Curriculum Vitae: Alexander L. Gaeta

Address

Department of Applied Physics and Applied Mathematics
Columbia University
500 W. 120th St.
Mudd 200, MC 4701
New York, NY 10027
phone: 212-854-6564
e-mail: a.gaeta@columbia.edu

Education

B. S. (1983), M. S. (1985), and Ph. D (1991). in Optics, University of Rochester, Rochester, New York; *Doctoral Thesis Title*: Stochastic and deterministic fluctuations in stimulated Brillouin scattering; *Advisor*: Professor R. W. Boyd.

Research Interests

Ultrafast nonlinear optics, nanophotonics, nonlinear propagation in fibers and bulk media, photonic crystal fibers, optical frequency combs, coherent interactions of laser light with matter, application of nonlinear optics to quantum information, stimulated scattering processes.

Professional Positions

Academic

David M. Rickey Professor of Applied Physics, Columbia University, 2015-.

Samuel B. Eckert Professor of Engineering, School of Applied and Engineering Physics, Cornell University, 2013-2015.

Director, School of Applied and Engineering Physics, Cornell University, 2011 - 2014.

Director, NSF Center for Nanoscale Systems in Information Technologies, Cornell University, 2007-2012.

Professor, School of Applied and Engineering Physics, Cornell University, 2004 - 2013.

Associate Director, School of Applied and Engineering Physics, Cornell University, 2006 - 2007.

Director of Graduate Studies, School of Applied and Engineering Physics, Cornell University, 1999 - 2004.

Associate Professor, School of Applied and Engineering Physics, Cornell University, 1998 - 2004.

Assistant Professor, School of Applied and Engineering Physics, Cornell University, 1992 - 1998.

Postdoctoral Associate, Institute of Optics, University of Rochester, 1990 - 1992.

Commercialization

Co-founded (w/ Michal Lipson and Alex Cable) PicoLuz, Inc., 2010.

Service

Selected Editorial Roles

Editor-in-Chief, *Optica*, Optical Society of America (2013 -).

Editorial Board, *New Journal of Physics*, 2005 - 2008.

Selected Research Administration and Service to Societies
Member, Long-Term Publications Group, Optical Society of America, 2010-2012.

Director-at-Large, Board of Directors, Optical Society of America, 2008-2010

I. I. Rabi Prize Committee of the American Physical Society, 2007-2010.

Member, Strategic Planning Committee, Optical Society of America, 2006-2008.

Chair, Science and Engineering Council Optical Society of America, 2004-2006.

Executive Committee, Member-at-Large, Division of Laser Science, American Physical Society, 2004-2005.

Chair, Division of Quantum Electronics, Optical Society of America, term 2000-2002.

Selected Conference Organization
Program Chair, Nonlinear Photonics Topical Meeting, July, 2014, Barcelona.

General Chair, Nonlinear Optics Topical Meeting, August 2009, Hawaii.

General Chair, 2007 Quantum Electronics and Laser Science Conference, Baltimore.

Program Chair, Nonlinear Optics Topical Meeting, August 2007, Hawaii.

Program Chair, 2005 Quantum Electronics and Laser Science Conference, Baltimore, MD.

Chair, Frontiers in Optics 2003: Annual Meeting of the Optical Society of America, Tucson, AZ.

Mentorship

PhD Students Supervised

Imad Agha (University of Dayton), Amar Bhagwat (Northwestern), Daniel Broaddus, Prathamesh Donvalkar (OEWaves), Alessandro Farsi (Psi Quantum), Mark Foster (Johns Hopkins), Saikat Ghosh (IIT - Kanpur), Taylor Grow (Coherent Technologies), Chris Hensley (IMRA, Inc.), Doug Homoelle (Lawrence Livermore), Adrea Johnson (Honeywell), Mary Lanzerotti (Air Force Academy), Ryan Lau, Kevin Moll (Precision Photonics), Yoshi Okawachi (Columbia), Dimitre Ouzounov (Cornell), Jinendra Ranka (Trex Enterprises), Kasturi Saha (IIT-Bombay), Robert Schirmer (Applied Physics Labs), Samuel Schrauth (LLNL), Vivek Venkataraman (Harvard), Luat Vuong (CUNY - Queens), Henry Wen (Oxford College), Stephan Wielandy (Lucent-Alcatel)

Postdoctoral Associates Supervised

Alessandro Farsi (Psi Quantum), Stephane Clemmen (Ghent), Mark Foster (Johns Hopkins), Moti Fridman (Bar Ilan), David Geraghty (Stanford), Amiel Ishaaya (Ben Gurion), Onur Kuzucu (Middle East Technical University), Michael Lamont, Pablo Londero (Yale), Sven Ramelow (Humboldt University -Berlin), Reza Salem (PicoLuz), Jay Sharping (Univ. California – Merced), Bonggu Shim (SUNY – Binghamton), Aaron Slepkov (Trent University), Alexandre Streltsov (Corning, Inc.)

Publications [Total citations: >21,000, *h*-index: 75 (Google Scholar)]

1. A. Dutt, C. Joshi, X. Ji, J. Cardenas, Y. Okawachi, K. Luke, A. L. Gaeta, and M. Lipson, "On-chip dual comb source for spectroscopy," *Science Adv.* **4**, e1701858 (2018).
2. C. Joshi, A. Farsi, S. Clemmen, S. Ramelow, and A. L. Gaeta, "Frequency multiplexing for quasi-deterministic heralded single-photon sources," *Nature Comm.* **9**, 847 (2018).

3. C. Joshi, A. Klenner, Y. Okawachi, M. Yu, K. Luke, X. Ji, M. Lipson, and A. L. Gaeta, "Counter-rotating cavity solitons in a silicon nitride microresonator," *Opt. Lett.* **43**, 547 (2018).

4. Y. Okawachi, M. Yu, J. Cardenas, X. Ji, M. Lipson, and A. L. Gaeta, "Coherent, directional supercontinuum via cascaded dispersive wave generation," *Opt. Lett.* **42**, 4466 (2017).

5. M. Yu, Y. Okawachi, A. G. Griffith, M. Lipson, and A. L. Gaeta, "Microresonator-based high resolution gas spectroscopy," *Opt. Lett.* **42**, 4442 (2017).

6. Y. Okawachi, M. Yu, V. Venkataraman, P. M. Latawiec, A. G. Griffith, M. Lipson, M. Loncar, and A. L. Gaeta, "Competition between Raman and Kerr effects in microresonator comb generation, *Opt. Lett.* **42**, 2086 (2017).

7. S. A. Miller, M. Yu, X. Ji, A. G. Griffith, J. Cardenas, A. L. Gaeta, and M. Lipson, "Low-loss silicon platform for broadband mid-infrared photonics," *Optica* **4**, 707 (2017).

8. X. Ji, F. A. S. Barbosa, S. P. Roberts, A. Dutt, J. Cardenas, Y. Okawachi, A. Bryant, A. L. Gaeta, and M. Lipson, "Ultra-low-loss on-chip resonators with sub-milliwatt parametric oscillation threshold," *Optica* **4**, 619 (2017).

9. M. Yu, J. K. Jang, Y. Okawachi, A. G. Griffith, K. Luke, S. A. Miller, X. Ji, M. Lipson, and A. L. Gaeta, "Breather soliton dynamics in microresonators," *Nature Comm.*, **8**, 14569 (2017).

10. X. Gao, G. Patwardhan, S. Schrauth, D. Zhu, T. Popmintchev, H. C. Kapteyn, M. M. Murnane, D. A. Romanov, R. J. Levis, and A. L. Gaeta, "Picosecond ionization dynamics in femtosecond filaments at high pressures," *Phys. Rev. A* **95**, 013412 (2017).

11. S. Clemmen, A. Farsi, S. Ramelow, and A. L. Gaeta, "Ramsey interference with single photons," *Phys. Rev. Lett.* **117**, 223601 (2016).

12. Y. H. Wen, M. R. E. Lamont, S. H. Strogatz, and A. L. Gaeta, "Self-organization in Kerr-cavity-soliton formation in parametric frequency combs," *Phys. Rev. A* **94**, 063843 (2016).

