Kelvin H. Wagner

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Education

Ph.D. in Electrical Engineering June 87, California Institute of Technology, Pasadena, CA.
     Thesis: *Time and Space Integrating Acousto-Optic Signal Processing*
MS in Electrical Engineering June 82, California Institute of Technology, Pasadena, CA.
BS in Applied Physics June 81, California Institute of Technology, Pasadena, CA.
     Thesis: *Multichannel Optical CCD Correlator Array.*

Honors

2006-2011	Joseph Negler Endowed Chair in Engineering
2005-	Senior member of the IEEE
2003-	Fellow of the Optical Society of America
1992-1997	National Science Foundation Young Investigator
1983-1986	Army Research Office Graduate Research Fellowship
1977-1979	Caltech Prize Scholarship

Work Experience

2001-   **Professor:** *Electrical and Computer Engineering, University of Colorado, Boulder*
Optics, optical computing, spectral holography, and RF signal processing are the concentration of my courses and research. My research in optical information processing focuses on utilizing the unique computational properties of optical systems to produce special purpose signal processing systems with significant computational advantages over conventional microelectronic digital approaches. Currently, I am pursuing 4 avenues of research towards this goal: applications of stabilized tunable lasers and spectral hole burning materials in spatial-spectral holography for multidimensional signal processing including multi-mode fiber demultiplexing and dispersion compensation; computational super-resolution imaging using wavelength-controlled Silicon-photonic beamsteering apertures for LIDAR, optical devices and architectures for all-optical holographic Deep learning, and acousto-optic devices and systems including AO tunable filters for dual-comb spectroscopy, AO generated beam arrays for Fourier-Basis computational imaging, and acousto-optic addressed millimeter-wave spatial-light-modulator imaging,

6/95 - 2001   **Associate Professor:** *ECE, CU Boulder*

9/88 - 5/95   **Assistant Professor:** *ECE, CU Boulder*

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[0] January 17, 2021

During the period of the OCS center at CU (1987-1998) I pursued 5 avenues of research. Adaptive optical neural networks using dynamic volume holograms; imaging, target recognition, and adaptive beamforming using optical processing of advanced radar systems; development of photorefractive and organic holographic materials and VLSI-liquid crystal devices for incorporation in these systems; advanced acoustooptic crossbars and routing systems for ultrawideband optical interconnection networks using both bulk and surface wave devices, and interactions between optical spatial solitons and 3-dimensional light bullets for ultrafast and massively parallel digital optical computing.

7/88 - 8/88 **Visiting Professor:** *Ecole Nationale Superieure Telecommunications, Paris, France.* Analysis of incoherent polarization holography using anisotropic propagation through crystals. Development of a taxonomy for optical neural network architectures.

6/87 - 9/88 **Research Assistant Professor:** *Optical Sciences Center, University of Arizona, Tucson, AZ.* Research in the use of photorefractive volume holograms as adaptive optical interconnections for optical learning networks. Demonstration of neuron like operation of nonlinear GaAs multiple-quantum-well bistable Fabry-Perot etalons.

1985 - 1986 **Consultant:** *Research and Development Labs, Culver City, CA.* Design of brassboard acoustooptic signal processing system for real-time synthetic aperture radar imaging.

1981 - 1987 **Graduate Research Assistant:** *California Institute of Technology, Pasadena, CA.* Investigation of time-and-space integrating acoustooptic signal processing for real-time synthetic aperture radar imaging, and folded spectrum analysis.

1982-1985 **Consultant:** *Applied Technology Division, Litton Industries, Sunnyvale, CA.* Analysis of acoustooptic signal processing systems for spread spectrum processing, ambiguity function processing, and phased array processing.

