited talk, Workshop on Cold Rydberg gases, ITAMP, Harvard University, Cambridge, MA (2001).

Four (refereed) contributed talks, QELS, Baltimore, MD (2001).

Five contributed talks, DAMOP, London, Canada (2001).

Invited talk, ICPEAC, Santa Fe, NM (2001).

Invited talk, Cross Border Workshop on Laser Science, University of Toronto, Canada (2001).

Poster presentation, Workshop on Non-Neutral Plasmas, San Diego, CA (2001).

Special seminar, Max-Planck-Institute for Quantum Optics, Garching, Germany (2001).

Two atomic physics seminars, University of Ulm, Germany (2001).

Colloquium at the University of York, Canada (2001).

Special seminar, University of Ulm, Germany (Fall 2001).

QUELS 2002 presentations: Trapping of atoms in a magnetic guide (student talk), Spectroscopy of atoms in a non-neutral plasma (student talk), Long Beach, CA (2002).

DAMOP 2002 presentations: Tunneling resonances and coherence in a gray optical lattice (student talk), Cold Rydberg atoms in strong magnetic fields (post-doc talk), Cryogenic MOT and Trap for cold Rydberg atoms (student talk), Stern-Gerlach beamsplitter (poster), Williamsburg, VA (2002).

Atomic Physics seminar, MIT, Cambridge, MA (2002).

Atomic Physics seminar, Berkeley, CA (2002).

Invited talk at Quantum Optics conference, Obergurgl, Austria (2003).

Presentation at the OSA Ann Arbor Chapter (2002).

QUELS 2003 presentations: Laser-cooled Rydberg atoms (student talk), Cold atoms and plasmas in strong magnetic fields (poster), density effects in wave-packet motion of atoms in optical lattices (poster), Baltimore, MD (2003).

DAMOP 2003 presentations: Cold Rydberg atoms in strong magnetic fields (post-doc talk), High resolution non-linear spectroscopy of cold Rydberg atoms (student talk), Effects of magnetic fields on wave-packet dynamics in an optical lattice (student talk), Boulder, CO (2003).

Invited talk at Atomic, Molecular and Optical Sciences Research meeting of the DoE, Tahoe City, CA (2003).

Invited talk at the OSA/ILS meeting in Tucson, AZ (2003).

Lecturer at a school on "Rydberg Physics", MPI for the Physics of Complex Systems, Dresden, Germany (2004).

DAMOP 2004 presentations: a) Magnetically guided atomic beams (invited), b) Strongly magnetized Rydberg gases and Plasmas (contributed), c) Influence of thermal black-body radiation on the evolution of a cold Rydberg gas (contributed), d) Laser cooling and trapping near 3T (contributed), e) Coherent population transfer into the 85Rb 44D Rydberg state. Tucson, AZ (2004).

Seminar, Center for Ultracold atoms, MIT, Cambridge, MA (2004).

Atomic Physics seminar, Miami University, Oxford, OH (2004).

Invited talk at international workshop PARYS (Ultracold Plasmas And Rydberg Systems), Paris, France (2005).

Invited talk at international Symposium "Frontiers of Quantum Optics and Applications," Max-Planck Institute for Quantum Optics, Garching, Germany (2005).

Two contributed talks at QUELS, Baltimore, MD (2005). (QThA2: Coherent Population Transfer from Ground State Atoms into Rydberg States, QThA6: Raman Optical Lattice)

Four contributed talks, one talk in Undergraduate Research session, one poster at DAMOP, Lincoln, NE (2005) (G4.00003 Magnetic trapping of high-angular-momentum Rydberg atoms in strong magnetic fields G4.00004 Emission of fast Rydberg atoms from cold Rydberg-atom gases G4.00005 Coherent Population Transfer of Ground State Atoms into Rydberg States F1.00005 Recombination of a Strongly Magnetized Two-Component Plasma in a Nested Penning-Ioffe Trap M6.00034 Continuous Propagation of Magnetically Guided Dark State 87Rb B5.00014 Raman Optical Lattice)

Invited talk, ITAMP workshop "Cold and Ultracold Plasmas and Rydberg Physics," Cambridge, MA (2005).