13. J. K. Jang, Y. Okawachi, M. Yu, K. Luke, X. Ji, M. Lipson, and A. L. Gaeta, "Dynamics of mode-coupling-induced microresonator frequency combs in normal dispersion," *Opt. Express* **24**, 28794 (2016).

14. A. S. Mayer, C. R. Phillips, C. Langrock, A. Klenner, A. R. Johnson, K. Luke, Y. Okawachi, M. Lipson, A. L. Gaeta, M. M. Fejer, and U. Keller, "Offset-free gigahertz mid-infrared frequency comb based on optical parametric amplification in a periodically poled lithium niobate waveguide," *Phys. Rev. Applied* **6**, 054009 (2016).

15. Y. Okawachi, M. Yu, K. Luke, D. O. Carvalho, M. Lipson, and A. L. Gaeta, "Quantum random number generator using a microresonator-based Kerr oscillator," *Opt. Lett.* **41**, 4194 (2016).

16. R. I. Grynko, D. L. Weerawarne, X. Gao, H. Liang, H. J. Meyer, K.-H. Hong, A. L. Gaeta, and B. Shim, "Inhibition of multi-filamentation of high power laser beams," *Opt. Lett.* **41**, 4064 (2016).

17. M. Yu, Y. Okawachi, A. G. Griffith, M. Lipson, and A. L. Gaeta, "Modelocked mid-infrared frequency combs in a silicon microresonator," *Optica* **3**, 854 (2016).

18. A. G. Griffith, M. Yu, Y. Okawachi, J. Cardenas, A. Mohanty, A. L. Gaeta, and M. Lipson, "Coherent mid-infrared frequency combs in silicon-microresonators in the presence of Raman effects," *Opt. Express* **24**, 13044 (2016).

19. C. Joshi, J. K. Jang, K. Luke, X. Ji, S. A. Miller, A. Klenner, Y. Okawachi, M. Lipson, and A. L. Gaeta, "Thermally controlled comb generation and soliton modelocking in microresonators," *Opt. Lett.* **41**, 2565 (2016).

20. A. Klenner, A. S. Mayer, A. R. Johnson, K. Luke, M. R. E. Lamont, Y. Okawachi, M. Lipson, A. L. Gaeta, and U. Keller, "Gigahertz frequency comb offset stabilization based on supercontinuum generation in silicon nitride waveguides," *Opt. Express* **24**, 11043 (2016).

21. A. Dutt, S. Miller, K. Luke, J. Cardenas, A. L. Gaeta, P. Nussenzveig, and M. Lipson, "Tunable squeezing using coupled ring resonators on a silicon nitride chip," *Opt. Lett.* **41**, 223 (2016).

22. D. Popmintchev,C. Hernández-García, F. Dollar, C. Mancuso, J. A. Pérez-Hernández, M.-C. Chen, A. Hankla, X. Gao, B. Shim, A. L. Gaeta, M. Tarazkar, D. A. Romanov, R. J. Levis, J. A. Gaffney, M. Foord, S. B. Libby, A. Jaron-Becker, A. Becker, L. Plaja, M. M. Murnane, H. C. Kapteyn, T. Popmintchev, "Ultraviolet surprise: Efficient soft x-ray high-harmonic generation in multiply ionized plasmas," *Science* **4**, 1225 (2015).

23. P. S. Donvalkar, S. Ramelow, S. Clemmen, and A. L. Gaeta, "Continuous generation of Rubidium vapor in hollow-core photonic bandgap fibers," *Opt. Lett.* **40**, 5379 (2015).

24. Y. Okawachi, M. Yu, K. Luke, D. O. Carvalho, S. Ramelow, A. Farsi, M. Lipson, and A. L. Gaeta, "Dual-pumped degenerate Kerr oscillator in a silicon nitride microresonator," *Opt. Lett.* **40**, 5267 (2015).

25. A. R. Johnson, A. S. Mayer, A. Klenner, K. Luke, E. S. Lamb, M. R. E. Lamont, C. Joshi, Y. Okawachi, F. W. Wise, M. Lipson, U. Keller, and A. L. Gaeta, "Octave-spanning coherent supercontinuum generation in a silicon nitride waveguide," *Opt. Lett.* **40**, 5117 (2015).

26. K. Luke, Y. Okawachi, M. R. E. Lamont, A. L. Gaeta, and M. Lipson, "Broadband mid-infrared frequency comb generation in a Si_3N_4 microresonator," *Opt. Lett.* **40**, 4823 (2015).

27. J. Cardenas, M. Yu, Y. Okawachi, C. B. Poitras, R. K. W. Lau, A. Dutt, A. L. Gaeta, and M. Lipson, "Optical nonlinearities in high-confinement silicon carbide waveguides," *Opt. Lett.* **40**, 4138 (2015).

28. S. A. Miller, Y. Okawachi, S. Ramelow, K. Luke, A. Dutt, A. Farsi, A. L. Gaeta, and M. Lipson, "Tunable frequency combs based on dual microring resonators," *Opt. Express* **23**, 21527 (2015).

29. R. K. W. Lau, M. R. E. Lamont, Y. Okawachi, and A. L. Gaeta, "Effects of multiphoton absorption on parametric comb generation in silicon microresonators," *Opt. Lett.* **40**, 2778 (2015).

30. A. S. Mayer, A. Klenner, A. R. Johnson, K. Luke, M. R. E. Lamont, Y. Okawachi, M. Lipson, A. L. Gaeta, and U. Keller, "Frequency comb offset detection using supercontinuum generation in silicon nitride waveguides," *Opt. Express* **23**, 15440 (2015).

31. A. Dutt, K. Luke, S. Manipatruni, A. L. Gaeta, P. Nussenzveig, and M. Lipson, "On-chip optical squeezing," *Phys. Rev. Applied* **3**, 044005 (2015).

32. A. G. Griffith, R. K W. Lau, J. Cardenas, Y. Okawachi, A. Mohanty, R. Fain, Y. H. D. Lee, M. Yu, C. T. Phare, C. B. Poitras, A. L. Gaeta, and M. Lipson, "Silicon-chip mid-infrared frequency comb generation," *Nature Comm.* **6**, 6299 (2015).

33. M. Fridman, Y. Okawachi, S. Clemmen, M. Menard, M. Lipson, A. L. Gaeta, "Waveguide-based single-shot temporal cross-correlator," *J. Opt.* **17**, 035501 (2015).

34. D. L. Weerawarne, B. Shim, X. Gao, and A. L. Gaeta "Higher-order nonlinearities revisited and their effect on harmonic generation," *Phys. Rev. Lett.* **114**, 093901 (2015).

35. S. Miller, K. Luke, Y. Okawachi, J. Cardenas, A. L. Gaeta, and M. Lipson, "On-chip frequency comb generation at visible wavelengths via simultaneous second- and third-order optical nonlinearities," *Opt. Express* **22**, 26517 (2014).

36. S. Ramelow, A. Farsi, S. Clemmen, J. S. Levy, A. R. Johnson, Y. Okawachi, M. R. E. Lamont, M. Lipson, and A. L. Gaeta, "Strong polarization mode coupling in microresonators," *Opt. Lett.* **39**, 5134 (2014).

37. R. K. W. Lau, M. R. E. Lamont, A. Griffith, Y. Okawachi, M. Lipson, and A. L. Gaeta, "Octave-spanning mid-infrared supercontinuum generation in silicon nanowaveguides," *Opt. Lett.* **39**, 4518 (2014).

38. Y. Okawachi, M. R. E. Lamont, K. Luke, D. O. Carvalho, M. Yu, M. Lipson, and A. L. Gaeta, "Bandwidth shaping of microresonator-based frequency combs via dispersion engineering," *Opt. Lett.* **39**, 3535 (2014).

39. P. S. Donvalkar, V. Venkataraman, S. Clemmen, K. Saha, and A. L. Gaeta, "Frequency translation via four-wave mixing Bragg scattering in Rb filled photonic bandgap fibers," *Opt. Lett.* **39**, 1557 (2014).