Teaching Experience at University of Colorado and University of Arizona

New Courses Developed

Fundamentals of Photonics, developed with R. Piestun
Applications of Photonics, developed with R. Piestun
Nonlinear and Crystal Optics
Graduate Optics Lab, Developed 14 new labs and completely new lab facility.
Optical Computing
Quantum Electronics
Optoelectronic Computing Systems, co-taught with K. Johnson, J. Neff, V. Heuring
Acoustooptic Devices, with Jieping Xu

Additional Courses Taught

Linear Systems
Circuits and Systems
Electromagnetic Waves
Optoelectronic Systems Design
Physical Optics
Fourier Optics

Optical Electronics
Brains, Minds, and Computers, co-taught with H. Wachtel, M. Lutges, and R. Su

Dissertations and Thesis Directed

Masters Completed

1. Richard Eric Feinleib, Adaptive Optical Learning Network with a Photorefractive Crystal, University of Arizona, Optical Sciences Center, 1988. (Co-supervised with Prof. Hyatt Gibbs)
2. Jose Luis Contreras-Vidal, An Optical-Connectionist Model for Image Pattern Recognition, University of Colorado, Boulder, 1989.
3. Dave Finamore, A Wide Band, Large Area, Wide Dynamic Range, Photodetector Amplifier, University of Colorado, Boulder, 1991.
4. Arnaud Brignon, Polarization State Evolution in Photorefractive BSO, Thesis submitted to Institut d'Optique, Orsay France, 1992.
5. Joseph Dimasi, 1999.
6. Alan Hoskins, 2004.
7. Sean Mccomb, 2020.

Doctor of Philosophy

PhD Completed

1. George William Gigioli, Jr., *Optimization and Tolerancing of Nonlinear Fabry-Perot Etalons for Optical Computing Systems,* University of Arizona, Optical Sciences Center, 1988.
2. Huang Tizhi, *Physics and Applications of Photoanisotropic Organic Volume Holograms*, May 22, 1993.
3. Kuang-Yi Wu, *Acousto-optic fiber crossbar switches*, 1995.
4. Robert M. Mcleod, *Spectral domain analysis and design of three-dimensional optical switching and computing systems*, 1995.
5. Charles Garvin, *Experimental demonstration of a cascaded optical system for temporal signal classification using error driven optical learning*, 1996.
6. Anthony W. Sarto, *Adaptive Phase-array processing using photorefractive volume holograms*, 1996.
7. Timothy Slagle, *A smart pixel holographic competitive learning network*, 1998.
8. Steve Blair, *Optical soliton based logic gates*, 1998.
9. Ken Anderson, *Multidimensional optical signal processing using optical coherent transient spatial-spectral holography*, 2001
10. Paulo Silveira, *Optoelectronic Signal Processing using finite impulse response neural networks*, Feb 19, 2001.
11. Greg Kriehn, *Coherent optical signal processing for broadband adaptive phased-array antennas using the BEAMTAP algorithm*, 2003.
12. Alex Romariz, *Optoelectronic technology for implementation of pulsed neural networks*, 2003.

13. Kishore Yellampalle, *Optical soliton controlled inverters in quadratic media and inhomogeneous waveguides*, 2004.
14. Friso Schlottau, *Multidimensional Signal Processing in Spatial-Spectral Holographic Media*, 2005.
15. Lu Gao, *Wavelength-domain RF photonic signal processing*, 2007.
16. Max Colice, *Spectral Hole Burning Spectrum Analyzer*, 2007.
17. Robert Ted Weverka, *Optical signal processing for phased array radar*, 2008.
18. Sangtaek Kim, *Acousto-optic devices for optical signal processing and quantum computing*, 2008.
19. Ben Braker, *Simultaneous spectral and spatial correlation in spectral hole burning materials: Systems for Microwave & Millimeter-wave imaging and radar*, 2008.
20. Jingyi Xiong, *High bandwidth scanner based on spatial-spectral holograms*, 2010
21. Dan Feldhkun, *Doppler encoded excitation patterning (DEEP) microscopy*, 2010.
22. Jon Pfeiffer, *Exploring novel crystals and designs for acousto-optic devices*, 2016.
23. Qing Chao, *Optical imaging in scattering medium using supercontinuum laser and the effects of polarization*, 2017.
24. Keith Nowicki, *Computational Microscopy at 5 Meters using Symmetric Fourier Sampling*, 2018
25. Nathan Dostart *Silicon Photonic Devices for Optical Communications and LIDAR*, 2020. Jointly with M. Popović, Boston University.
26. Stephanie Swartz *Spectral Sensing and Processing with Dynamic Tunable Volume Gratings*, 2020

PhDs In Progress

1. Mchael Brand.
2. Kai-Ting Ting, PN-coded multibeam LIDAR.
3. Channing Philbrick, Multibeam tracking and ranging in SCALABLE LIDAR.

