CURRICULUM VITAE - THOMAS BÖTTGER

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APPOINTMENTS

2009-present Associate Professor of Physics and Astronomy, University of San Francisco, San Francisco, California

2003-2009 Assistant Professor of Physics and Astronomy, University of San Francisco, San Francisco, California

2002-2003 Postdoctoral Researcher and Adjunct Instructor, Montana State University, Bozeman, Montana

EDUCATION

2002 Doctor of Philosophy, Physics, with Minor in Physics Education, Montana State University, Bozeman, Montana
Thesis: *"Laser Frequency Stabilization to Spectral Hole Burning Frequency References in Erbium-Doped Crystals: Material and Device Optimization"*, Advisor: Prof. Rufus L. Cone

2000 Minor degree in *Physics Education*, successfully completed 16 credit coursework in *Physics Education* under the supervision of Prof. Gregory E. Francis, Montana State University, Bozeman, Montana

1999 Master of Science, Physics, Montana State University, Bozeman, Montana

1996 Diploma (equivalent to M.S.), Physics, summa cum laude, Humboldt-Universität, Berlin, Germany
Thesis: *"Interface Exciton and Localized Spin Heating by Photoexcited Carriers in ZnSe/ZnMnSe Quantum Well Structures"*, Advisor: Prof. Fritz Henneberger

1993 University Diploma, Physics, cum laude, University of Kent, Canterbury, England
Senior Project: *"Opto-Mechanical Design of an Optical Logical Gate"*, Advisor: Prof. David D. Sampson (now at University of Western Australia)

TEACHING EXPERIENCE

2003-present University of San Francisco: 13 different courses

General Physics I (Physics 110): 2003, 2004, 2005, 2007
General Physics II (Physics 210): 2004, 2005, 2006, 2007, 2008
Introductory Physics I (Physics 100): 2012
Introductory Physics II (Physics 101): 2013, 2014
General Physics II Laboratory (Physics 210): 2004, 2007
Introduction to Electrodynamics (Physics 320): 2003, 2005, 2007, 2009
Optics (Physics 340): 2004, 2006, 2011, 2013
Upper Division Laboratory (Physics 341): 2005, 2008, 2009, 2012
Physics by Inquiry (Physics 201): 2006, 2008-2014
Freshmen Seminar (Physics 195): 2009
Electronics (Physics 361): 2006, 2010, 2013
Digital Electronics (Physics 262): pilot spring 2015
Thermodynamics and Statistical Mechanics (Physics 312): 2010, 2012
Directed Optics Research: 2004-2014
Physics Colloquium (Physics 350): 2013

1996-2002 Montana State University: 3 different courses

Analog Electronics (Physics 261): Fall 2002
College Physics II (Physics 206): Summer 2000
Physics by Inquiry (Physics 201): Spring 1997, Spring 1998, Fall 1998

Lab-TA *College Physics II (Physics 206)*: Summer 1997, Spring 2000
Lab-TA *College Physics I (Physics 205)*: Fall 1997
Lab-TA *Physics for Engineers I (Physics 211)*: Spring 1997
Grader *Our Physical World (Physics 103)*: Spring 1997
Grader *College Physics I (Physics 205)*: Fall 1996

1991-1992 Teaching Assistant *Experimental Physics*, Humboldt-Universität, Berlin, Germany

RESEARCH EXPERIENCE

2009-present Associate Professor of Physics and Astronomy, University of San Francisco, California

2003-2009 Assistant Professor of Physics and Astronomy, University of San Francisco, California

2004-present Visiting Research Professor, Montana State University, Bozeman, Montana

2005	Visiting Assistant Research Professor, Centre National de la Recherché Scientifique (CNRS), Laboratoire Aimé Cotton, Orsay, France
2002-2003	Postdoctoral Researcher, Physics Department, Montana State University, Bozeman, Montana
1998-2002	Graduate Research Assistant, Physics Department, Montana State University, Bozeman, Montana
1994-1996	Undergraduate Research Assistant, Physics Department, Humboldt-Universität, Berlin, Germany
1992-1993	Undergraduate Research Assistant, Physics Department, University of Kent, Canterbury, England

REFEREED PUBLICATIONS

Post-tenure:

1. *Measuring and analyzing excitation-induced decoherence in rare-earth-doped optical materials,* C.W. Thiel, R.M. Macfarlane, Y. Sun, T. Böttger, N. Sinclair, W. Tittel, and R. L. Cone, Laser Physics, accepted April 2014.