40. A. R. Johnson, Y. Okawachi, M. R. E. Lamont, J. S. Levy, M. Lipson, and A. L. Gaeta, "Microresonator-based comb generation without an external laser source," *Opt. Express* **22**, 1394 (2014).

41. M. Lamont, Y. Okawachi, and A. L. Gaeta, "Route to stabilized ultrabroadband microresonator-based frequency combs," *Opt. Lett.* **38**, 3478 (2013).

42. D. J. Moss, R. Morandotti, A. L. Gaeta, and M. Lipson, "New CMOS-compatible platforms based on silicon nitride and Hydex for nonlinear optics," *Nature Phot.* **7**, 597 (2013).

43. R. Salem, M. A. Foster, and A. L. Gaeta, "The application of space-time duality to ultrahigh speed optical signal processing," *Adv. Opt. Phot.* **5**, 274 (2013).

44. V. Venkataraman, K. Saha, and A. L. Gaeta, "Phase modulation at the few-photon level for weak-nonlinearity-based quantum computing," *Nature Phot.* **7**, 138 (2013).

45. K. Saha, Y. Okawachi, B. Shim, J. S. Levy, R. Salem, A. R. Johnson, M. A. Foster, M. R. E. Lamont, M. Lipson, and A. L. Gaeta, "Modelocking and femtosecond pulse generation in chip-based frequency combs," *Opt. Express* **21**, 1335 (2013).

46. Y. Okawachi, R. Salem, A. R. Johnson, K. Saha, J. S. Levy, M. Lipson, and A. L. Gaeta, "Asynchronous single-shot characterization of high-repetition-rate ultrafast waveforms using a time-lens-based temporal magnifier," *Opt. Lett.* **37**, 4892 (2012).

47. K. Saha, Y. Okawachi, J. S. Levy, K. Luke, R. K. W. Lau, M. A. Foster, M. Lipson, and A. L. Gaeta, "Broadband parametric frequency comb generation with a 1-μm pump source," *Opt. Express* **20**, 26935 (2012).

48. S. Clemmen and A. L. Gaeta, "Applied Physics: Brighter images with no added noise," *Nature* **491**, 202 (2012).

49. J. S. Levy, K. Saha, Y. Okawachi, M. A. Foster, A. L. Gaeta, and M. Lipson, "High-performance silicon-nitride-based multiple-wavelength source," *Photon. Tech. Lett.* **24**, 1375 (2012).

50. T. Popmintchev, M.-C. Chen, D. Popmintchev, P. Arpin, S. Brown, S. Alisauskas, G. Andriukaitis, T. Balciunas, O. D. Mucke, A. Pugzlys, A. Baltuska, B. Shim, S. E. Schrauth, A. L. Gaeta, C. Hernandez-Garcia, L. Plaja, A. Becker, A. Jaron-Becker, M. M. Murnane, H. C. Kapteyn, "Bright coherent ultrahigh harmonics in the keV X-ray regime from mid-infrared femtosecond lasers," *Science* **336**, 1287 (2012).

51. Y. H. Wen, O. Kuzucu, M. Fridman, A. L. Gaeta, L.-W. Luo, and M. Lipson, "All-optical control of an individual resonance in a silicon microresonator," *Phys. Rev. Lett.* **108**, 223907 (2012).

52. R. Halir, Y. Okawachi, J. S. Levy, M. A. Foster, M. Lipson, and A. L. Gaeta, "Ultrabroadband supercontinuum generation in a CMOS-compatible platform," *Opt. Lett.* **37**, 1685 (2012).

53. Y. Okawachi and A. L. Gaeta, "Nonlinear photonics: Compressing light and sound," *Nature Phot.* **6**, 274 (2012).

54. Y. Okawachi, A. L. Gaeta, and M. Lipson, "Breakthroughs in nonlinear silicon photonics 2011," *IEEE Photon. J.* **4**, 601 (2012).

55. N. Ophir, R.K. W. Lau, M. Menard, X. Zhu, K. Padmaraju, Y. Okawachi, R. Salem, M. Lipson, A. L. Gaeta, and K. Bergman, "Wavelength conversion and unicast of 10-Gb/s data spanning up to 700 nm using a silicon nanowaveguide," *Opt. Express* **20**, 6488 (2012).

56. A. R. Johnson, Y. Okawachi, J. S. Levy, J. Cardenas, K. Saha, M. Lipson, and A. L. Gaeta, "Chip-based frequency combs with sub-100-GHz repetition rates," *Opt. Lett.* **37**, 875 (2012).

57. N. Ophir, R.K. W. Lau, M. Menard, R. Salem, K. Padmaraju, Y. Okawachi, M. Lipson, A. L. Gaeta, and K. Bergman, "First demonstration of a 10-Gb/s end-to-end link at 1884 nm based on four-wave mixing of telecom-band RZ data in silicon waveguides," *Photon. Tech. Lett.* **24**, 276 (2012).

58. Y. Okawachi, O. Kuzucu, M. A. Foster, R. Salem, A. C. Turner-Foster, A. Biberman, N. Ophir, K. Bergman, M. Lipson, and A. L. Gaeta, "Characterization of nonlinear optical crosstalk in silicon nanowaveguides," *Photon. Tech. Lett.* **24**, 185 (2012).

59. B. Shim, S. E. Scharauth, A. L. Gaeta, M. Klein, and G. Fibich, "Loss of phase of collapsing beams," *Phys. Rev. Lett.* **108**, 043902 (2012).

60. M. Fridman, A. Farsi, Y. Okawachi, and A. L. Gaeta, "Demonstration of temporal cloaking," *Nature* **481**, 62 (2012).

61. V. Venkataraman, K. Saha, P. Londero, and A. L. Gaeta, "Few-photon all-optical modulation in a photonic band-gap fiber," *Phys. Rev. Lett.* **107**, 193902 (2011).

62. Y. Okawachi, K. Saha, J. S. Levy, Y. H. Wen, M. Lipson, and A. L. Gaeta, "Octave-spanning frequency comb generation in a silicon nitride chip," *Opt. Lett.* **36**, 3398 (2011).

63. M. A. Foster, J. S. Levy, O. Kuzucu, K. Saha, M. Lipson, and A. L. Gaeta, "Silicon-based monolithic optical frequency comb source," *Opt. Express* **19**, 14233 (2011).

64. L. Xu, N. Ophir, M. Menard, R. K. W. Lau, A. C. Turner-Foster, M. A. Foster, M. Lipson, A. L. Gaeta, and K. Bergman, "Simultaneous wavelength conversion of ASK and DPSK signals based on four-wave-mixing in dispersion engineered silicon waveguides," *Opt. Express* **19**, 12172 (2011).

65. J. S. Levy, M. A. Foster, A. L. Gaeta, and M. Lipson, "Harmonic generation in silicon nitride ring resonators," *Opt. Express* **19**, 11415 (2011).

66. M. A. Foster, R. Salem, and A. L. Gaeta, "Ultrahigh-speed optical processing using space-time duality," *Opt. Photon. News* **22**, 29 (2011).

67. E. Y. Morales Teraoka,T. Kita, D. H. Broaddus, A. Tsukazaki, M. Kawasaki, A. L. Gaeta, and H. Yamada, "Analysis of the nonlinear optical parameter of ZnO channel waveguides," *Jpn. J. Appl. Phys.* **50**, 04DG01 (2011).

68. P. Londero, O. Kuzucu, and A. L. Gaeta, "Spectral amplitude and phase measurement of ultrafast pulses using all-optical differential tomography," *Opt. Lett.* **36**, 1686 (2011).

69. S. E. Schrauth, B. Shim, A. D. Slepkov, L. T. Vuong, A. L. Gaeta, N. Gavish, and G. Fibich, "Pulse splitting in the anomalous group-velocity dispersion regime," *Opt. Express* **19**, 9157 (2011).

