

Curriculum Vitae

Michael J. Crescimanno

Department of Physics and Astronomy, Youngstown State University
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Education:

Ph.D., Physics U.C. Berkeley, 1991
B.A., Physics, *summa cum laude* Princeton, 1985

Work:

Full Professor, Department of Physics and Astronomy YSU, 2008-present
Associate Professor, Department of Physics and Astronomy YSU, 2002-2007
Assistant Professor, Department of Physics and Astronomy YSU, 2000-2002
Assistant Professor of Physics Berea College, 1994-2000
Post-Doctoral Research Associate, Center for Theoretical Physics MIT, 1991-1994

External Honors and Awards:

Invited Visitor, The Harvard-Smithsonian Center for Astrophysics (ITAMP) \$ 5100 ea.
March 2000, Spring 2002, Spring 2004, Fall 2005, Spring 2016
Radcliffe Summer Fellowship awardee Summer 2016
Chair, Quantum Optics and Advanced Spectroscopy Conference (at the Great Lakes Photonics Symposium), Cleveland, OH. June 7-10th, 2004
Invited Visitor, The Center for Ultracold Atoms, MIT, \$ 5100 ea. Spring 2002, Fall 2002
Scholars Program, Institute for Theoretical Physics, U.C. Santa Barbara, \$2400/ann. 1998-2001
Chair, Photon Induced Processes, OSAPS conference, Youngstown, OH. April 11-12, 2001
Nomination for the Cutting Edge Award, 1998
The Appalachian Colleges Association, for work on educational physics applets.
National Science Foundation Graduate Fellowship \$18000/ann. 1986-1989
Department of Education Graduate Fellowship \$18000/ann. 1990-1991
Kusaka Memorial Award in Physics, $\Phi\beta\kappa$ and $\Sigma\Xi$ (Princeton University) 1985

External Grants:

NSF Coherence-Derived Light Fluctuations for Atomic Magnetometry, with Lewis and Clark University,
2017, NSF PHY-211446 RUI, YSU portion \$15,281 \$195,008
NSF DMR (OP) "Nonlinear Optical Properties of Organic Cavity Polaritons," with CWRU
2016-2019, with C.W.R.U., NSF DMR-1609077, YSU Portion \$72,312 \$455501
NSF EAGER EPMD "EAGER: Verification of Coherent Perfect Rotation,"
2013-2014, ECCS-1360725, \$130000
NSF S-STEM "Science, Technology, Engineering and Mathematics Scholars Program," co-PI
2008-2012 DUE-0728616. \$600000
Radcliffe Institute for Advanced Studies Fellow, and Benjamin White Whitney Scholar \$80000
2007-2008.

<i>NASA NAG9-1166</i> , Consultant to Harvard-Smithsonian Center for Astrophysics, 2002	\$ 13340
<i>Cluster Ohio Program</i> of the Ohio Supercomputer Center, co-PI, 2001	\$70000
<i>DOE EPSCoR Grant</i> , Subcontractor to U. of Ky. Theory Group, 2001-2003	\$58088
<i>NSF EPSCoR Research Enhancement Grant</i> , PI, 1999	\$12000
<i>DOE EPSCoR Grant</i> , Subcontractor to U. of Ky. Theory Group 1996-1999	\$30000
<i>Cottrell National College Science Award</i> , PI, Research Corporation, #CC5285 (and 1995 (\$35000))	\$11900
Grant number #CC3943, to involve students in fundamental physics research in imaging spectrometers and ion/atom trap dynamics. Continuing as grant #CC5285	
<i>Faculty-Student Research Grant</i> , The Appalachian College Association, three-time awardee, 1995, '96, '97	\$5400/ea
<i>Philip Morris Fellowship</i> , University of Kentucky, 1996	\$9000
<i>DOE/EPSCoR Energy Scholar Award</i> , University of Kentucky, 1997	\$9000
To study new non-perturbative techniques in quantum gauge theories.	