Conference and Professional Society Activities

1. Guest Editor, Applied Optics special issue on the Lake Tahoe Optical Computing Meeting, May 1, 1988.
2. Session Chairman, Optical Image Processing, OSA Annual Meeting, October 1987, Rochester, NY.
3. Session Chairman, Optical Neural Networks, IEEE Parallel Processing, Fullerton CA, March 29 1989.
4. Organizer and Program Chair, Workshop on Optical Neural Networks, Jackson WY, Feb 7-10 1990.
5. Organizer and Program Chair, Workshop on Fundamental Limits in Optical Computing, Boston MA, Nov 4 1990.
6. Program Committee, OSA meeting on Optical Computing, Salt Lake City UT, March 4-6 1991.

7. Program Committee, International Joint Conference on Neural Networks, Seattle WA, July 8-12 1991.

8. Program Committee, SPIE Annual Meeting, Devices for Optical Processing, San Diego CA, July 21-26.

9. Organizer and Program Committee, workshop on neural network hardware, Banff, Can, Mar 3-7, 1992.

10. Organizer, 1992 OSA annual meeting symposium on Photorefractive Storage, Albuquerque NM, Sept 1992.

11. Program Committee, OSA meeting on Optical Computing, Palm Springs CA, March 13-17 1993.

12. Program Committee, CLEO '93, Baltimore MD.

13. Guest Editor, Applied Optics special issue on Optical Neural Networks, March 10, 1993.

14. Program Committee, CLEO '94.

15. Organizer, 1994 OSA annual meeting symposium on Optical Neural Networks, Dallas TX, Oct 1994.

16. Program Chair, OSA topical meeting on Optical Computing, 1995.

17. Guest Editor, Applied Optics special issue on Optical Computing, March 10, 1996.

18. General Chair, OSA topical meeting on Optical Computing, 1997.

19. Topical Editor, Applied Optics Information Processing, 1996-1998.

20. OSA/ICO Optical Computing steering committee chair, 1998-2000.

21. Member OSA Technical Council 1998-2000

22. Program Committee, SPIE meeting on Photonic Devices and Algorithms for Computing 1999, Denver, CO.

23. Program Committee, Optics in Computing, 2000, Quebec City CA.

24. Program Committee, SPIE meeting on Photonic Devices and Algorithms for Computing 2000, San Diego, CA.

25. Program Committee, CLEO Pacific Rim 2001

26. Program Committee, SPIE meeting on Photonic Devices and Algorithms for Computing 2001, San Diego, CA.

27. CLEO 2002 program committee – subcommittee #5 Holography, Wavemixing, Photorefractives, and Storage.

28. Member of SPIE program committee, Photonic Devices and Algorithms for Computing, SPIE annual meeting July 2002, Seattle, WA.

29. Member of SPIE program committee, Photonic Devices and Algorithms for Computing, SPIE annual meeting July 2003, San Diego, CA.

30. CLEO 2003 (Conference on Lasers and Electro-Optics) program committee, subcommittee "Holography, Wavemixing, Photorefractves, and Storage."

31. HBSM03 (Hole Burning and Single Molecule Spectroscopies) program committee member, 2003.

32. CLEO 2004 (Conference on Lasers and Electro-Optics) program committee, subcommittee "Holography, Wavemixing, Photorefractives, and Storage."

33. Member of SPIE program committee, Photonic Devices and Algorithms for Computing, SPIE annual meeting July 2004, Denver CO.