70. B. Shim, S. E. Schrauth, L. T. Vuong, Y. Okawachi, and A. L. Gaeta, "Dynamics of elliptical beams in the anomalous group-velocity dispersion regime," *Opt. Express* **19**, 9139 (2011).

71. B. Shim, S. E. Schrauth, and A. L. Gaeta, "Filamentation in air with ultrashort mid-infrared pulses," *Opt. Express* **19**, 9118 (2011).

72. Y. H. Wen, O. Kuzucu, T. Hou, M. Lipson, and A. L. Gaeta, "All-optical switching of a single resonance in silicon ring resonators," *Opt. Lett.* **36**, 1413 (2011).

73. K. Saha, V. Venkataraman, P. Londero, and A. L. Gaeta, "Enhanced two-photon absorption in a hollow-core photonic-band-gap fiber," *Phys. Rev. A* **83**, 033833 (2011).

74. R. K. W. Lau, M. Ménard, Y. Okawachi, M. A. Foster, A. C. Turner-Foster, R. Salem, M. Lipson, and A. L. Gaeta, "Continuous-wave mid-infrared frequency conversion in silicon nanowaveguides," *Opt. Lett.* **36**, 1262 (2011).

75. N. Ophir, J. Chan, K. Padmaraju, A. Biberman, A. C. Foster, M. A. Foster, M. Lipson, A. L. Gaeta, and K. Bergman, "Continuous wavelength conversion of 40-Gb/s data over 100 nm using a dispersion-engineered silicon waveguide," *Photon. Tech. Lett.* **23**, 73 (2011).

76. J. Cardenas, M. A. Foster, N. Sherwood-Droz, C. B. Poitras, H. L. R. Lira, B. Zhang, A. L. Gaeta, J. B. Khurgin, P. Morton, and M. Lipson, "Wide-bandwidth continuously tunable optical delay line using silicon microring resonators," *Opt. Express* **18**, 26525 (2010).

77. Y. Zhu, E. Cabrera-Granado, O. G. Calderon, S. Melle, Y. Okawachi, A. L. Gaeta, and D. J. Gauthier, "Competition between the modulation instability and stimulated Brillouin scattering in a broadband slow light device," *J. Opt.* **12**, 104019 (2010).

78. E. Y. Morales-Teraoka, D. H. Broaddus,T. Kita, A. Tsukazaki, M. Kawasaki, A. L. Gaeta, and H. Yamada, "Self-phase modulation at visible wavelengths in nonlinear ZnO channel waveguides," *Appl. Phys. Lett.* **97**, 071105 (2010).

79. A. Biberman, B. G. Lee, A. C. Turner-Foster, M. A. Foster, M. Lipson, A. L. Gaeta, and K. Bergman, "Wavelength multicasting in silicon photonic nanowires," *Opt. Express* **17**, 18047 (2010).

80. V. Venkataraman, P. Londero, A.R. Bhagwat, A. D. Slepkov, and A. L. Gaeta, "All-optical modulation of four wave mixing in Rb-filled photonic band-gap fiber," *Opt. Lett.* **35**, 2287 (2010).

81. B. Shim, S. E. Schrauth, C. J. Hensley, L. T. Vuong, P. Hui, A. A. Ishaaya, and A. L. Gaeta, "Controlled interactions of femtosecond light filaments in air," *Phys. Rev. A* **81**, 061803(R) (2010).

82. D. H. Broaddus, M. A. Foster, O. Kuzucu, A. C. Turner-Foster, K. W. Koch, M. Lipson, and A. L. Gaeta, "Temporal-imaging system with simple external-clock triggering," *Opt. Express* **18**, 14262 (2010).

83. A. D. Slepkov, A. R. Bhagwat, V. Venkataraman, P. Londero, and A. L. Gaeta, "Spectroscopy of Rb atoms in hollow-core fibers," *Phys. Rev. A* **81**, 053825 (2010).

84. A. C. Turner-Foster, M. A. Foster, J S. Levy, C. B. Poitras, R. Salem, A. L. Gaeta, and M. Lipson, "Ultrashort free-carrier lifetime in low-loss silicon nanowaveguides," *Opt. Express* **18**, 3582 (2010).

85. A. C. Turner-Foster, M. A. Foster, R. Salem, A. L. Gaeta, and M. Lipson, "Frequency conversion over two-thirds of an octave in silicon nanowaveguides," *Opt. Express* **18**, 1904-1908 (2010).

86. Y. Dai, Y. Okawachi, A. C. Turner-Foster, M. Lipson, A. L. Gaeta, and C. Xu, "Ultralong continuously tunable parametric delays via a cascading discrete stage," *Opt. Express* **18**, 333 (2010).

87. J. S. Levy, A. Gondarenko, M. A. Foster, A. C. Turner-Foster, A. L. Gaeta, and M. Lipson, "CMOS-compatible multiple-wavelength oscillator for on-chip optical interconnects," *Nature Photonics* **4**, 37 (2010).

88. M. A. Foster, R. Salem, D. F. Geraghty, A. C. Turner-Foster, M. Lipson, and A. L. Gaeta, "Ultrafast measurements using a silicon-chip-based temporal lens," ***Optics in 2009*** in *Optics and Photonics News*, **20**, 40 (2009).

89. O. Kuzucu, Y. Okawachi, R. Salem, M. A. Foster, A. C. Turner-Foster, M. Lipson, and A. L. Gaeta, "Spectral phase conjugation via temporal imaging," *Opt. Express* **17**, 20605 (2009).

90. A. A. Ishaaya, C. J. Hensley, B. Shim, S. Schrauth, K. W. Koch, and A. L. Gaeta, "Highly-efficient coupling of linearly- and radially-polarized femtosecond pulses in hollow-core photonic band-gap fibers," *Opt. Express* **17**, 18630 (2009).

91. M. A. Foster, R. Salem, Y. Okawachi, A. C. Turner-Foster, M. Lipson, and A. L. Gaeta, "Ultrafast waveform compression using a time-domain telescope," *Nature Phot.* **3**, 581 (2009).

92. I. H. Agha, Y. Okawachi, and A. L. Gaeta, "Theoretical and experimental investigation of broadband cascaded four-wave mixing in high-Q microspheres," *Opt. Express* **17**, 16209 (2009).

93. Y. Dai, X. Chen, Y. Okawachi, A. C. Turner-Foster, M. A. Foster, M. Lipson, A. L. Gaeta, and C. Xu, "1 μs tunable delay using parametric mixing and optical phase conjugation in Si waveguides: reply," *Opt. Express* **17**, 16029 (2009).

94. P. Londero, V. Venkataraman, A.R. Bhagwat, A. D. Slepkov, and A. L. Gaeta, "Ultralow-power four-wave mixing with Rb in a hollow-core photonic band-gap fiber," *Phys. Rev. Lett.* **103**, 043602 (2009).

95. A.R. Bhagwat, A. D. Slepkov, V. Venkataraman, P. Londero, and A. L. Gaeta, "On-demand all-optical generation of controlled Rb-vapor densities in photonic-band-gap fibers," *Phys. Rev. A* **79**, 063809 (2009).

96. Y. Dai, X. Chen, Y. Okawachi, A. C. Turner-Foster, M. A. Foster, M. Lipson, A. L. Gaeta, and C. Xu, "1 μs tunable delay using parametric mixing and optical phase conjugation in Si waveguides," *Opt. Express* **17**, 7004 (2009).

97. D. H. Broaddus, M. A. Foster, I. H. Agha, J. T. Robinson, M. Lipson, and A. L. Gaeta, "Silicon-waveguide-coupled high-Q chalcogenide microspheres," *Opt. Express* **17**, 5998 (2009).

98. Y. Okawachi, R. Salem, M. A. Foster, A. C. Turner-Foster, M. Lipson, and A. L. Gaeta, "High-resolution spectroscopy using a frequency magnifier," *Opt. Express* **17**, 5691 (2009).

99. R. Salem, M. A. Foster, A. C. Turner-Foster, D. F. Geraghty, M. Lipson, and A. L. Gaeta, "High-speed optical sampling using a silicon-chip temporal magnifier," *Opt. Express* **17**, 4324 (2009).