Internal Awards and Grants:

7. Distinguished Professorship Award (Scholarship)	2006, 2016
6. LEGUP grant, "Making quantum wierdness useful," \$50000	2012-2013
5. University Research Council Grant	2004, 2005
4. Faculty Improvement Leave	Spring, 2004
3. Dr. Martin Luther King <i>Mentorship</i> Award	2003
2. Faculty, Electromagnetic Fields Research and Instrumentation Center (EFRIC), A YSU PACER partnership between Electrical Engineering and Physics and Astronomy.	2003
1. Research Professorship Award, YSU,	2001, 2005, 2007, 2012, 2016

Recent Presentations :

89. "Harmonic generation with an ultra-strongly coupled cavity polariton," DAMOP 2017 poster , K1.00128	June 7, 2017
88. "EIT amplitude noise spectroscopy," DAMOP 2017 poster, D1.00103	June 6, 2017
87. "EIT Amplitude Noise Spectroscopy," Invited talk, Foundations of Non-linear Optics, 2017	May 25, 2017
87. "Nonlinear optics in organic cavity polaritons" SPIE Conference Presentation, with Kenneth D. Singer, Bin Liu and Robert J. Twieg Proc. SPIE 10101, Organic Photonic Materials and Devices XIX, 1010114	April 19, 2017
86. "Non-linear optics of ultrastrongly coupled cavity polaritons," DAMOP 2016 contributed talk, B7.00002	May 24, 2016
85. "Non-linear optics of ultrastrongly coupled cavity polaritons ," invited departmental colloquium, Harvard-Smithsonian ITAMP	May 5, 2016
84. "Non-linear optics of ultrastrongly coupled cavity polaritons ," invited departmental colloquium, College of the Bahamas	Mar. 30, 2016
83. "Non-linear optics of ultrastrongly coupled cavity polaritons," invited colloquium, Lewis and Clark College	Mar. 7, 2016
82. "Non-linear optics of ultrastrongly coupled cavity polaritons," invited departmental colloquium, C.W.R.U.	Feb. 18, 2016
81. "Non-linear optics of ultrastrongly coupled cavity polaritons," invited AMO colloquium, O.S.U. Feb 2, 2016	

80. "Non-linear optics of a strongly coupled multiple-cavity polariton," invited colloquium, W.V.U. Nov. 19, 2015
79. "Non-linear optics of a strongly coupled multiple-cavity polariton," OSAPS Fall 2015, (Cleveland State U.) abs: #OSF15-2015-000052 talk: E3.5 Oct. 17, 2015
78. "Non-linear optics of a strongly coupled multiple-cavity polariton," invited colloquium, U. Miami (Oh.) Sept. 30, 2015
77. "Developments in Coherent Perfect Polarization Rotation", with J. Andrews, C. Zhou and M. Baker, DAMOP 2015 (Columbus, Oh.) #U7.00001 Jun. 12, 2015
76. 'First Experimental Demonstration of Coherent Perfect Rotation,' with C. Zhou and J. Andrews, OSAPS Spring 2015, (Kent, Oh.) abs: #OSS15-2015-000069 talk: F5.3 Mar. 28, 2015
75. 'Coherent perfect rotation theory: connections with, and consequences beyond, the anti-laser,' with J. Andrews, C. Zhou, and M. Baker, DAMOP 2014, (Madison, Wi.) #DAMOP14-2014-000699, J6.00010 June 4, 2014
74. 'Experimental realization of Coherent Perfect Rotation in TGG,' with C. Zhou, J. Andrews and J. Petrus, DAMOP 2014, (Madison, Wi.) #DAMOP14-2014-000716, N6.00009 June 5, 2014
73. 'Nanolayered microlenses in theory and practice,' with J. Andrews, T. Oder, C. Zhou, C. Merlo, C. Hetzel, C. Bagheri, J. Petrus and A. Mazzocco, DAMOP 2014, (Madison, Wi.) #DAMOP14-2014-000692, K1.00086 June 4, 2014
72. 'Understanding Zeeman EIT Noise Correlation Spectra in Buffered Rb Vapor,' with Shannon OLeary, Aojie Zheng, DAMOP 2014, (Madison, Wi.) #DAMOP14-2014-000862, K100078 June 4, 2014
71. 'New optical settings contrast Coherent Perfect Phenomena,' with C. Zhou, M. Baker and J. Andrews, OSAPS Spring 2014, (YSU) #OSS14-2014-000042 April 5, 2014
70. 'Dispersion and Conversion: Coherent Perfect Rotation in 1-d Photonic Crystals,' with M. Baker, C. Zhou and J. Andrews, OSAPS Spring 2014, (YSU) #OSS14-2014-000041 April 5, 2014
69. 'Optical wave evolution in nano-structured plastic films,' with M. Baker, OSAPS Fall 2013, (U. Cincinatti) #OSF13-2013-000045 Oct. 5, 2013
68. 'Theoretical evaluation of layered microlens optics,' with M. Baker, OSAPS Fall 2013, (U. Cincinatti) #OSF13-2013-000048 Oct. 5, 2013
67. "Understanding temperature tuning of the all polymer co-extruded laser," OSAPS Fall 2012 (Wayne State U.) #OSF12-2012-000066 Oct. 6, 2012
66. "Experimental demonstration of the anti-maser," OSAPS Fall 2012 (Wayne State U.) #OSF12-2012-000064 Oct. 6, 2012
65. "The theory of the anti-maser: coherent perfect absorption of RF," OSAPS Fall 2012 (Wayne State U.) #OSF12-2012-000063 Oct. 6, 2012
64. "Coherent Perfect Rotation: The conservative analogue of CPA," DAMOP 2012 (Anaheim) P7.00009 June 7, 2012
63. "EIT Noise Resonance Power Broadening: A Probe of Coherence Dynamics", with C. Snider and S. O'Leary, at DAMOP 2012 (Anaheim), D1.00005 June 5, 2012
62. "Coherent Perfect Rotation," OSAPS Spring 2012 (OSU) April 14, 2012
61. "Causes of power broadening in EIT Noise Spectroscopy," with C. Snider and S. O'Leary, at DAMOP 2011 (Atlanta) June 17, 2011
60. "Black Hole Odyssey with Jack and Jill," invited talk at Washington and Jefferson College, Physics, Wash. PA., May 5, 2011