34. CLEO 2005 (Conference on Lasers and Electro-Optics) program committee, subcommittee "Holography, Wavemixing, Photorefractves, and Storage."

35. Program Committee 1st topical meeting on Information Photonics, June 2005. Committee formed with Invited speaker selection in 2004.

36. Member of SPIE program committee, Photonic Devices and Algorithms for Computing, SPIE annual meeting August 2005, San Diego, CA.

37. HBSM06 (Hole Burning and Single Molecule Spectroscopies) program committee member, 2006, France.

38. OSA COTA (Coherent Optical Technologies and Applicationsi) Topical Meeting, July 2006, Whistler, BC.

39. Member of SPIE program committee, Photonic Devices and Algorithms for Computing, SPIE annual meeting August 2006, San Diego, CA.

40. Member of OSA program committee Digital Holography and 3-D Imaging OSA topical meeting, 2009-2011

41. Editorial board member for Journal of 3D Research, 2013-2017

42. Member of OSA Program Committee Information Photonics 2017

43. Member of OSA Program Committee Information Photonics 2019

Publications

Summary of publications: 3 book chapter, 80 journal papers, and 196 conference publications.

Book Chapters

1. Robert T. Weverka, Kelvin Wagner, Robert Mcleod, Kuang-Yi Wu, Charles Garvin, Low-loss acousto-optic photonic switch, in Acousto-optic signal processing, 2nd Edition, Norm Berg and John Pelligrino Editors, Marcel Decker 1995.
2. Steve Blair and Kelvin Wagner, Gated Logic with Optical Solitons, in "Collision-Based Computing", ed by Andrew Adamatzky, Springer-Verlag, UK, 2002.
3. G. R. Kriehn and K. Wagner, True-time-delay adaptive array processing using photorefractive crystals, Photorefractive Materials Effects and Devices 3 volume book series, Springer-Verlag, 2006.

Journal Publications

1. D. Psaltis and K. Wagner, Real-time optical synthetic aperture radar (SAR) processor, Optical Engineering, Vol. 21(5), p. 288 (1982).
2. P. Tong, D. Neikirk, D. Psaltis, D. Rutledge, K. Wagner, and P. Young, Tracking antenna arrays for near-millimeter waves, IEEE Trans. AP-3l(3), p. 512 (1983).
3. K. Wagner and D. Psaltis, Space integrating acousto-optic matrix multiplier, Optics Comm., Vol. 54, p. 173 (1984).
4. K. Wagner and D. Psaltis, Time and space integrating acoustooptic folded spectrum processing for SETI, The Telecommunications and Data Acquisition Progress Report, p. 229, February 15, (1986).
5. K. Wagner and D. Psaltis, Multilayer optical learning networks, Applied Optics, Vol. 26(23), p. 5061 (1987).
6. L Wang, V. Esch, R. Feinleib, L. Zhang, R. Jin, H. Chou, R. Sprague, A. Macleod, G. Khitrova, H. Gibbs, K. Wagner, and D. Psaltis, Interference filters as nonlinear decision-making elements for three-spot pattern recognition and associative memories, Applied Optics, Vol. 27(9), p. 1715 (1988).
7. D. Psaltis, D. Brady and K. Wagner, Adaptive optical networks using photorefractive crystals, Applied Optics, Vol 27(9), p. 1752 (1988).
8. R. Athale, D. Psaltis, and K. Wagner, Optical computing: introduction by the guest editors to the feature in the 1 May 1988 issue, Applied Optics, Vol. 27(9), p. 1641 (1988).
9. W T. Cathey, K. Wagner, and W. J. Miceli, Digital computing with optics, IEEE Proceedings vol. 77(10), p. 1558 (1989).
10. J. Pankove, C. Radehaus, K. Wagner, Winner-take-all neural net with memory, Electronic Letters, vol 26(6), p.349 (1990).
11. Robert T. Weverka, Mark Saffman, and Kelvin Wagner, Fully interconnected, two-dimensional neural arrays using wavelength-multiplexed volume holograms, Optics Letters, Vol. 16(11), June 1 (1991).
12. E. Maniloff, K. Johnson, and K. Wagner, Dynamic energy transfer and transient fringe dislocations in photorefractive lithium niobate, Journal of the optical society of america. B, vol 9(9), p. 1673 September 1992.