100. B. G. Lee, A. Biberman, A. C. Turner-Foster, M. A. Foster, M. Lipson, A. L. Gaeta, and K. Bergman, "Demonstration of broadband wavelength conversion at 40 Gb/s in silicon waveguides," *Photon. Technol. Lett.* **21**, 182 (2009).

101. J. D. Marconi, A. Cergueira S. Jr., J. T. Robinson, N. Sherwood-Droz, Y. Okawachi, H. E. Hernandez-Figueroa, M. Lipson, A. L. Gaeta and H. L. Fragnito, "Performance investigation of microphotonic-silicon devices in a field-trial all-optical network," *Opt. Comm.* **282**, 849 (2009).

102. G. M. Gehring, R. W. Boyd, A. L. Gaeta, D. J. Gauthier, and A. E. Willner, "Fiber-based slow-light technologies," *J. Lightwave Technol.* **26**, 3752 (2008).

103. M. A. Foster, R. Salem, D. F. Geraghty, A. C. Turner-Foster, M. Lipson, and A. L. Gaeta, "Silicon-chip-based ultrafast optical oscilloscope," *Nature* **456**, 81 (2008).

104. N. Gavish, G. Fibich, L. T. Vuong, and A. L. Gaeta, "Predicting the filamentation of high-power beams and pulses without numerical integration: A nonlinear geometrical optics method," *Phys. Rev. A* **78** (2008).

105. J. E. Sharping, J. R. Sanborn, M. A. Foster, D. Broaddus, and A. L. Gaeta, "Generation of sub-100-fs-pulses from a microstructure-fiber-based optical parametric oscillator," *Opt. Express* **16**, 18050 (2008).

106. A.C. Turner, M. A. Foster, A. L. Gaeta, and M. Lipson, "Ultra-low power parametric frequency conversion in a silicon microring resonator," *Opt. Express* **16**, 4881 (2008).

107. Y. Okawachi, M. A. Foster, X. P. Chen, A. C. Turner-Foster, R. Salem, M. Lipson, C. Xu, and A. L. Gaeta, "Large tunable delays using parametric mixing and phase conjugation in Si nanowaveguides," *Opt. Express* **16**, 10349 (2008).

108. A.D. Slepkov, A. R. Bhagwat, V. Venkataraman, P. Londero, and A. L. Gaeta, "Generation of large alkali vapor densities inside bare hollow-core photonic band-gap fibers," *Opt. Express* **16**, 18976 (2008).

109. A.R. Bhagwat and A. L. Gaeta, "Nonlinear optics in hollow-core photonic bandgap fibers," (invited paper in the Focus Serial in Nonlinear Optics) *Opt. Express* **16**, 5035 (2008).

110. R. Salem, M. A. Foster, A. C. Turner, D. F. Geraghty, M. Lipson, and A. L. Gaeta, "Optical time lens based on four-wave mixing on a silicon chip," *Opt. Lett.* **33**, 1047 (2008).

111. D. F. Geraghty, R. Salem, M. A. Foster, and A. L. Gaeta, "A simplified optical correlator and its application to packet-header recognition," *Photon. Tech. Lett.* **20**, 487 (2008).

112. Z. H. Zhong, N. M. Gabor, J. E. Sharping, A. L. Gaeta, and P. L. McEuen, "Terahertz time-domain measurement of ballistic electron resonance in a single-walled carbon nanotube," *Nature Nanotechnology* **3**, 201 (2008).

113. M. A. Foster, A. C. Turner, M. Lipson, and A. L. Gaeta, "Nonlinear optics in photonic nanowires," (invited paper in the Focus Serial in Nonlinear Optics) *Opt. Express* **16**, 1300 (2008).

114. L. T. Vuong, R. B. Lopez-Martens, C. P. Hauri, and A. L. Gaeta, "Spectral reshaping and pulse compression via sequential filamentation in gases," *Opt. Express* **16**, 390 (2008).

115. A.A. Ishaaya, L. T. Vuong, T. D. Grow, and A. L. Gaeta, "Self-focusing dynamics of polarization vortices in Kerr media," *Opt. Lett.* **33**, 13 (2008).

116. R. Salem, M. A. Foster, A. C. Turner, D. F. Geraghty, M. Lipson, and A. L. Gaeta, "Signal regeneration using low-power four-wave mixing on silicon chip," *Nature Photonics* **2**, 35 (2008).

117. M. A. Foster, A. C. Turner, R. Salem, D. F. Geraghty, M. Lipson, and A. L. Gaeta, "Broad-band continuous-wave parametric wavelength conversion silicon nanowaveguides," *Opt. Express* **15**, 12949 (2007).

118. Y. Okawachi, R. Salem, and A. L. Gaeta, "Continuous tunable delays at 10 Gbits/s data rates via self-phase modulation and dispersion," *J. Lightwave Tech.* **25**, 3710 (2007).

119. Y. Okawachi, A. D. Slepkov, I. H. Agha, D. F. Geraghty, and A. L. Gaeta, "Absorption of ultrashort pulses in water," *J. Opt. Soc. Am. A* **24**, 3343 (2007).

120. I. H. Agha, Y. Okawachi, M. A. Foster, and A. L. Gaeta, "Four-wave mixing parametric oscillation in dispersion-compensated high-Q silica microspheres," *Phys. Rev. A* **76**, 043837 (2007).

121. Y. Wang, C. Y. Yu, L. S. Yan, A. E. Willner, R. Roussev, C. Langrock, M. M. Fejer, J. E. Sharping, and A. L. Gaeta, "44-ns continuously tunable dispersionless optical delay element using a PPLN waveguide with two-pump configuration, DCF, and a dispersion compensator," *IEEE Phot. Tech. Lett.* **19**, 861 (2007).

122. A.L. Gaeta, "Slow light – putting the brakes on images," *Nature Phot.* **1**, 140 (2007).

123. R. Salem, M. A. Foster, D. F. Geraghty, A. L. Gaeta, A. C. Turner, and M. Lipson, "All-optical regeneration on a Silicon chip," *Opt. Express* **15**, 7802 (2007).

124. C. J. Hensley, D. H. Broaddus, A. L. Gaeta, and C. B. Schaffer, "Photonic band-gap fiber gas cell fabricated using femtosecond micromachining," *Opt. Express* **15**, 6690 (2007).

125. T. D. Grow, A. A. Ishaaya, L. T. Vuong, and A. L. Gaeta, "Collapse and stability of necklace beams in Kerr media," *Phys. Rev. Lett.* **99**, 133902 (2007).

126. C. J. Hensley, D. G. Ouzounov, A. L. Gaeta, N. Venkataraman, M. Gallagher, and K. W. Koch, "Silica-glass contribution to the effective nonlinearity of hollow-core photonic band-gap fibers," *Opt. Express* **15**, 3507 (2007).

127. A.A Ishaaya, T. D. Grow, S Ghosh, L. T. Vuong, and A. L. Gaeta, "Collapse dynamics of coupled optical beams," *Phys. Rev. A* **75**, 023813 (2007).

128. J. E. Sharping, M. A. Foster, A. L. Gaeta, J. Lasri, O. Lyngnes, and K. Vogel, "Octave-spanning, high-power microstructure-fiber-based optical parametric oscillators," *Opt. Express* **15**, 1474 (2007).

129. J. E. Sharping, K. M. Lee, M. A. Foster, A. C. Turner, B. S. Schmidt, M. Lipson, A. L. Gaeta, and P. Kumar, "Generation of correlated photons through parametric scattering in nanoscale silicon waveguides," *Opt. Express* **14**, 12388 (2006).

130. Y. Okawachi, J. E. Sharping, C. Xu, and A. L. Gaeta, "Large tunable optical delays via self-phase modulation and dispersion," *Opt. Express* **14**, 12022 (2006).

131. M. A. Foster, A. C. Turner, J. E. Sharping, B. S. Schmidt, M. Lipson, and A. L. Gaeta, "Broad-band optical parametric gain on a silicon photonic chip," *Nature* **441**, 960 (2006).

