Zhaoming Zhu

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Research Interest

Nonlinear guided-wave optics, slow light, photonic crystal fibers, photonic crystals, optical sensors.

Education

Ph.D. in Optics, University of Rochester, Rochester, NY, 2004
Thesis: *Photonic crystal fibers: characterization and supercontinuum generation*

M.S. in Physics, Tsinghua University, Beijing, China, 1998
Thesis: *High-resolution small-angle measurements using surface plasmon resonance*

B.E. in Electronic Engineering, Tsinghua University, Beijing, China, 1995

Research Experience

Duke University, Dept. of Physics — Durham, NC, USA
Postdoctoral Research Associate — 2004–present
Mentor: Prof. Daniel J. Gauthier
Experimental and theoretical study of slow and stored light in optical fibers and their applications in optical communications.

University of Rochester, Institute of Optics — Rochester, NY, USA
Research Assistant — 1999–2004
Advisor: Prof. Thomas G. Brown
Photonic crystal fibers modeling and supercontinuum generation; Surface plasmon cross coupling in corrugated metal films.

Tsinghua University, Dept. of Physics — Beijing, China
Research Assistant — 1996–1998
Advisor: Prof. Jihua Guo
High resolution angle measurement based on surface plasmon resonance; Light diffraction by small circular apertures.

Tsinghua University — Beijing, China
Dept. of Electronic Engineering
Research Assistant — 1994–1995
Design and characterization of a semiconductor optical amplifier.

Teaching Experience

University of Rochester, Institute of Optics — Rochester, NY, USA
Teaching Assistant — Fall 1999–Spring 2000
Geometrical Optics for undergraduates
Physical Optics for graduates

Tsinghua University — Beijing, China
Teaching Assistant — Fall 1996
Upper-level undergraduate electronics lab

Refereed Journal Articles

[21] Z. Zhu, D. J. Gauthier, and R. W. Boyd, "Stored light in an optical fiber via stimulated Brillouin scattering," Science **318**, 1748-1750 (2007).

[20] Z. Shi, R. Pant, Z. Zhu, M. D. Stenner, M. A. Neifeld, D. J. Gauthier, and R. W. Boyd, "Design of a tunable time-delay element using multiple gain lines for increased fractional delay with high data fidelity," Opt. Lett. **32**, 1986-1988 (2007).

[19] B. Zhang, L. Yan, I. Fazal, L. Zhang, A. E. Willner, Z. Zhu, and D. J. Gauthier, "Slow light on Gbit/s differential-phase-shift-keying signals," Opt. Express **15**, 1878-1883 (2007).

[18] Z. Zhu, A. M. C. Dawes, D. J. Gauthier, L. Zhang, and A. E. Willner, "Broadband SBS slow light in an optical fiber," J. Lightwave Technol. **25**, 201-206 (2007).

[17] Z. Zhu and D. J. Gauthier, "Nearly transparent SBS slow light in an optical fiber," Opt. Express **14**, 7238-7245 (2006).

[16] M. D. Stenner, M. A. Neifeld, Z. Zhu, A. M. C. Dawes, and D. J. Gauthier, "Distortion management in slow-light pulse delay," Optics Express **13**, 9995-10002 (2005).

[15] Z. Zhu, D. J. Gauthier, Y. Okawachi, J. E. Sharping, A. L. Gaeta, R. W. Boyd, and A. E. Willner, "Numerical study of all-optical slow-light delays via stimulated Brillouin scattering in an optical fiber," J. Opt. Soc. Am. B **22**, 2378-2384 (2005).

[14] 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 delays via Brillouin slow light in an optical fiber," Phys. Rev. Lett. **94**, 153902 (2005).

[13] Y. Li, F. C. Salisbury, Z. Zhu, T. G. Brown, P. S. Westbrook, K. S. Feder, and R. S. Windeler, "Interaction of supercontinuum and Raman solitons with microstructure fiber gratings," Opt. Express **13**, 998-1007 (2005).

[12] Z. Zhu and T. G. Brown, "Experimental study of polarization properties of supercontinua generated in a birefringent photonic crystal fiber," Opt. Express **12**, 791-796 (2004).

[11] Z. Zhu and T. G. Brown, "Effect of frequency chirping in supercontinuum generation in photonic crystal fibers," Opt. Express **12**, 689-694 (2004).

[10] Z. Zhu and T. G. Brown, "Polarization properties of supercontinuum spectra generated in birefringent photonic crystal fibers," J. Opt. Soc. Am. B **21**, 249-257 (2004).

[9] Z. Zhu and T. G. Brown, "Stress-induced birefringence in microstructured optical fibers," Opt. Lett. **28**, 2306-2308 (2003).

[8] Z. Zhu and T. G. Brown, "Full-vectorial finite-difference analysis of microstructured optical fibers," Opt. Express **10**, 853-864 (2002).

[7] Z. Zhu and T. G. Brown, "Multipole analysis of hole-assisted optical fibers," Opt. Commun. **206**, 333-339 (2002).

[6] Z. Zhu and T. G. Brown, "Analysis of the space filling modes of photonic crystal fibers," Opt. Express **8**, 547-554 (2001).

[5] Z. Zhu and T. G. Brown, "Nonperturbative analysis of cross coupling in corrugated metal films," J. Opt. Soc. Am. A **17**, 1798-1806 (2000).

[4] J. H. Guo, Z. Zhu, and W. M. Deng, "A novel magneto-optic modulator," Acta Optica Sinica **20**, 110-113 (2000) (in Chinese).

[3] J. H. Guo, Z. Zhu, and W. M. Deng, "Small-angle measurement based on surface-plasmon resonance and the use of magneto-optical modulation," Appl. Opt. **38**, 6550-6555 (1999).