Invited talk, Cross-Border workshop on Laser Science, Ohio State University, Columbus, OH (2005).

Invited talk, Mid-Western Cold-Atom workshop, University of Illinois at Urbana-Champaign,

IL (2005).

Invited talk, LPHYS'06, Lausanne, Switzerland (July 24-28, 2006).

Invited talk, ITAMP, Cambridge, MA (May 2006).

Presentations at DAMOP 2006 (Knoxville, Kentucky): "Applications of cold, magnetically-guided atomic beams," S. Olson, R. Mhaskar, G. Raithel (poster), "Van-der-Waals shifts of rubidium Rydberg states," T. Cubel Liebisch, A. Reinhard, B. Knuffman, P. R. Berman, G. Raithel (oral), "Rydberg atoms in laser fields," B. Knuffman, G. Raithel (poster), "Open-channel fluorescence imaging of atoms in a high-gradient magnetic trap," R. Mhaskar, S. Olson, G. Raithel (oral), "Confinement of strongly magnetized ultracold plasmas," J.-H. Choi, X. Zhang, A. P. Povilus, and G. Raithel (oral), "Laser cooling and localization measurements in a Raman optical lattice," Rui Zhang, Rachel Sapiro, Natalya Morrow, Paul Berman, Georg Raithel (oral).

Presentation at DoE AMOS Research meeting, Airlie, VA (September 2006).

Presentation at ARO Atomic & Molecular Physics Program Review, Arlington, VA (August 2006).

Invited talk at FIO 2006/LS XXII, Rochester, NY (October 2006).

Invited talk, Physics of Quantum Electronics, "Cold Rydberg Atoms and Cold Plasmas ," Snowbird, UT (January 2007).

Invited talk, Gordon Conference in Atomic Physics, "Interactions between Cold Rydberg Atoms," Tilton School, Tilton, NH (July 2007).

Presentations at DAMOP 2007 (Calgary, Canada, June 2007): "Rydberg Multipole Transitions in Time-Dependent Ponderomotive Potentials," B. Knuffman , G. Raithel (oral), "Resonant enhancement of state-mixing and ionizing collisions in Rb Rydberg states," Aaron Reinhard, Tara Cubel Liebisch, Paul Berman, Georg Raithel (oral), "Interactions of low-energy ions and electrons with Bose-Einstein condensates," Rachel Sapiro, Rui Zhang, Georg Raithel (poster), "Superfluorescence from Laser-Cooled Atoms," E. Paradis, B. Barrett, A. Kumarakrishnan, R. Zhang G. Raithel (poster), "Interactions of cold Rydberg atoms," Georg Raithel (**invited**), "2-Dimensional Compressed Magneto-Optical Trap," Rahul Mhaskar, Varun Vaidya, Georg Raithel (poster).

Seminar talk, "Towards Continuous-wave Bose-Einstein Condensation and Atom Lasing," Michigan State University, Lansing, MI (Fall 2007).

Invited talk, "Spectroscopy of Rydberg atom interactions in a dipole trap", International workshop on Atomic Physics, MPIKS, Dresden (November 2007).

Invited talk at International Workshop on Cold Antimatter Plasmas and Application to Fundamental Physics (Pbar 2008), "Interactions of laser-cooled atoms in a high-magnetic-field atom trap", Naha, Okinawa, Japan (February 2008).

Invited talk on international workshop on Rydberg excited atoms at Sandbjerg Estate, Den-

mark (May 2008).