59. "Co-extruded mechanically tunable multilayer elastomer laser," with G. Mao and J. Andrews, OSAPS 2011 April 16, 2011
58. "Black Hole Odyssey with Jack and Jill," YSU WB Planetarium Public Lecture Apr. 14, 2011
57. "Applications of plane geometry to astronomical distances," Canfield HS, Dec. 9, 2010
56. "Magneto-optics, gain and coherence- assisted absorption in layered polymers," Condensed Matter Seminar, U. Michigan Dec. 7, 2010
55. "What is Bouyancy?" presentation for National Laboratory Day, " Mr. Witmers' 8th grade class, Nov. 21, 2010
54. "Theory of the non-power broadened EIT noise resonance," Midwest Cold Atom Workshop, U. Michigan Nov. 13, 2010
53. "Topology change in conformal field theory/Chern-Simons correspondence," YSU Topology Conference, Oct. 17, 2010
52. "Theory of the coherent perfect absorber (CPA) and the layered polymer laser," OSAPS Conf., Marrieta College Oct. 9, 2010
51. "Band Edge Enhancement of Magneto-optical rotation in a 1-d polymer lattice," at Kettering University, Mi. OSAPS conference May 1, 2010
50. "The near future of time measurement," at University of Akron, Nov. 11, 2009
49. "EIT Intensity Noise Spectroscopy," C5.00004, OSAPS Fall 08, Wright State University Oct. 11, 2008
48. "Joint CPT and N resonances in compact atomic time standards," DAMOP 2008, Penn State Univ. R1.00068 May 30, 2008
47. "Geometry, Matter and Beyond," at Belmont H.S., Belmont, Ma. May 20, 2008
46. "EIT- and N- joint resonance lineshape asymmetry," OSAPS Spring Meeting, Youngstown State University March 29, 2008
45. "The (near-) future of time measurement," invited talk at the Radcliffe Institute for Advanced Studies (Harvard University) March 12, 2008
44. "For a good time..., " invited talk at the Rowland Institute (Harvard University), Dec 11, 2007
43. "Linkages between your local university and area businesses: a view from the ivory tower", Rotary International (Canfield, OH.) Jan 7, 2007
42. "The N - and CPT- joint resonance," Contributed talk, DAMOP 2006 (Knoxville) May 18, 2006
41. " VCSEL-based CPT atomic clock: Understanding the magic modulation index," Contributed talk, Wayne State U., Detroit Apr. 1, 2006
40. "A Theory of the N+CPT resonance," Invited seminar, Harvard Smithsonian Center for Astrophysics, Boston, MA, Nov. 4, 2005
39. "Quantum optics of new atomic frequency standards," Invited seminar, ITAMP, Boston, MA Oct. 27, 2005
38. "A theoretical perspective on N-resonance spectroscopy," APS Ohio Section, Cleveland State University, Cleveland, OH Oct. 15, 2005
37. "Physical Model of Modulation Dependent Effects in CPT Clocks," DAMOP 2005, Lincoln, Neb. May 20, 2005
36. " Why bother improving atomic clocks?," Cleveland State University Physics Colloquium, CSU Physics Feb. 10, 2005
35. " Why bother improving atomic clocks?," YSU Sigma Xi brownbag talk Feb. 9, 2005
34. " The American Physical Society: Section History and Promise," July 27, 2004
Wayne State University, Detroit, Michigan.
33. "Coherent Population Trapping for Clocks and Beyond," June 10, 2004