132. T. D. Grow, A. A. Ishaaya, L. T. Vuong, A. L. Gaeta, N. Gavish, and G. Fibich, "Collapse dynamics of super-Gaussian beams," *Opt. Express* **14**, 5468 (2006).

133. A. C. Turner, C. Manolatou, B. S. Schmidt, M. Lipson, M. A. Foster, J. E. Sharping, and A. L. Gaeta, "Tailored anomalous dispersion in silicon channel waveguides," *Opt. Express* **14**, 4357 (2006).

134. S. Ghosh, A. R. Bhagwat, C. K. Renshaw, S. Goh, A. L. Gaeta, and B. J. Kirby, "Low-light-level optical interactions with Rubidium vapor in a photonic band-gap fiber," *Phys. Rev. Lett.* **97**, 023603 (2006).

135. R. W. Boyd, D. J. Gauthier, and A. L. Gaeta, "Applications of slow light in telecommunications," *Optics and Photonics News* **7**, 18 (2006).

136. L. T. Vuong, T. D. Grow, A. Ishaaya, A. L. Gaeta, G. W. Hooft, E. R. Eliel, and G. Fibich, "Collapse of optical vortices," *Phys. Rev. Lett.* **96**, 133901 (2006).

137. I. H. Agha, J. E. Sharping, M. A. Foster, and A. L. Gaeta, "Optimal sizes of microspheres for linear and nonlinear optical interactions," *Appl. Phys. B* **83**, 303 (2006).

138. Y. Okawachi, M. A. Foster, Q. Xu, J. E. Sharping, M. Lipson, and A. L. Gaeta, "All-optical slow-light on a photonic chip," *Opt. Express* **14**, 2317 (2006).

139. Z. Zhu, D. J. Gauthier, R. W. Boyd, Y. Okawachi, J. E. Sharping, A. L. Gaeta, and A. E. Willner, "Numerical study all-optical slow-light delays via stimulated Brillouin scattering in an optical fiber," *J. Opt. Soc. Am. B* **22**, 2378 (2005).

140. J. E. Sharping, Y. Okawachi, J. van Howe, C. Xu, Y. Wang, A. E. Willner, and A. L. Gaeta, "All-optical, wavelength and bandwidth preserving, pulse delay based on parametric wavelength conversion and dispersion," *Opt. Express* **13**, 7872 (2005).

141. M. J. Dejneka, C. Powell, N. Borrelli, D. G. Ouzounov, and A. L. Gaeta, "Transparent magnetic glass-ceramics," *J. Am. Ceram. Soc.* **88**, 2435 (2005).

142. M. A. Foster, A. L. Gaeta, Q. Cao, and R. Trebino, "Soliton-effect compression of supercontinuum to few-cycle durations in photonic nanowires," *Opt. Express* **13**, 6848 (2005).

143. D. G. Ouzounov, C. J. Hensley, A. L. Gaeta, N. Venkataraman, M. Gallagher, and K. W. Koch, "Soliton pulse compression in photonic band-gap fibers," *Opt. Express* **13**, 6153 (2005).

144. J. E. Sharping, Y. Okawachi, and A. L. Gaeta, "Wide bandwidth slow light using a Raman fiber amplifier," *Opt. Express* **13**, 6092 (2005).

145. G. Fibich, S. Eisenmann, B. Ilan, Y. Erlich, M. Fraenkel, Z. Henis, A. L. Gaeta and A. Zigler, "Self-focusing distance of very high power laser pulses," *Opt. Express* **13**, 4594 (2005).

146. D. A. Homoelle, K. D. Moll, A. L. Gaeta, and R. W. Boyd, "Conical three-photon-excited stimulated hyper-Raman scattering," *Phys. Rev. A* **72**, 011802 (*Rapid Communication)* (2005).

147. T. D. Grow and A. L. Gaeta "Dependence of multiple filamentation on beam ellipticity," *Opt. Express* **13**, 4594 (2005).

148. M. A. Foster, J. M. Dudley, B. Kibler, Q. Cao, D. Lee, R. Trebino, and A. L. Gaeta "Nonlinear pulse propagation and supercontinuum generation in photonic nanowires: experiment and simulation," *Appl. Phys. B* **81**, 363 (2005).

149. Y. Okawachi, M. S. Bigelow, J. E. Sharping, Z. Zhu, A. Schweinsberg, D. J. Gauthier, R. W. Boyd, and A. L. Gaeta, "Tunable all-optical slow-light delays via stimulated Brillouin scattering in an optical fiber," *Phys. Rev. Lett.* **94**, 193902 (2005).

150. S. Ghosh, J. E. Sharping, D. G. Ouzounov, and A. L. Gaeta "Resonant optical interactions with molecules confined to hollow-core photonic band-gap fibers," *Phys. Rev. Lett.* **94**, 093902 (2005).

151. R. W. Boyd, D. J. Gauthier, A. L. Gaeta, and A. E. Willner "Maximum time delay achievable in a slow-light medium," *Phys. Rev. A.* **71**, 023801 (2005).

152. V. R. Almeida, C. A. Barrios, R. R. Panepucci, M. Lipson, M. A. Foster, D. G. Ouzounov, and A. L. Gaeta, "All-optical switch on silicon," *Opt. Lett.* **29**, 2867 (2004).

153. M. A. Foster and A. L. Gaeta, "Ultra-low threshold supercontinuum generation in sub-wavelength waveguides," *Opt. Express* **12**, 3137 (2004).

154. M. A. Foster, K. D. Moll, and A. L. Gaeta, "Optimal waveguide dimensions for nonlinear interactions," *Opt. Express* **12**, 2880 (2004).

155. K. D. Moll and A. L. Gaeta, "Role of dispersion on multiple-collapse dynamics," *Opt. Lett.* **29**, 995 (2004).

156. D. G. Ouzounov, F. R. Ahmad, D. Müller, N. Venkataraman, M. Gallagher, C. M. Smith, M. G. Thomas, J. Silcox, K. W. Koch, and A. L. Gaeta, "Generation of megawatt solitons in hollow-core photonic band-gap fibers," *Science* **301**, 1702 (2003).

157. J. N. Ames, S. Ghosh, R. S. Windeler, A. L Gaeta, and S. T. Cundiff, "Excess noise generation during spectral broadening in microstructure fiber," *Appl. Phys. B* **77**, 279 (2003).

158. A. L. Gaeta, "Collapsing light really shines," *Science* (Perspective) **301**, 54 (2003).

159. K. D. Moll, G. Fibich, and A. L. Gaeta, "Self-similar wave collapse: observation of the Townes profile," *Phys. Rev. Lett.* **90**, 203902 (2003).

160. D. Homoelle, A. L. Gaeta, V. Yanovsky, and G. Mourou, "Pulse-contrast enhancement via nonlinear ellipse rotation in a hollow waveguide," *Opt. Lett.* **27**, 1646 (2002).

161. D. G. Ouzounov, K. D. Moll, M. A. Foster, W. Zipfel, W. W. Webb, and A. L. Gaeta, "Delivery of nanojoule femtosecond pulses through large-core microstructured fibers," *Opt. Lett.* **27**, 1513 (2002).

162. Q-H. Park, R. W. Boyd, J. E. Sipe, and A. L. Gaeta, "Theory of relativistic optical harmonic generation," *J. Sel. Top. in Quantum Electron.* **8**, 413 (2002).

163. K. D. Moll, D. Homoelle, A. L. Gaeta, and R. W. Boyd, "Conical harmonic generation in isotropic materials," *Phys. Rev. Lett.* **88**, 153901-1 (2002).

164. N. Jiang, J. R. Qiu, A. L. Gaeta, and J. Silcox, "Nanoscale modification of optical properties of Ge-doped SiO2 glass by electron-beam irradiation," *Appl. Phys. Lett.* **80**, 2005 (2002).