Presentations at DAMOP 2008 (Penn State, State College, PA, May 2008):
B6.00006 Double-resonance spectroscopy of interacting Rydberg-atom systems,
J3.00002 High-gradient Magnetic Guide for Rydberg Atoms,
J3.00003 Laser Spectroscopy of Rydberg Atoms in Strong Magnetic Fields,
J3.00004 High-resolution studies of strongly magnetized, cold Rydberg atoms near the photo-ionization threshold,
L1.00126 Rydberg excitation blockade effects in strongly magnetized atom clouds,
O3.00006 1-D Mott insulator transition of a Bose-Einstein condensate,
P4.00005 Bose-Einstein condensate inside a Bragg-reflecting atom cavity,
P6.00011 Rydberg atom interactions in high density samples,
R1.00090 Progress towards a Continuous-Wave BEC.

Invited talk at the 9th International Workshop on Non-neutral Plasmas, "Plasma dynamics and recombination in a high-magnetic-field atom and plasma trap," Columbia University, NY (June 2008).

Seminar talk, "Bose-Einstein condensates in a one-dimensional optical lattice," Wayne State University, Detroit, MI (Fall 2008).

Seminar talk, "Bose-Einstein condensates in a one-dimensional optical lattice," Stevens Institute of Technology, Hoboken, NJ (Fall 2008).

Presentations at DAMOP 2009 (University of Virginia, Charlottesville, VA, May 2009): Two talks, five posters.
E1.00042 Direct spatial imaging of blockade effects in a cold Rydberg gas,
E1.00063 Charged impurities in a BEC,
E1.00090 Progress towards a continuous atom laser,
J6.00006 Rotary echo tests of coherence in Rydberg-atom excitation,
M1.00118 Atom interferometry using Kapitza-Dirac scattering,
S4.00007 Guiding and Trapping of Rydberg atoms in a linear magnetic atom guide,
T1.00068 Rydberg three-body recombination experiments in a Penning trap.

Invited talk at ITAMP workshop "Engineering Rydberg Interactions in Atoms, Molecules and Plasmas: A Collaborative Workshop", title "Rydberg Atoms in a Ponderomotive Optical Lattice," Cambridge, MA (Sept. 2009).

Invited talk at Midwestern Cold Atom workshop, Chicago, IL (Nov. 2009).

Presentation for the Society of Physics Students, U of M, (Nov. 2009).

AMO Program Review of the AFOSR, Washington, DC (Jan. 22, 2010). [This was an obligatory sponsor conference]

Invited talk as international Atom Laser conference, title "Experiments with BECs and ffcold guided atomic beams," Les Houches, France (April 2010) http://www.irsamc.ups-tlse.fr/Atom2010/

Presentations at DAMOP 2010 (Houston, TX, May 25-29, 2010): Seven student presenta-

tions.
C5.00010 State-dependent Energy Shift of Rydberg Atoms in a Ponderomotive Optical Lattice,
E1.00103 Continuous, guided atomic beams,
M1.00039 Ion-BEC Interactions,
M1.00148 Rydberg Atoms in Ponderomotive Optical Lattices,
Q1.00001 Observation of Rydberg excitation blockade effects in strongly magnetized atom clouds,
T1.00088 Field Enhancement Cavity for Pondermotive Optical Lattices,
T1.00156 Imaging of spatial correlations of Rydberg excitations in cold atom clouds.

International conference ICONO/LAT 2010, title "Trapping of Rydberg atoms in optical lattices," Kazan, Russia (Aug. 2010).

International conference on Cold Rydberg Gases and Ultracold Plasmas (CRYP2010), title "Trapping of Rydberg atoms in optical lattices," MPIKS Dresden (Sept. 2010).

International workshop on Ultracold Rydberg Physics, title "Trapping of Rydberg atoms," Recife, Brazil (Nov. 2010).

International workshop on , title "Dense light-induced nanoparticle crystals in solution," MPIKS Dresden (Nov. 2010).

Presentations at DAMOP 2011 (Atlanta, GA, June 13-17, 2011): Eight student presentations.
E1.00088 Spectroscopy of Rydberg atoms in a high-magnetic-field atom trap,
M3.00006 Interactions between ultra-cold ions and neutral atoms/Bose-Einstein condensates,
M6.00005 Imaging spatial correlations of Rydberg excitations in cold atom clouds,
P4.00007 Three-dimensional arrays of sub-micron particles generated by an optical lattice,
Q1.00030 Modeling ion dynamics for BEC-ion interaction experiments,
T3.00006 Evolution of Rydberg atom clouds in a linear magnetic trap,
U2.00007 Design for a compact CW atom laser,
U4.00003 Enhancement of Rydberg-atom trapping efficiency in a ponderomotive optical lattice using lattice translations.