- Invited talk at the Great Lakes Photonics Symposium, Cleveland, OH.
32. "The role of diffusion in Coherent Population Trapping linewidths," May 25, 2004
C. Y.-T. Wang, M. Klein, I. Novikova, D. F. Phillips, M. Crescimanno, R. L. Walsworth, DAMOP 04 talk
 31. "Modulation-induced frequency shifts in Coherent Population Trapping clocks" May 25, 2004
D. F. Phillips, I. Novikova, C. Y.-T. Wang, M. Crescimanno, R. L. Walsworth, DAMOP 04 talk,
 30. "Modulation-dependent frequency shifts in CPT-based atomic clocks," May 16, 2004
I. Novikova, D. F. Phillips, C. Wang, and R. L. Walsworth and M. Crescimanno, CLEO 2004 conference #CMH5
 29. "A view of modulation-dependence in CPT-based clocks," Apr. 30, 2004
Invited speaker, Walsworth Group Talk, Harvard-Smithsonian Center for Astrophysics
 28. "The Quantum Optics of CPT clocks," Mar. 4, 2004
invited condensed matter colloquium speaker, Ohio University,
 27. "The Lamb-Dicke Kernel and the AC Stark Effect in Optical Coherences," Feb. 13, 2004
Invited speaker, Walsworth Group Talk, Harvard-Smithsonian Center for Astrophysics
 26. "The Fit and the Pendulum: the Quantum Optics of CPT clocks," Nov. 20, 2003
invited colloquium speaker, Case Western Reserve University.
 25. "Fundamental Metrology and Computer Networks," Sept. 19, 2003
invited interviewee for radio talk show, Columbia, Mo.,
 24. "Light shifts in CPT clocks," DAMOP, 2003 poster # J1.187, and #B4.007 May 22, 2003
Colorado University, Boulder, Co.,
 23. "Atomic Physics with Cluster Computing," April 24, 2003
invited speaker at the Cluster Ohio Focus Group meeting, Ohio Supercomputer Center, Columbus, Ohio.
 22. "Physical effects in Computer Networks," March 19, 2003
invited speaker at the regional Association of Computing Machinery (ACM)
 21. "Vortex Matter in BEC," (with J. Anglin), ICAP July 29, 2002 International Conference of Atomic Physics
 20. "Speed of Light Measurement Using *ping*," (with J. Lepak) OSAPS Meeting April 12, 2002
 19. "Bose Condensate Vortex Lattices in the Thomas-Fermi Limit," (With J. Anglin, MIT CUA) OSAPS meeting April 12, 2002
 18. "Information, Entropy and Evolution," invited speaker at the Ohio Supercomputer Center March 12, 2002
 17. "The Lambda System and the Gauged WZNW Model," ITAMP Feb. 07, 2002
 16. "Analytical Estimate of Vortex Pair Nucleation by a Moving Stirrer," May 19, 2001
Division of Atomic, Molecular and Optical Physics of the American Physical Society Meeting, London, Ontario
 15. "Advanced Computation Working Group at YSU," June 6, 2001
to Ohio Supercomputer Delegation, at YSU
 14. "Entropy and Information in the Genome," Joel Lepak and MC April 21, 2001
OSAPS Meeting at KSU.
 13. "The Final State of the Two-Ion Penning Trap," April 21, 2001
OSAPS Meeting at KSU.
 12. "Bose Condensate Critical Velocity; Theoretical Perspectives," Nov. 6, 2000
invited condensed matter colloquium, Case Western Reserve University
 11. "Dilute alkali BEC critical velocity bound," OSAPS, U. Toledo, Oct 13, 2000
 10. "Critical Velocity and Vortex Creation in Bose Condensates," June 26, 2000
Division of Atomic, Molecular and Optical Physics of the American Physical Society Meeting, University of Connecticut