13. Tim Slagle and Kelvin Wagner, A winner-take-all spatial light modulator, Optics Letters, Vol. 17(16), p 1164 (1992).

14. Tizhi Huang and K. Wagner, Holographic diffraction in photoanisotropic organic materials, J. Opt. Soc. Am. A, vol. 10(2), pp. 306-315, February 1993.

15. Tizhi Huang and K. Wagner, Photoanisotropic incoherent-to-coherent optical converter, Applied Optics, vol. 32(11), p 1188-1900, April 10 1993.

16. K. Wagner and T. Slagle, Optical competitive learning with VLSI/Liquid Crystal winner-take-all modulators, Applied Optics, vol. 32(8), pp. 1408-1436, March 10 1993.

17. K. Wagner and D. Psaltis, Optical Neural Networks: An introduction by the feature editors, Applied Optics, vol. 32(8), pp. 1261-1263, March 10 1993.

18. A. Brignon, and K.Wagner, Polarization state evolution and eigenmode switching in photorefractive BSO, Optics Communications, vol 101, p 239-246 (1993).

19. Kenneth Purchase, David Brady and Kelvin Wagner, Time of flight cross-correlation on a detector array for ultrafast packet detection, Optics Letters, vol. 18(24), pp 2129-2131, Dec 15 1993.

20. Huang Tizhi and Kelvin Wagner, Dynamic polarization volume holograms, IEEE Journal of Quantum Electronics, vol. 31(2), pp 372-390, Feb 1995.

21. Huang Tizhi and Kelvin Wagner, Real-time joint transform correlation using photoanisotropic dye-polymer films, Applied Optics, vol. 33(32), pp 7634-7645, Nov 10, 1994.

22. Steve Blair, Kelvin Wagner, and Robert Mcleod, Asymetric Spatial Soliton Dragging, Optics Letters, vol. 19(23), pp. 1943-5, Dec 1, 1994.

23. Sam Weaver and Kelvin Wagner Nonlinear Techniques in Optical SAR Image Generation and Recognition, Applied Optics, vol. 34(20) pp 3981-96, July 10 1995.

24. Huang Tizhi and Kelvin Wagner, Diffraction analysis of photoanisotropic holography: An anisotropic saturation model, JOSA B, vol 13(12), pp 282-299, 1996.

25. Robert Mcleod, Kelvin Wagner and Steve Blair, 3+1 dimensional optical soliton dragging logic, Phys Rev A, vol. 52(4), pp3254-78, Oct 1995.

26. Yao Li, Jun Tanida, Frank Tooley, and Kelvin Wagner, Optical Computing: introduction by the feature editors, Applied Optics, vol 35(8), 1177-1179, March 10 1996.

27. R. T. Weverka, K. Wagner, and A. Sarto, Photorefractive processing for large adaptive phased-arrays, Applied Optics, vol 35(8), pp 1344-1366, Mar 10 1996.

28. A. W. Sarto, K. H. Wagner, R. T. Weverka, S. Weaver, and E. K. Walge, Wide Angular Aperture Holograms in Photorefractive Crystals using orthogonally polarized write and read beams, Applied Optics, vol 35(29), pp 5765-5775, Oct 10 1996.

29. Charles Garvin and Kelvin Wagner, Real-time signal classification using an acousto-optic triple product processor cascaded into a volume holographic classifier, Applied Optics, vol.35(20), pp 3937-3944, July 10 1996.

30. Robert Mcleod, Kuang-yi-Wu, Kelvin Wagner and R. T. Weverka, Acoustooptic Photonic Crossbar Switch: Part 1 - Design, Applied Optics, vol 35(32), pp 6331- 6353, Nov 10 1996.