Cleo 2011, title "Spectroscopy of Rydberg Atoms in a Ponderomotive Optical Lattice,": Georg Raithel, Sarah Anderson (speaker), Kelly Younge, Baltimore, MD (May 4, 2011).

FIO/LS conference, "Three-dimensional arrays of sub-micron particles generated by an optical lattice," G. Raithel B. N. Slama-Eliau, R. E. Sapiro, San Jose, CA (Oct. 2011).

Midwestern Cold Atom Workshop, "Trapping of mesoscopic matter in optical lattices," Northwestern University (Nov. 2011).

Boston Chapter of the IEEE Photonics Society, Laser Control of Individual Atoms Workshop, "Applications of Optical Lattices to the Trapping of Rydberg Atoms and Nano-particles," Lexington, MA (Oct. 2011).

University of Waterloo, Department colloquium, "Trapping of mesoscopic matter in optical

lattices," Waterloo, Canada (Nov. 2011).

COHERENCE workshop, University of Heidelberg, invited talk, "Direct Spatial Imaging of the Rydberg Excitation Blockade," Germany (Nov. 2011).

Presentations and posters at DAMOP 2012 (Anaheim, CA,June 13-17, 2012):
C7.00003 Trapping Rydberg Atoms in an Optical Lattice (invited, given by graduate student),
D1.00093 Cold Rydberg atoms in circular states,
J2.00001 Characterization and manipulation of a high-magnetic field trap,
K1.00107 Laser Spectroscopy of Rydberg Atoms in Deep Optical Lattices,
Q1.00092 Rydberg atoms in a linear magnetic atom guide,
Q1.00095 Imaging spatial correlations of Rydberg excitations in cold atom clouds,
Q1.00121 Apparatus to image ultra-cold impurities in Bose-Einstein condensates,
Q1.00147 A miniature mechanical shutter for atomic beams.

Midwestern Cold Atom Workshop, (student gave presentation), UIUC (Nov. 2012).

Workshop "Continuous Sources of Quantum Matter," invited talk, "Cold, guided atoms," Freudenstadt, Germany (March 2013).

Conference on "Ultracold Rydberg Physics," invited talk, Dresden Germany (July 2013).

Presentations and posters at DAMOP 2013 (Quebec City, Canada, June 3-7, 2013):
D1.00062 Electric-field and two-photon excitation calculations for BEC-ion interaction experiments,
D1.00072 High-Precision Measurement of the Rydberg Constant,
H3.00009 Photoionization of Rydberg atoms in a standing-wave light field,
H3.00010 Laser spectroscopy of Rydberg atoms in deep optical lattices,
H3.00001 Magnetic trapping of circular Rydberg atoms.

Midwestern Cold Atom Workshop, (student and myself gave presentation), Purdue, West Lafayette, IN (Nov. 2013).

AMO Seminar, "Rydberg atoms in optical and magnetic traps," University of Michigan (Nov. 2013).

Department Seminar, "Rydberg atoms in optical and magnetic traps," University of Nevada at Reno, NV (Nov. 2013).

Seminar, "Rydberg-atom trapping and spectroscopy in optical trapping fields," University of Wisconsin, Madison, WI (March 2014).

Research visit at Shanxi University, Taiyuan, Shanxi, China (May 2014).

Presentations and posters at DAMOP 2014 (Madison, WI, June 2-6, 2014):
B5.00004 Photoassociation of long-range nD Rydberg molecules,
M5.00001 Driving Rydberg-Rydberg transitions with an amplitude-modulated optical lattice,
M5.00004 Microwave-induced two-photon Autler-Townes splitting in Rydberg EIT,
P3.00008 Trapping of atoms with a concentric cavity,
T3.00002 The effects of light-shift and temporal evolution on collective Rydberg excitations.