9. "Estimating the Critical Velocity in Trapped Bose Condensates," March 21, and 24, 2000
Harvard-Smithsonian CFA and Massachusetts Institute of Technology, Cambridge, MA.
8. "Critical Velocity from Vortices in Inhomogeneous BEC," June 6, 1999
Gordon Conference on Atomic Physics, Manchester, NH.
7. "Evolution of an Applet: The Autocatalytic Engine," September 30, 1998
ACA and Mellon Foundation Technology Summit, Knoxville
6. "Exotic Four-Dimensional Superconformal Quantum Field Theories," CALTECH March 17, 1997
5. "Large N QCD₂," University of Kentucky and University of Cincinnati, October 30-31, 1995
4. "Dissipation and Quantum Mechanics," Butler University, Ind. November 11, 1994
3. "Black Hole Seismology," Brown University September 30, 1993
2. "Handle Operators In R.C.F.T.'s" U. C. Berkeley May 28, 1993
at the *Strings '93 International Conference*.
1. "Equilibrium Two-Dimensional Dilatonic Spacetimes" April 29, 1993
at the *Workshop on String Theory, Gauge Theory and Quantum Gravity*
I.C.T.P., Trieste, Italy.

National and International Press Citations :

1. Clifford J. Cunningham, "Updating Eratosthenes, " *Mercury* (Astronomical Society of the Pacific), March-April 2003, pg. 10.
2. Marcus Chown, "Tape measure for the Earth," *New Scientist*, 14 September 2002, Pg. 19.
3. Marcus Chown, "Round the World in Milliseconds," *The Guardian* (Manchester), 12 September, 2002.
4. Michael Martin, "Computer Signals Size up the Earth," *News Factor* 19, September, 2002
5. David Schneider, "First Pings First," *American Scientist*, May-June, 2003, pg. 215
6. Michael Martin, "Computer Pings May Measure Light Speed," *Science News Week* (March, 2002) and *Computer Bits Magazine*, June 2002, Vol. 12, #6.
7. Thomas Colthurst, "Speed of Light Measurement Using Ping," *SlashDot.Org*, Tuesday, Jan. 29, 2002. available at
<http://science.slashdot.org/article.pl?sid=02/01/29/2319244&mode=thread>

Michael Crescimanno

Publications

50. "Linear Distributed Bragg Cavity Effects on Optical Limiting in Two- and Three-Level Media," with M. Smotzer, B. Latronica and J. H. Andrews, *Jour. Opt. Soc. Am.* **B** vol 33, #12, E102 (2016).
49. "Experimental Realization of Coherent Perfect Polarization Rotation," with C. Zhou and J. H. Andrews, *Opt. Lett.* Vol. 41, #10, pp. 2201-2204 (2016).
48. "EIT Intensity Correlation Power Broadening in a Buffer Gas," with A. Zheng, A. Green and S. O'Leary, *Phys. Rev. A.* **93**, 043825 (2016).
47. "Structure and Symmetry in Coherent Perfect Polarization Rotation," with J. H. Andrews, C. Zhou and M. A. Baker, *Phys. Rev. A* **91**, 013845 (2015).
46. "Chromatic Control in Coextruded Layered Polymer Microlenses," with T. N. Oder, J. H. Andrews, C. Zhou, Joshua B. Petrus, Cory Merlo, Cameron Bagheri, Connor Hetzel, James Tanca-bel, K. D. Singer and E. Baer, *Optics Express* **22** Issue 24, pp.29668-29678 (2014).
45. "Melt-Processed Polymer Multilayer Distributed Feedback Lasers: Progress and Prospects," with J. Andrews, K. Singer and E. Baer, invited review paper in "*Materials Views*", *J. of Polymer Sci.* **B**, Polymer Physics, issue 52(3), pp 251-271 (2014).
44. "Thermo-spectral properties of plastic lasers", with Nathan J. Dawson , Michael Aviles , James H. Andrews, Joshua B. Petrus , Anthony Mazzocco, Kenneth D. Singer, Eric Baer and Hyunmin Song, in conference proceedings of *SPIE Nanophotonics and Macrophotonics for Space Environments VII*, 25 August 2013, San Diego, California, USA
43. "Modeling off-resonant nonlinear-optical cascading in mesoscopic thin films and guest-host molecular systems," with N. Dawson and J. Andrews, *Phys. Rev. A* **88**, 063831 (2013).
42. "Thermo-spectral study of all-polymer multilayer lasers," with James H. Andrews, Michael Aviles, Nate Dawson, Josh Petrus, Anthony Mazzocco, Kenneth D. Singer, Eric Baer, Hyunmin Song, *Optics Materials Express*, **3**, 1152-1160 (2013).
41. "Post-Process Tunability of Folded One-Dimensional All-Polymer Photonic Crystal Microcavity Lasers," with Nathan Dawson, Kenneth D. Singer, James H. Andrews, Guilin Mao, Joshua Petrus, Hyunmin Song, Eric Baer, *Non-Linear Optics and Quantum Optics*, Vol. 45, #1-2 pp. 101-111, (2012).
40. "Coherent Perfect Rotation," with Nate Dawson and Jim Andrews, *Phys. Rev. A.*, **86**, 031807(R) (2012).
39. "Folding flexible co-extruded all-polymer multilayer distributed feedback films to control lasing," with James H. Andrews, Nathan J. Dawson, Guilin Mao, Joshua B. Petrus, Kenneth D. Singer, Eric Baer, Hyunmin Song, *Optics Express* **20**, #14, pp. 15580-15588 (2012).
38. "The role of group velocity delay in Faraday rotation in a multilayer polymer lattice," with Guilin Mao, James H. Andrews, Kenneth D. Singer, Eric Baer, Anne Hiltner, Hyunmin Song, Kyle Comeau, Bijayandra Shakya, Aaron Bishop, and Ryan Livingston, *J. Opt. Soc. Am. B* **29**, Iss. 5, pp. 1038-1047 (2012).