165. A. L. Gaeta, "Supercontinuum generation in microstructured fibers," *Opt. Lett.* **27**, 924 (2002).

166. D. G. Ouzounov, D. Homoelle, A. L. Gaeta, W. Zipfel, W. W. Webb, J. A. West, J. C. Fajardo, and K. W. Koch, "Dispersion measurements of microstructured fibers using femtosecond laser pulses," *Opt. Commun.* **192**, 219 (2001).

167. A. L. Gaeta and F. W. Wise, Comment on "Self-compression of high-intensity femtosecond optical pulses and spatio-temporal soliton generation," *Phys. Rev. Lett.* **87**, 229401 (2001).

168. J. Qiu, A. L. Gaeta, and K. Hirao, "Long-lasting phosphorescence in oxygen-deficient Ge-doped silica glasses at room temperature," *Chem. Phys. Lett.* **333**, 236 (2001).

169. M. R. Fewings and A. L. Gaeta, "Compensation of pulse distortions by phase conjugation via difference-frequency generation," *J. Opt. Soc. Am. B* **17**, 1522 (2000).

170. J. Qiu, P. G. Kazanski, J. Si, K. Miura, T. Mitsuyu, K. Hirao, and A. L. Gaeta, "Memorized polarization-dependent light scattering in rare-earth-ion-doped glass," *Appl. Phys. Lett.* **77**, 1940 (2000).

171. A. L. Gaeta, "Catastrophic collapse of ultrashort pulses," *Phys. Rev. Lett.* **84**, 3582 (2000).

172. D. Homoelle and A. L. Gaeta, "Propagation dynamics of ultrashort pulses in hollow waveguides," *Opt. Lett.* **25**, 761 (2000).

173. G. Fibich and A. L. Gaeta, "On the critical power for self-focusing in bulk media and in hollow waveguides," *Opt. Lett.* 25, 335 (2000).

174. A. M. Streltsov, K. D. Moll, A. L. Gaeta, P. Kung, D. Walker, and M. Razeghi, "Pulse autocorrelation measurements based on two- and three-photon conductivity in a GaN photodiode," *Appl. Phys. Lett.* **75**, 3778 (1999).

175. M. Y. Lanzerotti, R. W. Schirmer, A. L. Gaeta, and G. S. Agarwal, "Quantum noise in phase conjugation by four-wave mixing in an atomic vapor," *Phys. Rev. A* **60**, 4980 (1999).

176. D. Homoelle, S. Wielandy, A. L. Gaeta, N. F. Borrelli, and C. Smith, "Infrared photosensitivity in silica glasses exposed to femtosecond laser pulses," *Opt. Lett.* **24**, 1311 (1999).

177. A. C. Millard, D. N. Fittinghoff, J. A. Squier, M. Muller, and A. L. Gaeta, "Using GaAsP photodiodes to characterize ultrashort pulses under high numerical aperture focusing in microscopy," *J. Microscopy* **193**, 179 (1999).

178. S. Wielandy and A. L. Gaeta, "Coherent control of the polarization of light," *Phys. Rev. Lett.* **81**, 3359 (1998).

179. S. Wielandy and A. L. Gaeta, "Investigation of electromagnetically induced transparency in the strong probe regime," *Phys. Rev. A* **58**, 2500 (1998).

180. A. M. Streltsov, J. K. Ranka and A. L. Gaeta, "Femtosecond ultraviolet autocorrelation measurements based on two-photon conductivity in fused silica," *Opt. Lett.* **23**, 798 (1998).

181. J. K. Ranka and A. L. Gaeta, "Breakdown of the slowly-varying envelope approximation in the self-focusing of ultrashort pulses," *Opt. Lett.* **23,** 534 (1998).

182. J. K. Ranka, R. W. Schirmer, and A. L. Gaeta, "Coherent spectroscopic effects in the propagation of ultrashort pulses through a two-level system," *Phys. Rev. A* **57**, R36 (1998).

183. J. K. Ranka, A. L. Gaeta, A. Baltsuka, M. S .Pshenichnikov, and D. A. Wiersma, "Autocorrelation measurement of 6-fs pulses based on the two-photon-induced photocurrent in a GaAsP photodiode," *Opt. Lett.* **22**, 1344 (1997).

184. R. W. Schirmer and A. L. Gaeta, "Nonlinear mirror based on two-photon absorption," *J. Opt. Soc. Am. B* **14**, 2865 (1997).

185. R. W. Schirmer, M. Y. Lanzerotti, A. L. Gaeta, and G. S. Agarwal, "Quantum theory of noise in phase conjugation by four-wave mixing in a two-level system," *Phys. Rev. A* **55,** 3155 (1997).

186. T. Kajava and A. L. Gaeta, "Intracavity frequency doubling of a Nd:YAG laser passively Q switched by GaAs," *Opt. Commun.* **137**, 93 (1997).

187. M. Y. Lanzerotti, R. W. Schirmer, A. L. Gaeta, and G. S. Agarwal, "Phase conjugation of weak, continuous-wave optical signals," *Phys. Rev. Lett.* **77**, 2202 (1996).

188. J. K. Ranka, R. W. Schirmer, and A. L. Gaeta, "Observation of pulse splitting in nonlinear dispersive media," *Phys. Rev. Lett.* **77**, 3783 (1996).

189. M. Y. Lanzerotti, R. W. Schirmer, and A. L. Gaeta, "High-reflectivity, wide-bandwidth optical phase conjugation using potassium vapor," *Appl. Phys. Lett.* **69**, 1199 (1996).

190. T. Kajava and A. L. Gaeta, "Q switching of a diode-pumped Nd:YAG laser with GaAs," *Opt. Lett.* **21**, 1244 (1996).

191. W. V. Davis, A. L. Gaeta, R. W. Boyd, and G. S. Agarwal, "Statistical-noise properties of an optical amplifier utilizing two-beam coupling in atomic potassium vapor," *Phys. Rev. A* **53**, 3625 (1996).

192. M. Y. Lanzerotti and A. L. Gaeta, "Theory of quantum optical measurements with a phase-conjugate mirror," *Phys. Rev. A* **51**, 4057 (1995).

193. T. D. Krauss, J. K. Ranka, F. W. Wise, and A. L. Gaeta, "Measurements of the tensor properties of third-order nonlinearities in wide-gap semiconductors," *Opt. Lett.* **20**, 1110 (1995).

194. W. V. Davis, M. Kauranen, E. M. Nagasako, R. J. Gehr, A. Gaeta, and R. W. Boyd, "Excess noise acquired by a laser beam after propagating through atomic potassium vapor," *Phys. Rev. A* **51**, 4152 (1995).

195. M. Y. Lanzerotti and A. L. Gaeta, "Optical phase conjugation of nonclassical fields," *Phys. Rev. A* **51**, 3182 (1995).

196. M. O. Kauranen, A. L. Gaeta, R. W. Boyd, and G. S. Agarwal, "Amplification of vacuum fluctuations by two-beam coupling in an atomic vapor," *Phys. Rev. A* **50,** R929 (1994).

197. R. W. Boyd, G. S. Agarwal, W. V. Davis, A. L. Gaeta, E. M. Nagasako, and M. O. Kauranen, "Quantum-noise characteristics of nonlinear optical amplifiers," *Acta Physica Polonica A* **86**, 117 (1994).

198. M. O. Kauranen, A. L. Gaeta, and C. J. McKinstrie, "Transverse instabilities of two beams intersecting in a nonlinear Kerr medium," *J. Opt. Soc. Am. B* **10**, 2298 (1994).

199. M. O. Kauranen, A. L. Gaeta, and R. W. Boyd, "Noise properties of quantum amplifiers with frequency-dependent gain," *Opt. Commun.* **103**, 211 (1993).

200. A. L. Gaeta and R. W. Boyd, "Transverse instabilities in the polarizations and intensities of counterpropagating light waves," *Phys. Rev. A* **48**, 1610 (1993).

201. G. S. Agarwal, A. L. Gaeta, and R. W. Boyd, "Quantum statistics of phase-conjugate resonators," *Phys. Rev. A* **47**, 597 (1993).