Invited talk at international workshop on Ultracold Rydberg Physics in Recife, Brazil (Oct. 5-8, 2014).

Invited talk at international workshop on Atomic Physics in Dresden, Germany (Nov. 24-28, 2014).

Talk at NASA Fundamental Physics PI workshop, Pasadena CA (Nov. 17-18, 2014).

Midwestern Cold Atom Workshop; two students gave the talk, Argonne National Lab (Nov. 15, 2014).

Invited talk at the 2015 PQE (Physics of Quantum Electronics), Snowbird, UT (Jan. 4-8, 2015).

Presentations and posters at DAMOP 2015 (Columbus, OH, WI, June 8-12, 2015). **P2.00003 is invited**:
B8.00004 Progress towards measuring the Rydberg Constant Using Circular Rydberg Atoms in an Intensity-Modulated Optical Lattice,
H3.00001 Ponderomotive spectroscopy: Driving Rydberg transitions using harmonics and magic wavelengths of an intensity-modulated optical lattice,
H5.00005 Enhanced absorption and Autler-Townes splitting of electromagnetically induced transparency,
K1.00100 Measurement of strong electric fields using room-temperature Rydberg-EIT,
M6.00002 The effect of a rotary echo on the correlation function of interacting Rydberg atoms,
P2.00003 [Invited] Photoassociation of long-range nD Rydberg molecules,
Q1.00016 Angular-momentum couplings in long-range Rydberg molecules,
Q1.00147 532-nm intensity-modulated optical lattice for driving Rydberg-Rydberg transitions.

Invitation to talk at ICORD 2015 (International Conference on Rydberg atoms), Durham, UK (June 28 - July 3, 2015).

9 Department, College and University Service and Committees

1997-1998	Terwillinger Prize Committee, Commencement Marshal
1998-1999	Organization of Mini-Colloquia, Rackham Predoctoral Fellowship Committee
1999-2000	CM/AMO Seminar, Outreach Programs Committee, AMO Faculty Search Committee
2000-2001	Graduate Qualifying Exam Committee, Graduate Admissions Committee, Summer Science Committee
2001-2002	Graduate Qualifying Exam Committee, Graduate Admissions Committee, Outreach Committee, Undergraduate Brochure Committee

2002-2003	AMO Theory Faculty Search Committee, Outreach Committee, Physics Olympiad
2003-2004	Cornwell Price Committee
2004-2005	Graduate Admissions Committee, AMO/CM seminar, Physics Olympiad, FOCUS Council
2005-2006	Graduate Exams Committee, Graduate-student Advising, Outreach Committee, David Reis TRP (Promotion) Committee, Third-year Review Committee
2006-2007	Graduate Exams Committee, Graduate-student Advising, AMO Seminar, FOCUS Seminar
2007-2008	Graduate Exams Committee, Graduate-student Advising, Physics Olympiad
2008-2009	Graduate Exams Committee, Graduate-student Advising, Physics Olympiad - Lead Organizer, AMO Seminar
2009-2010	Graduate Exams Committee, Physics Olympiad - Lead Organizer, AMO Seminar
2009-	Associate Chair for Research, Physics Department, U of M
2010-2011	Graduate Exams Committee, Search Committee, IT Committee, Safety Committee, Mentor (Vanessa Sih), Physics Olympiad - Lead Organizer, Jennifer Ogilvie TRP (Promotion) Committee (Chair)
2011-2012	Graduate Admissions Committee, IT Committee, Safety Committee, Mentor, Physics Olympiad - Lead Organizer, REU Committee
2012-2013	Graduate Exam Committee, CM/AMO Seminar, Physics Olympiad - Lead Organizer, REU Committee
2013-2014	Graduate Awards, Physics Olympiad - Lead Organizer, Vanessa Sih TRP (Promotion) Committee, prepared Distinguished University Professor file for a colleague
2014-2015	Undergraduate Awards, Graduate Admissions, Hui Deng TRP (Promotion) Committee (Chair)