31. Steve Blair, Kelvin Wagner, and Robert Mcleod, Material figures of merit for spatial soliton interactions in the presence of absorption, JOSA B, vol 13(10), 2141–2153, October 1996.

32. T. M. Slagle and K. H. Wagner, Optical Smart-Pixel-Based Clos Crossbar Switch, Applied Optics, p. 8336-8351, v. 36, 1997

33. S. Blair, and K. Wagner, Propagation of (2+1)-D spatio-temporal solitary waves including higher-order corrections, Optical and Quantum Electronics special issue on spatial solitons, vol 30, pp 697-737, 1998.

34. B. Yellampalle and Kelvin H. Wagner, Redundant interconnections for fault-tolerant digital optical computing, Optical Engineering, vol 38(3), March 1999.

35. R. Mcleod, K. Wagner, and S. Blair, Variational approach to orthogonally-polarized optical soliton interaction with cubic and quintic nonlinearities, Physica Scripta, vol. 59(5), pp 365-373, May 1999.

36. Ali Adibi, Jose Mumbru, Kelvin Wagner, and Demetri Psaltis, Secondary grating formation by read-out at Bragg-null incidence, Applied Optics, vol 38(20), July 10 1999.

37. K.D. Merkel, W.R. Babbitt, K.E. Anderson, K.H. Wagner, Variable-time-delay optical coherent transient signal processing, Optics Letters, vol. 24(20), Oct 15 1999.

38. Steve Blair and Kelvin Wagner, Spatial Soliton Angular Deflection Logic Gates, Applied Optics, vol 38(32), pp 6749-6772, Nov 10 1999.

39. Gregory Kriehn, Andrew Kiruluta, Paulo E. X. Silveira, Sam Weaver, Shawn Kraut, Kelvin Wagner, R. Ted Weverka, and Lloyd Griffiths, Optical BEAMTAP Beamforming and Jammer Nulling System for Phased Array Antennas, Applied Optics, vol. 39(2), pp 212-230, Jan 10 2000.

40. Steve Blair and Kelvin Wagner, Cascadable Spatial Soliton Logic , Applied Optics, vol. 39, p. 6006-6018, Nov 10 2000.

41. A. V. Kir'yanov, Igor V. Mel'nikov, and Kelvin Wagner, Two-color generation in a rare-earth-doped quasiphase-matched structure, Applied Physics Letters, vol. 76(20), pp. 2829-2831, MAY 15 2000.

42. Paulo E.X. Silveira, G. S. Pati, and Kelvin H. Wagner, Optical Finite Impule Response Neural Networks, Applied Optics, Vol 41(20), pp 4162-4180, July 10 2002.

43. J. Shamir and K. Wagner, Generalized Bragg selectivity in volume holography Applied Optics, v. 41 (32), 6773-6785, Nov 10 2002.

44. Andrew Kiruluta, G.S. Pati, Gregory Kriehn, Paulo E. X. Silveira, Anthony W. Sarto, and Kelvin Wagner, Spatio-Temporal Operator Formalism for Holographic Recording and Diffraction in a Photorefractive Based True-Time-Delay Phased Array Processor, Applied Optics, 42 (26): 5334-5350 SEP 10 2003.

45. F. Schlottau and K. Wagner, Demonstration of a continuous scanner and time-integrating correlator using spatial-spectral holography Jounal of Luminescnece, Vol 107, no 1-4, pp 90-102, 2004.

46. Paulo E. X. Silveira, G. S. Pati and Kelvin H. Wagner, Optoelectronic implementation of a 256-channel sonar adaptive array processor, Applied Optics 43 (35): 6421-6439 DEC 10 2004

47. F. Schlottau, M. Piket-May, and K. Wagner, Modeling of femtosecond pulse interaction withinhomogeneously broadened media using an iterative predictor corrector FDTD method, Optics Express, v 13(1): 182-194 Jan 10 2005.

48. Max Colice, Ted Weverka, Gregory Kriehn, Friso Schlottau, and Kelvin Wagner, Holographic Method of Cohering Fiber Tapped-Delay-Lines, Applied Optics, v 44(25), 5257-5272, Sept 1 2005.