202. A. L. Gaeta, G. S. Agarwal, and R. W. Boyd, "Quantum-noise limit on optical amplification by two-beam coupling in an atomic system," *Phys. Rev. A* **46**, 4271 (1992).

203. W. V. Davis, A. L. Gaeta, and R. W. Boyd, "Polarization ellipse rotation by induced gyrotropy in atomic vapors," *Opt. Lett.* **17**, 1304 (1992).

204. A. L. Gaeta and R. W. Boyd, "Stimulated Brillouin scattering in the presence of feedback," Intntl. *J. Nonlinear Opt. Phys.* **1**, 581 (1992).

205. A. L. Gaeta and R. W. Boyd, "Stochastic dynamics of stimulated Brillouin scattering in an optical fiber," *Phys. Rev. A* **44**, 3205 (1991).

206. O. Kulagin, P. A. Pasmanik, A. L. Gaeta, T. R. Moore, G. J. Benecke, and R. W. Boyd, "Observation of deterministic chaos with counterpropagating waves in a Brillouin-active medium," *J. Opt. Soc. Am.* B **8**, 2155 (1991).

207. M. Kauranen, J. J. Maki, A. L. Gaeta, and R. W. Boyd, "Observation of two-beam excited conical emission," *Opt. Lett.* **16**, 943 (1991).

208. M. T. Gruneisen, K. R. MacDonald, A. L. Gaeta, R. W. Boyd, and D. Harter, "Laser beam combining in potassium vapor," *IEEE J. Quantum Electron.* **QE-27**, 128 (1991).

209. G. G. Luther, C. J. McKinstrie, and A. L. Gaeta, "The transverse instability of counterpropagating waves," *Nonlinear Dynamics in Optical Systems*, edited by N. B. Abraham, E. Garmire, and P. Mandel (1990) pp. 205-209.

210. R. W. Boyd and A. L. Gaeta, "Chaos in nonlinear optics," *Laser Optics of Condensed Matter*, edited by A. Maradudin, E. Garmire, and K. K. Rebane (Plenum, New York, 1990) pp. 99-105.

211. D. J. Gauthier, M. S. Malcuit, A. L. Gaeta, and R. W. Boyd, "Polarization bistability of counterpropagating beams," *Phys. Rev. Lett.* **64**, 1721(1990)

212. A. L. Gaeta and R. W. Boyd, "Quantum statistics of optical phase conjugation," *Coherence and Quantum Optics* VI, edited by J. H. Eberly, L. Mandel, and E. Wolf, (Plenum, New York, 1989) pp. 343-348.

213. M. T. Gruneisen, K. R. MacDonald, A. L. Gaeta, R. W. Boyd, and D. Harter, "Energy transfer in an atomic vapor," *Phys. Rev. A* **40**, 3464 (1989).

214. A. L. Gaeta, M. D. Skeldon, R. W. Boyd, and P. Narum, "Observation of instabilities of laser beams counterpropagating through a Brillouin medium," *J. Opt. Soc. Am. B* **6**, 1709 (1989).

215. A. L. Gaeta and R. W. Boyd, "Quantum noise in phase conjugation," *Phys. Rev. Lett.* **60**, 2618 (1988).

216. P. Narum, A. L. Gaeta, M. D. Skeldon, and R. W. Boyd, "Instabilities of laser beams counterpropagating through a Brillouin-active medium," *J. Opt. Soc. Am. B* **5**, 623 (1988).

217. A. L. Gaeta, R. W. Boyd, J. R. Ackerhalt, and P. W. Milonni, "Instabilities and chaos in the polarizations of counterpropagating light fields," *Phys. Rev. Lett.* **58**, 2432 (1987).

218. A. L. Gaeta, R. W. Boyd, P. W. Milonni, and J. R. Ackerhalt, "Instabilities in the propagation of arbitrarily polarized counterpropagating waves in a nonlinear Kerr medium," *Optical Bistability* III, edited by H. M. Gibbs, P. Mandel, N. Peyghambarian, and S. D. Smith, (Springer-Verlag, Berlin, 1986) pp. 302-305.

219. A. L. Gaeta, M. T. Gruneisen, and R. W. Boyd, "Theory of degenerate four-wave mixing in saturable media with the inclusion of pump propagation effects," *IEEE J. Quantum Electron.* **QE-22**, 1095 (1986).

220. M. T. Gruneisen, A. L. Gaeta, and R. W. Boyd, "Exact theory of pump-pave propagation and its effect on degenerate four-wave mixing in saturable absorbing media," *J. Opt. Soc. Am. B* **2**, 1117 (1985).

Book Chapters

A. L. Gaeta, "Spatial and Temporal Dynamics of Collapsing Ultrashort Laser Pulses," *Self-Focusing: Past and Present*, ed. R.W. Boyd, S.G. Lukishova, Y.-R. Shen (Springer, New York, 2007).

A. L. Gaeta and R. S. Windeler, "Microstructure Fiber and White Light Generation," in *Femtosecond Optical Frequency Comb: Principle, Operation, and Applications* ed. J. Ye and S. Cundiff (Kluwer, Norwell, 2005).

A. L. Gaeta and R. W. Boyd, "Nonlinear Optics Basics: Ultrafast and Intense-Field Nonlinear Optics," in *Encyclopedia of Modern Optics* ed. M. Ruck (Elsevier, Oxford, 2005).

J. K. Ranka and A. L. Gaeta, "Optical Properties of Microstructure Optical Fibers," in *Photonic Crystal Fibers*, ed. R. Slusher (2003).

A. L. Gaeta and R. W. Boyd, "Nonlinear Optics," in *Atomic, Molecular, and Optical Physics Handbook*, ed. G. W. Drake (AIP, Woodbury, 1996).

Invited, Keynote, Plenary, and Tutorial Lectures (> 300)

Patents

"System for Combining Laser Beams by Transfering Energy therebetween in Atomic Vapor," R. W. Boyd, A. L. Gaeta, M. T. Gruneisen, K. R. MacDonald, #4,918,699, April 17 1990.

"Optical Fiber Delivery and Collection System for Biological Applications such as Multiphoton Microscopy, Spectroscopy, and Endoscopy," A. L. Gaeta, D. G. Ouzounov, W. W. Webb, R. Williams, W. R. Zipfel, Patent 7,702,381 (2010).

"Fiber optical parametric oscillator with high power and bandwidth," J. Sharping, A. L. Gaeta, M. Foster, Patent 7,898,731 (2008).

"All-Optical Controllable Pulse Delay Generator," A. L. Gaeta, J. Sharping, C. Xu, Patent 7,538,935 (2010).

"Silicon integrated photonic parametric amplifier, oscillator, and wavelength converter," M. A. Foster, A. L. Gaeta, M. Lipson, J. Sharping, and A. C. Turner, Patent 8,041,157 (2011), 8,270,783 (2012).

Awards

Fellow of the American Physical Society.

Fellow of the Optical Society of America.

College of Engineering Teaching Award, Cornell University, 1997, 2000, 2003, and 2007.

Army Research Office Young Investigator Award, 1995.

Office of Naval Research Young Investigator Award, 1993.

Conference Organization (Selected)

General Chair, Nonlinear Photonics Topical Meeting, July, 2016, Sydney.

Program Chair, Nonlinear Photonics Topical Meeting, July, 2014, Barcelona.

General Chair, Nonlinear Optics Topical Meeting, August 2009, Hawaii.

General Chair, 2007 Quantum Electronics and Laser Science Conference, Baltimore.

Program Chair, Nonlinear Optics Topical Meeting, August 2007, Hawaii.

Co-Chair, CNS Symposium: Nanophotonics – From Discovery to Systems, July 2006, Ithaca, NY.

Program Chair, 2005 Quantum Electronics and Laser Science Conference, Baltimore, MD.

Chair, Frontiers in Optics 2003: Annual Meeting of the Optical Society of America, Tucson, AZ.

Chair, Nonlinear Optical Phenomena Program Committee, 2001 Conference on Lasers and Electro Optics, Baltimore, MD.