10 Teaching

II-97 240 Electromagnetism discussion sections (one regular, one double size)
II-98 260 Electromagnetism (new undergraduates; Honors)
II-98 644 Graduate Atomic Physics (co-taught)
I-99 507 Graduate Mechanics
II-99 405 Electromagnetism (junior and senior undergraduates)
I-00 453 Quantum Mechanics (junior and senior undergraduates)
II-00 405 Electromagnetism (junior and senior undergraduates)
I-01 453 Quantum Mechanics (junior and senior undergraduates)
II-01 340 Modern Physics I (intermediate undergraduates)

I-02 390 Modern Physics II (intermediate undergraduates)
II-02 505 Graduate Electromagnetism I
I-03 506 Graduate Electromagnetism II
II-03 505 Graduate Electromagnetism I
I-04 506 Graduate Electromagnetism II
I-05 405 Electromagnetism (junior and senior undergraduates)
I-06 260 Electromagnetism (new undergraduates; Honors)
II-06 401 Classical Mechanics (junior and senior undergraduates)
I-07 260 Electromagnetism (new undergraduates; Honors)
I-08 341 Modern Physics Lab (intermediate undergraduates)
I-09 341 Modern Physics Lab (intermediate undergraduates)
II-09 511 Graduate Quantum Mechanics I
I-10 512 Graduate Quantum Mechanics II
II-11 106 Everyday Physics (Lecture and Lab for non-physics majors)
II-12 405 Electromagnetism (junior and senior undergraduates)
I-13 405 Electromagnetism (junior and senior undergraduates)
II-13 511 Graduate Quantum Mechanics I
I-14 512 Graduate Quantum Mechanics II
II-14 644 Graduate Atomic Physics
I-15 106 Everyday Physics (Lecture and Lab for non-physics majors)

Teaching Assignments before 1997 (in Germany):

(WT= winter term from Nov. 1 to Febr. 27, ST= summer term from May 1 to July 31)

Physics discussion courses for undergraduates in:

* Atomic physics (ST 1988)
* Classical electrodynamics (ST 1990)
* Optics and waves (WT 1990/91 and WT 1991/92)

Instruction and demonstration in labs for physics undergraduates (WT 1988/89, ST 1991, ST 1992, WT 1992/93, ST 1993, WT 1993/94, ST 1994, WT 1994/95).

Instruction and demonstration in labs for medical students (ST 1989 and WT 1989/90).

Five independent study projects for undergraduate physics students, supervision of ten physics diploma students, supervision of and cooperation with six physics graduate students.

11 Dissertation Committees

Name	Dept.	Candidacy	Degree	Chair
Amos Kuditcher	App. Phys.	W96	F99	
Thomas Weinacht	Physics	F97	F00	
Jason Engbrecht	Physics	W98	F02	
Matthew DeCamp	Physics	W99	F02	
Jae-Wook Ahn	Physics	W99	F02	
Boonkeng Teo	Physics	F99	W02	X
Qichun Xu	Physics	F99	F01	
Subrata Dutta	EECS	F99	F00	X
Brett Pearson	Physics	F00	W04	
Emily Peterson	Physics	F00	F04	
Christopher Search	App. Phys.	F00	F02	
David Feldbaum	Physics	W01	S03	X
Alisa Walz-Flannigan	App. Phys.	F01	S04	X
Natalya Morrow	Physics	F02	F05	X
Catherine Herne	Physics	F02	F07	
Lee Farina	App. Phys.	F02	F05	
Tara Cubel	App. Phys.	F03	F06	X
Jae Choi	Physics	F03	W06	X
Shouyuan Chen	EECS	F03	F04	
Martin John Madsen	Physics	F03	W06	
Wei Yi	Physics	W04	W06	
Claudiu Genes	Physics	W04	W06	
Spencer Olson	Physics	F04	W06	X
Haidan Wen	Physics	F04	S06	
Yanwen Wu	Physics	F04	F07	
Rahul Mhaskar	App. Phys.	F04	W08	X
Brenton Knuffman	App. Phys.	F04	F08	X
Dylan Manna	Physics	F04		
Maria Leonova	Physics	F04	W08	
Joel Murray	Physics	?	W06	
Aaron Reinhard	Physics	F05	W08	X
Rui Zhang	Physics	F05	W08	X
Xiaodong Xu	Physics	F05	F08	
Erik Kim	App. Phys.	W06	S09	
Eric Harding	App. Phys.	W06	W10	
Rachel Sapiro	Physics	F06	F09	X
J. Kestner	Physics	F06	S09	
Steven Olmschenk	Physics	F06	W09	
Guin-Dar Lin	Physics	F06	W10	
Daniel Stick	Physics	?	W07	
Bin Wang	Physics	?	F08	
Evan Goetz	Phyics	?	S10	
Jonathan Sterk	EECS	?	F10	