49. Sangtaek Kim, Kelvin Wagner, Ram M. Narayanan and Wei Zhou, Broadband Polarization Interferometric Time-integrating Acousto-optic correlator for random noise radar, Optical Engineering, v. 44(11), 108202 (2005).

50. F. Schlottau, M. Colice, and K. H. Wagner, Spectral linearization of high-bandwidth spectral holograms, Optics Letters, v 30, p 3003 (2005).

51. F. Schlottau, M. Colice, and K. H. Wagner, Spectral hole burning for wideband, high-resolution radio-frequency spectrum analysis, December 2005 issue of Virtual Journal of Ultrafast Science, http://www.vjultrafast.org/ .

52. Lu Gao, Sandrine I. Herriot, and Kelvin H. Wagner, A Novel Approach to RF Photonic Signal Processing Using an Ultrafast Laser Comb Modulated by Traveling-Wave Tunable Filters IEEE Selected Topics in Quantum Electronics, v 12(2), pp. 315-329, 2006

53. Youzhi Li, A. Hoskins, F. Schlottau, K.H. Wagner, C. Embry, and W.R. Babbitt, Ultrawideband coherent noise lidar range-Doppler imaging and signal processing by use of spatial-spectral holography in inhomogeneously broadened absorbers, Applied Optics, 45 (25): 6409-6420 SEP 1 2006

54. M. Colice, F. Schlottau, K.H. Wagner, Broadband radio-frequency spectrum analysis in spectral-hole-burning media Applied Optics, 45 (25): 6393-6408 SEP 1 2006

55. L. Gao, S.I. Herriot, K.H. Wagner, Sluggish light for radio-frequency true-time-delay applications with a large time-bandwidth product Optics Letters, 31 (22): 3360-3362 NOV 15 2006

56. A.R.S. Romariz, K.H. Wagner, Tunable vertical-cavity surface-emitting laser with feedback to implement a pulsed neural model. 1. Principles and experimental demonstration, Applied Optics, 46(21): 4736-4745 JUL 20 2007.

57. A.R.S. Romariz, K.H. Wagner, Tunable vertical-cavity surface-emitting laser with feedback to implement a pulsed neural model. 2. High-frequency effects and optical coupling, Applied Optics, 46 (21): 4746-4753 JUL 20 2007.

58. M. Colice, J.Y. Xiong, K. Wagner, Spectral hole burning for pulse repetition frequency analysis, J. Luminescence, 127 (1): 129-134 NOV 2007.

59. F. Schlottau, Y.Z. Li, K. Wagner, Demonstration of a spatial-spectral holographic LIDAR range-Doppler processor, J. of Luminescence, 127 (1): 135-145 NOV 2007.

60. Mohan RK, Chang T, Tian M, et al. Ultra-wideband spectral analysis using S2 technology, J. of Luminescence, 127(1): 116-128 NOV 2007.

61. J.Y. Xiong, M. Colice, F. Schlottau, B. Fornberg, and K. Wagner, Numerical solutions to 2D Maxwell-Bloch equations, Optical and Quantum Electronics, Vol. 40(5-6i), pp 447-453, Apr-May 2008

62. Y.Z . Li, H.L. Zhang, C.H. Kim, and K. Wagner, Pulsed ultrasound-modulated optical tomography using spectral-hole burning as a narrowband spectral filter, Applied Physics Letters Vol 93(1), Article Number: 011111, JUL 7 2008.

63. L. Gao, K.H. Wagner, R.R. McLeod, All-optical Tb/S 3R wavelength conversion using dispersion-managed light bullets, IEEE J. of selected topics in Quantum Electronics, Vol 14(3), pp 625-634, MAY-JUN 2008.

64. Squint-free Fourier-optical RF beamforming using a SHB crystal as, an imaging detector, B.M. Braker, F. Schlottau, K. Wagner, IEEE J. OF selected topics in Quantum Electronics, Vol 14(3), pp 952-962, MAY-JUN 2008.