2. *Laser linewidth narrowing using transient spectral hole burning,* C. W. Thiel, R. L. Cone, and Thomas Böttger, J. Lumin., http://dx.doi.org/10.1016/j.jlumin.2013.11.038i, in press (2014).

3. *Rare-earth-doped LiNbO3 and KTiOPO4 (KTP) for waveguide quantum memories*, C.W. Thiel, Y. Sun, R. M. Macfarlane, Thomas Böttger, and R. L. Cone, J. Phys. B: At. Mol. Opt. Phys. **45**, 124013 (2012).

4. *Rare-earth-doped materials with application to optical signal processing, quantum information science, and medical imaging technology,* R. L. Cone, C. W. Thiel, Y. Sun, Thomas Böttger, and R. M. Macfarlane, Proc. of SPIE, Vol. **8272**, 82720E-2 (2012).

5. *Rare-earth-doped materials for applications in quantum information storage and signal processing,* C. W. Thiel, Thomas Böttger, and R. L. Cone, J. of Lumin. **131**, 353 (2011).

6. *Optical decoherence and persistent spectral hole burning in* Er^{3+}*:*$LiNbO_3$, C. W. Thiel, R. M. Macfarlane, T. Böttger, Y. Sun, R. L. Cone, and W. R. Babbitt, J. of Lumin. **130**, 1603 (2010).

7. *Optical decoherence and persistent spectral hole burning in* Tm^{3+}*:*$LiNbO_3$, C. W. Thiel, Y. Sun, T. Böttger, W. R. Babbitt, and R. L. Cone, J. of Lumin. **130**, 1598 (2010).

8. *Effects of magnetic field orientation on optical decoherence in $Er^{3+}:Y_2SiO_5$*", Thomas Böttger, C. W. Thiel, R. L. Cone, and Y. Sun, Phys. Rev. B **79**, 115104 (2009).

   This article (#8) was selected for the March 2009 issue of Virtual Journal of Quantum Information. The Virtual Journal, which is published by the American Institute of Physics and the American Physical Society in cooperation with numerous other societies and publishers, is an edited compilation of links to articles from participating publishers, covering a focused area of frontier research. You can access the Virtual Journal at http://www.vjquantuminfo.org

Pre-tenure:

9. *Controlled compositional disorder in $Er^{3+}:Y_2SiO_5$ provides a wide-bandwidth spectral hole burning material at 1.5 μm*, Thomas Böttger, C. W. Thiel, R. L. Cone and Y. Sun, Phys. Rev. B **77,** 155125 (2008).

   This article was selected for the May 2008 issue of Virtual Journal of Nanoscale Science & Technology. The Virtual Journal, which is published by the American Institute of Physics and the American Physical Society in cooperation with numerous other societies and publishers, is an edited compilation of links to articles from participating publishers, covering a focused area of frontier research. You can access the Virtual Journal at http://www.vjnano.org

10. *Magnetic g-tensors for the $^4I_{15/2}$ and $^4I_{13/2}$ states of $Er^{3+}:Y_2SiO_5$*, Y. Sun, Thomas Böttger, C. W. Thiel, and R. L. Cone, Phys. Rev. B **77**, 085124 (2008).

11. *Laser Frequency Stabilization at 1.5 microns using ultranarrow inhomogeneous absorption profiles in $Er^{3+}:LiF_4$*, Thomas Böttger, G. J. Pryde, C. W. Thiel, and R. L. Cone, J. of Lumin. **127**, 83 (2007).

12. *Spectroscopy and Dynamics of $Er^{3+}:Y_2SiO_5$ at 1.5 μm*, Thomas Böttger, C. W. Thiel, Y. Sun, and R. L. Cone, Phys. Rev. B **74**, 075107 (2006).

13. *Optical Decoherence and Spectral Diffusion at 1.5μm in $Er^{3+}:Y_2SiO_5$ versus magnetic field, temperature, and Er^{3+} concentration*, Thomas Böttger, C. W. Thiel, Y. Sun, and R. L. Cone, Phys. Rev. B **73**, 075101 (2006).