Name	Dept.	Candidacy	Degree	Chair
Mark Acton	Physics	?	W08	
Tim Goodman	Physics	?	W09	
Kelly Younge	Physics	W08	S10	X
Yang-Hao Chan	Physics	S09	W13	
Yisa Rumala	App. Phys.	S09	S12	
Mallory Traxler	Physics	S09	W13	X
Eric Paradis	Physics	F09	W13	X
Jeonwon Lee	Physics	F09	S12	
Andrew Schwarzkopf	Physics	F09	W13	X
Evan Goetz	Physics	?	W13	
Emily Alden	Physics	F09	W13	
Bo Zhang	Physics	S10		
Sarah Anderson	Physics	S11	W14	X
David Anderson	App. Phys.	S11		X
Dongling Deng	Physics	S11		
Zhen Zhang	Physics	S11		
Yun-Jhih Chen	Physics	W12		X
Shengtao Wang	Physics	W13		
Marta Luengo-Kovac	Physics	S13		
Kaitlin Moore	App. Phys.	S13		X
Chao Shen	Physics	?	W14	
Matthew Bales,	Physics	?	S14	
Jieun Lee	Physics	?	S14	

12 Research Group 2014

Graduate Students

Name	Status
Sarah Anderson	Diss. Cand. Physics, graduated WI 2014
David Anderson	Diss. Cand. Applied Physics
Yun-Jhih Chen	Diss. Cand. Physics
Stephanie Miller	Diss. Cand. Physics
Kaitlin Moore	Diss. Cand. Physics
Nithiwadee Thaicharoen	Diss. Cand. Physics
Andira Ramos	Pre-cand., Physics
Luis Goncalves	Physics; Univ of Sao Paulo

Post-docs: Dr. Andrew Schwarzkopf

Undergraduates: Mark Brown (REU), Yiqian Gan

13 Participation in Special Programs for Undergraduates etc.

Summer 1998	REU student Bryan Williams: "Frequency-stabilization of laser diodes." The program "Research Experience for Undergraduates (REU)" is a program of the National Science Foundation.
Summer 1999	REU student Natalya Morrow: "Bichromatic optical lattice."
Summer 1999	Three high-school students from the NASA SHARP program (Summer High School Apprenticeship Research Program): "Setup of an atom trap."
Fall 1999	Lab intern Nataya Morrow (from Eastern Michigan University): "Bichromatic optical lattice."
Since Fall 1999	Occasional assistance in the Advanced Labs with the saturated spectroscopy and atom trap experiment.
Summer 2000	REU student Natalya Morrow. Project: "Feedback control of wave-packet motion in optical lattices."
Summer 2000	REU student Martin Centurion; has built equipment and developed software for an atom trap experiment in the Advanced Labs.
Summer 2000	Two high-school students from the NASA SHARP program: "Experiments on light detection and saturation spectroscopy."
Summer 2001	REU student Robert Fletcher: "Pyramidal magneto-optic trap."
Summer 2001	Two high-school students from the NASA SHARP program: "Measurement of the loading curve of a magneto-optic atom trap."
Spring 2002	Participated in the preparation and conduction of the 1st Michigan Physics Olympiad.
Summer 2002	REU student Maroof Khan: "Novel Littrow laser design."
Summer 2002	One high-school student from the NASA SHARP (Kyle Renshaw): "Experiments with a magneto-optic atom trap."
Summer 2002	Co-taught a MMSS course with Fred Becchetti, "Magic of Physics and Physics of Magic."
Summer 2003	REU student Anne Lewis: "Repumper laser for Rydberg trap."
Summer 2003	REU student Alexander Povilus: "Time Averaging of Multi-mode Optical Fiber Output for a Magneto-Optical Trap."
Summer 2003	REU student Robert Schabinger: "High-speed optical shutter."