65. M. Colice, J.Y. Xiong, K.H. Wagner, Frequency-doubled fiber lasers for RF spectrum analysis in spectral-hole-burning media IEEE J of Quantum Electronics, Vol 44(5-6), pp 587-594, MAY-JUN 2008.

66. S. Kim, R.R. Mcleod, M. Saffman, and K.H. Wagner, Doppler-free, multiwavelength acousto-optic deflector for two-photon addressing arrays of Rb atoms in a quantum information processor, Applied Optics, Vol 47(11), pp 1816-1831, APR 10 2008.

67. L. Gao, K.H. Wagner, Wavelength-compensated photonic multibeam-forming system for two-dimensional wideband radio-frequency phased-array antennas, Applied Optics, vol 48(22), pp E1-E12, AUG 1 2009.

68. D. Feldkhun and K.H. Wagner, Doppler encoded excitation pattern tomographic optical microscopy, Applied Optics, v. 49(34), pp H47-H63, Dec 1 2010.

69. B. Braker, K.Wagner, Wideband range-Doppler processing and beamforming using electro-optic arrays and spectral hole burning materials, Applied Optics, Vol. 49(19), pp.E121-E139 (2010)

70. Robert Mcleod and Kelvin Wagner, Vector Fourier Optics of Anisotropic Materials, Advances in Optics and Photonics vol 6, p 368412 (2014). doi:10.1364/AOP.6.000368

71. Qing Chao and Kelvin H. Wagner, Polarization Instability of Vector Raman Solitons ejected during Supercontinuum Generation, Optics Express, Volume: 23(16), Pages: 33691-33704 DOI: 10.1364/OE.23.033691 DEC 28 2015.

72. D. Feldkhun, and K.H. Wagner, Single-shot afocal three-dimensional microscopy, Optics Letters Vol 41(15), Pages: 3483-3486 DOI: 10.1364/OL.41.003483 Published: AUG 1 2016.

73. J.B. Pfeiffer, K.H. Wagner, Y. Kaufman, H. Ledbetter, J. Soos, M. Diestler, Complete elastic constants of α-BaB$_2$O$_4$: Schaefer-Bergmann acousto-optic diffraction and resonant ultrasound spectroscopy, J. Acoustical Society of America, Vol 140(4), Pages 2923-2932, 2016

74. Jonathan B, Pfeiffer, Kelvin H. Wagner, *Measuring photoelastic coefficients with Schaefer-Bergmann diffraction,* Applied Optics, Vol 57(10), Page C26-C35, 2018. DOI: 10.1364/AO.57.000C26

75. Stephanie Swartz, Michael Brand, Kelvin H. Wagner, *Box-bender: a 3D dispersion and pathlength-matched polarization interferometer,* Optics Letters, Vol 43(21), Page 5218-5221, 2018. DOI: 10.1364/OL.43.005218

76. Omer Tzang, Antonio M. Caravaca-Aguirre, Kelvin Wagner and Rafael Piestun, *Adaptive wavefront shaping for controlling nonlinear multimode interactions in optical fibres,* Nature Photonics, vol 12, June 2018, 368-374. https://doi.org/10.1038/s41566-018-0167

77. K. Nowicki, and K. Wagner, *Annular subaperture interferometry for high-departure aspheres using paraboloidal parameterization,* Applied Optics, Vol 58(12), Pages: 3282-3292, 2019. DOI: 10.1364/AO.58.003282

78. D. Feldkhun, O. Tzang, K.H. Wagner, R. Piestun, *Focusing and scanning through scattering media in microseconds,* Optica, Vol 6(1), Pages: 72-75, 2019. DOI: 10.1364/OPTICA.6.000072

79. Kelvin H. Wagner and Sean McComb *Optical Rectifying Linear Units for Back-Propagation Learning in a Deep Holographic Convolutional Neural Network,* IEEE Journal Selected Topics in Quantum Electronics, vol. 26, no. 1, pp. 1-18, Jan.-Feb. 2020, Art no. 7701318.

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