[2] J. H. Guo, Z. Zhu, and W. M. Deng, "Angle measurement using surface-plasmon-resonance heterodyne interferometry: a new method," Opt. Eng. **37**, 2998-3001 (1998).

[1] F. Guo, J. H. Guo, and Z. Zhu,"Diffraction of a small aperture–near-field optics theory," Acta Optica Sinica **18**, 1395-1398 (1998) (in Chinese).

Invited Conference Presentations/Papers

[4] Z. Zhu, A.M.C. Dawes, D.J. Gauthier, M.D. Stenner, M.A. Neifeld, T. Luo, C. Yu, L. Zhang, and A.E. Willner, "Recent Advances in Stimulated Brillouin Scattering Slow Light," OSA Topical Meeting on Slow and Fast Light, Washington, D.C., July 23-26, 2006.

[3] Z. Zhu, A.M.C. Dawes, and D.J. Gauthier, "Slow light via stimulated Brillouin scattering in optical fibers," IEEE/LEOS Summer Topicals 2006, Quebec City, Canada, July 17-19, 2006.

[2] Z. Zhu, A.M.C. Dawes, D.J. Gauthier, M.D. Stenner, and M.A. Neifeld, "Improving the bandwidth of slow-light delay lines," Photonics West 2006, San Jose, CA, Jan 21-26, 2006.

[1] Z. Zhu and J.H. Guo,"Tiny yawing angle measurement using surface plasma waves," Proc. of Asia-Pacific Symposium on Instrumentation, pp.6-10, Huang Shan, Aihui, China, 1997.

Contributed Conference Presentations/Papers

[13] B. Zhang, I. Fazal, L.-S. Yan, L. Zhang, A.E. Willner, Z. Zhu, and D.J. Gauthier, "System performance of DPSK signals transmitted through broadband SBS-based slow light element and reduction of slow-light-induced data-pattern dependence," Optical Fiber Conference 2007, Aneheim, CA, March 28, 2007.

[12] D.J. Gauthier, Z. Zhu, A.M.C. Dawes, L. Zhang, A.E. Willner, "Optimizing Broadband SBS Slow Light in an Optical Fiber," Laser Science XXII, Rochester, NY, Oct. 9, 2006.

[11] Z. Shi, R.W. Boyd, Z. Zhu, D.J. Gauthier, R. Pant, M.D. Stenner, and M. A. Neifeld, "Distortion-reduced pulse-train propagation with large delay in a triple gain medium," OSA Topical Meeting on Slow and Fast Light, Washington, D.C., July 23-26, 2006.

[10] Z. Zhu and D.J. Gauthier, "XPM-induced pulse delay and advancement in optical fiber," JThC61, Conference on Lasers and Electro-Optics and Quantum Electronics and Laser Science Conference (CLEO/QELS) 2006, Long Beach, CA, May 21-26, 2006.

[9] A.M.C. Dawes, Z. Zhu, and D.J. Gauthier, "Improving the bandwidth of SBS-based slow-light delay," CThW1, CLEO/QELS 2006, Long Beach, CA, May 21-26, 2006.

[8] Z. Zhu, A.M.C. Dawes, D.J. Gauthier, L. Zhang, and A.E. Willner, "12-GHz-bandwidth SBS slow light in optical fibers," postdeadline paper PDP1, OFC 2006, Anaheim, CA, Mar. 5-10, 2006.

[7] A.L. Gaeta, J.E. Sharping, Y. Okawachi, S. Gohsh, M. Bigelow, A. Schweinsberg, R. W. Boyd, Z. Zhu, D.J. Gauthier, Y. Wang, and A.E. Willner, "Slow light in optical fibers," invited talk, Photonics West 2006, San Jose, CA, Jan 21-26, 2006.

[6] Y. Okawachi, J.E. Sharping, A.L. Gaeta, M.S. Bigelow, A. Schweinsberg, R.W. Boyd, Z. Zhu, and D.J. Gauthier, "Tunable all-optical delays via Brillouin slow light in an optical fiber," invited talk, CMCC3, CLEO/QELS 2005, Baltimore, Maryland, May 22-27, 2005.

[5] Z. Zhu, D.J. Gauthier, Y. Okawachi, A.L. Gaeta, A. Schweinsberg, and R.W. Boyd, "Numerical study of slow light via stimulated Brillouin scattering in optical fibers," JTuC22, CLEO/QELS 2005, Baltimore, Maryland, May 22-27, 2005.

[4] Z. Zhu and T.G. Brown, "Polarization properties of supercontinua generated in birefringent photonic crystal fibers," poster, Frontier in Optics 2003, Tucson, AZ., Oct. 5-9, 2003.

[3] Z. Zhu and T.G. Brown, "Full-vector finite difference analysis of microstructured optical fibers," poster, OSA Annual Meeting 2002, Orlando, FL., Sept 29 - Oct. 3, 2002.

[2] Z.Q. Pan, H.Y. Zhang, J.Q. Yang, J.H. Chen, Z. Zhu, and B.K. Zhou,"Programmable tuning external cavity laser diode," Proc. of SPIE 2482, 269-274 (1995).

[1] J.Q. Yang, H.Y. Zhang, Z.Q. Pan, J.H. Chen, Z. Zhu, and B.K. Zhou, "High-precision temperature controller," Proc. of SPIE 2477, 25-30 (1995).

Professional Activities

Member of OSA, APS, and Sigma Xi
Referee for Optics Express, Optics Letters, JOSA A, JOSA B, Applied Optics, Journal of Lightwave Technology, Journal of Quantum Electronics, Photonics Technology Letters, Optics Communications, and Optical Engineering.