Summer 2003	Co-taught a MMSS course with Fred Becchetti, "Magic of Physics and Physics of Magic."
Summer 2004	REU student Kevin Vogel: "DAVLL laser lock for magneto-optic trap."
Summer 2004	REU student Alexander Povilus: "Ioffe-Penning trap"
Summer 2004	One high-school student from the NASA SHARP (Alex Alford): "Temperature-stabilized spectroscopic cell."
Summer 2004	Co-taught a MMSS course with Fred Becchetti, "Magic of Physics and Physics of Magic."
Summer 2005	REU student Robert Wilson: "Experiments with cold Rydberg atoms."
Summer 2005	Co-taught a MMSS course with Fred Becchetti, "Magic of Physics and Physics of Magic."
Summer 2006	REU students: Mallory Walker worked on building and current modulation of an ECDL, Robert van Wesep on a Zeeman slower, and Katie Crimmins on a cryogenic MOT setup.
Summer 2006	Co-taught a MMSS course with Fred Becchetti, "Magic of Physics and Physics of Magic."
Summer 2007	REU students: Juwon Lee on building ECDL lasers, Varun Vaidya on a Zeeman slower, and Katie Crimmins on a MOT setup.
Summer 2007	Co-taught a MMSS course with Fred Becchetti, "Magic of Physics and Physics of Magic."
Summer 2008	REU students: Yuru Niu and Gordan Montgomery on laser-cooling projects.
Summer 2008	Co-taught a MMSS course with Fred Becchetti, "Magic of Physics and Physics of Magic."
June 2009	Presentation of a Science Cafe, Jackson, MI.
Summer 2009	REU students: Stefan Zigo and Karl Lundquist on laser-cooling projects.
Summer 2009	Co-taught a MMSS course with Fred Becchetti, "Magic of Physics and Physics of Magic."
Summer 2010	Co-taught a MMSS course with Fred Becchetti, "Magic of Physics and Physics of Magic."
Summer 2010	REU students: Stefan Zigo, Karl Lundquist and Kevin Smith on various laser-cooling projects.
Summer 2011	Co-taught a MMSS course with Fred Becchetti, "Magic of Physics and Physics of Magic."
Summer 2011	REU student: Kevin Hu (Bard College at Simon's Rock/MIT). Local undergraduate students: Stefan Zigo, Karl Lundquist.

Summer 2012 MMSS course with Fred Becchetti, "Magic of Physics and Physics of Magic.". Participation in REU program (Monica Mohacsi, Adelphi). Other undergraduates: Tian Tian, Fei Wang, William Huang (USTC), Karl Lundquist, Jordy Tin, Matt Boguslawski (UM).

Summer 2013 MMSS course with Fred Becchetti, "Magic of Physics and Physics of Magic.". Participation in REU program (Grant Rorem, Gustavus). Other undergraduates: Pavel Okun (UM), Yiqian Gan (UM), Matt Boguslawski (UM).

Summer 2014 MMSS course with Fred Becchetti, "Magic of Physics and Physics of Magic.". REU program (Mark Brown, VTech). Other undergraduate: Yiqian Gan

Regular participation in campus days for prospective undergraduate and graduate students.