37. “Co-extruded mechanically tunable multilayer elastomer laser,” with Guilin Mao, James Andrews, Kenneth D. Singer, Eric Baer, Anne Hiltner, Hyunmin Song, and Bijayandra Shakya, *Optical Materials Express*, **Vol. 1**, Issue 1, pp. 108-114 (2011).
36. “Electromagnetically induced transparency with noisy lasers,” with Yanhong Xiao, Tun Wang, Maria Baryakhtar, Mackenzie Van Camp, Michael Hohensee, Liang Jiang, David F. Phillips, Mikhail D. Lukin, Susanne F. Yelin, and Ronald L. Walsworth, *Phys. Rev. A* **80**, 041805(R) (2009).
35. “Optical wave transport and localization in disordered photonic crystal waveguides,” with Juraj Topolancik, Frank Vollmer and Rob Ilic, *Conference on Lasers and Electro-Optics (CLEO)*, pg. CTuDD3, (2009).
34. “Out-of-plane scattering from vertically asymmetric photonic crystal slab waveguides with in-plane disorder,” with Juraj Topolancik, Frank Vollmer and Rob Ilic, *Optics Express* **17**, #15, pp. 12470-12480 (2009).
33. “The N+CPT clock resonance,” with M. Hohensee, *J. Opt. Soc. Am. B.* **25** #12 2130-2139 (2008).
32. “Linear frictional forces cause orbits to neither circularize nor precess,” with B. Hamilton, arXiv 0708.3827 *J. Phys. A: Math. Theor.* **41** #13 235205 (2008).
31. “Lineshape Asymmetry for joint CPT- and N-resonances,” with C. Hancox, M. Hohensee, D. F. Phillips, and R. L. Walsworth, *Opt. Lett.* **33** #13, 1536–1538 (2008), arXiv 0805.3384v1
30. “Modulation-associated AC stark effect in CPT-based atomic clock,” with D. F. Phillips, I. Novikova, Y. Xiao, and R. L. Walsworth, in review.
29. “Classifying N=2 superconformal field theories with two-dimensional coloumb branches,” hep-th/0504070 , with P. Argyres, A. S. Shapere and J. Wittig, to appear in the International Journal of High Energy Physics.
28. ”Modulation induced frequency shifts in a CPT-based atomic clock,” with D. F. Phillips, I. Novikova, C. Wang, and R. L. Walsworth, *J. Opt. Soc. Am. B* **22** #2, 305 (2005).
27. “Inhomogeneous vortex matter,” with J. Anglin, cond-mat/0210063, submitted to *Phys. Rev. Lett.*
26. “Measuring the earth with *traceroute*,” with S. Kicovic and L. Webb, physics/0208087 , accepted for publication in *Journal of Geography*.
25. “Speed of light measurement using *ping*,” with J. Lepak, physics/0201053, submitted to *The American Journal of Physics*.
24. “Solution to the two identical ion Penning trap final state,” with W. Blackburn, T. L. Brown, E. Cozzo and B. Moyers, *Phys. Rev. A* **64**, 055401 (2001)
23. “Spectral equivalence of bosons and fermions in one-dimensional harmonic potentials,” (with A. Landsberg, Claremont-McKenna Colleges), *Phys. Rev. A* **63**, 035601 (2001).
22. “Analytical estimate of the critical velocity for vortex creation in trapped Bose condensates,” (with two undergraduate students C. G. Koay and R. Peterson and also with R. Walsworth at the Harvard-Smithsonian CFA), *Phys. Rev. A* **62**, 063612 (2000).
21. “Limits to sympathetic evaporative cooling of a two-component Fermi gas,” (with C. G. Koay and R. Peterson), *Phys. Rev. A* **61**, 053602 (2000).

20. "Evaluation of the free energy of two-dimensional Yang-Mills theory," (with S. Naculich and H. Schnitzer), *Phys. Rev D* **54**, 1809 (1996).
19. "Large N universality of the two-dimensional Yang-Mills string," (with S. Naculich and H. Schnitzer), *Nuclear Physics* **B446**, 3 (1995).
18. "Universal aspects of two-dimensional Yang-Mills theory at large N ," (with H. Schnitzer), *Int. J. Mod. Phys.* **A11** (1996) 1733.
17. "Large N phases of chiral QCD₂," (with W. Taylor), *Nuclear Physics* **B437**, 3 (1995).
16. "Towards a semiclassical seismology of black holes," *Physical Review* **D50** (1994) 3954.
15. "Handle operators in R.C.F.T.," published in *STRINGS '93*, ed. M. B. Halpern, G. Rivlis and A. Sevrin, (World Scientific, Singapore), 1995, pp. 53-56.
14. "Equilibrium two-dimensional dilatonic spacetimes," *Physical Review* **D47** (1993) 4483.
13. "Einstein gravity in 2 + 1 dimensions from a gauge model with symmetry breaking" (with R. Brooks and D. Cangemi), MIT preprint CTP#2129, submitted to *Physical Review Letters*.
12. "Handle operators of coset models," *Modern Physics Letters* **A8** (1993) 1877.
11. "Adiabaticity in the Hamiltonian functional integral," (with undergraduate student H. Masud Haq), *Annals of Physics* **225** (1993) 48.
10. "Quantum mechanics and thermal noise in dissipative systems," *Annals of Physics* **223**, 229 (1993).
9. "Fusion potentials for G_K and handle squashing," *Nuclear Physics* **B393** (1993) 361.
8. "Geometry and duality of a non-Abelian coset model," *Modern Physics Letters* **A7** (1992) 489.
7. "Monopoles, modular invariance and Chern–Simons field theory" (with S. A. Hotes), *Nuclear Physics* **B372** (1992) 683.
6. "Topics in low-dimensional field theory," Preprint LBL-30676, Ph. D. Thesis.
5. "Classical W -algebras and non-Abelian parafermions," (with K. Bardakci and S. A. Hotes), *Physics Letters* **B257** (1991) 313.
4. "Parafermions from non-Abelian coset models," (with K. Bardakci and S. A. Hotes), *Nuclear Physics* **B349** (1991) 439.
3. "Exactness of the supersymmetric JWKB quantization formula," *Journal of Mathematical Physics* **31** (1990) 2946.
2. "Parafermions from coset models," (with K. Bardakci and E. Rabinovici), *Nuclear Physics* **B344** (1990) 334.
1. "Monopole backgrounds on the world sheet," (with K. Bardakci), *Nuclear Physics* **B313** (1989) 269.

Service Beyond YSU:

Chair, Theoretical Atomic Molecular and Optical Community (TAMOC) (2014-2016)
 American Physical Society, Ohio Section, Awards Committee (2008-)
 Board Member, ALPhA, the Advanced Laboratory Physics Association, AAPT. (2007-2009)
 American Physical Society, Ohio Section, Board Member-at-Large (2004-2005)
 American Physical Society, Ohio Section, President (2003-2004)
 American Physical Society, Ohio Section, Vice President (2002-2003)
 Referee for scientific journals including PRA, PRL, JOSA B, Opt. Lett.