Pre-USF:

14. *Material Optimization of $Er^{3+}:Y_2SiO_5$ at 1.5 μm for optical processing, memory, and laser frequency stabilization applications*, Thomas Böttger, Yongchen Sun, Charles W. Thiel, and Rufus L. Cone, Proc. of SPIE **4988**, 51 (2003).

15. *Programmable Laser Frequency Stabilization at 1523 nm yy Use of Persistent Spectral Holeburning*, Thomas Böttger, G.J. Pryde and R.L. Cone, Optics Letters **28**, 200 (2003).

16. *Coherent integration of 0.5 GHz spectral holograms at 1536 nm using dynamic bi-phase codes*, Z. Cole, T. Böttger, R. Krishna Mohan, R. Reibel, W. R. Babbitt, R. L. Cone, and K. D. Merkel, Applied Physics Letters **81**, 3525 (2002).

17. *Semiconductor Lasers Stabilized to Spectral Holes in Rare Earth Crystals to a Part in 10^{13} and their Application to Devices and Spectroscopy*, G. J. Pryde, T. Böttger, R. L. Cone, J. of Lumin. **98** (1-4), 309 (2002).

18. *Semiconductor Lasers Stabilized to Spectral Holes in Rare-Earth Crystals*, Thomas Böttger, G. J. Pryde, N. M. Strickland, P. B. Sellin, R. L. Cone, Optics & Photonics News **12,** 23 (2001).

19. *Numerical Modeling of Laser Stabilization by Regenerative Spectral Holeburning*, G. J. Pryde, T. Böttger, R. L. Cone, J. of Lumin. **94**, 587 (2001).

20. *Diode laser frequency stabilization to transient spectral holes and spectral diffusion in Er^{3+}:Y_2SiO_5 at 1536 nm*, Thomas Böttger, Y. Sun , G. J. Pryde, G. Reinemer, R. L. Cone, J. of Lumin. **94**, 565 (2001).

21. *Semiconductor Lasers Stabilized to Spectral Holes in Rare Earth Crystals*, R. L. Cone, T. Böttger, G. J. Pryde, N.M. Strickland, Y. Sun, P. B. Sellin, and J. L. Carlsten, Proc. of SPIE **4283**, 335 (2001).

22. *Laser Stabilization at 1536 nm Using Regenerative Spectral Hole Burning*, P. B. Sellin, N. M. Strickland, T. Böttger, J. L. Carlsten, and R. L. Cone, Phys. Rev. B **63**, 155111 (2001).

23. *Type-II Interface Exciton in ZnSe/(Zn, Mn)Se Heterostructures*, V.V. Rossin, T. Böttger, and F. Henneberger, Phys. Rev. B **54**, 7682 (1996).

<u>In progress:</u>

1. *Decoherence of Er^{3+}:KTiOPO4 (KTP) at 1.5μm*, Thomas Böttger, C.W Thiel, Y. Sun, R.M. Macfarlane, and R. L. Cone, submitted to Optics Letters

2. *Probing the Effects of Erbium Dopant Concentration on Spectral Inhomogeneity and Decoherence at 1536 nm in Er^{3+}:Y_2SiO_5*, C. W. Thiel, Rufus L. Cone, and Thomas Böttger, to be submitted to Physical Review B

3. *Spectroscopy and Dynamics of the electro-optic material Er^{3+}: KTP at 1.5 μm*, C. W. Thiel, Thomas Böttger, R. M. Macfarlane, and Rufus L. Cone, to be submitted to Physical Review B

CONFERENCE PAPERS AND COLLOQUIA

Post-tenure:

1. INVITED CONFERENCE TALK *Spectroscopy and Decoherence of Er^{3+}:KTiOPO4 (KTP) at 1.5 microns*, C.W Thiel, R.M. Macfarlane, Y. Sun, R L Cone, and Thomas Böttger, 17th International Conference on Luminescence and Optical Spectroscopy of Condensed Matter, Wroclaw, Poland, July 13-18, 2014.

2. *Wide Bandwidth Laser Phase Noise Suppression Using Dynamic Spectral Hole Filters in High Optical Density Materials*, Charles W. Thiel, Rufus L. Cone, and Thomas Böttger, 18th International Conference on Dynamical Processes in Excited States of Solids, Fuzhou, China, August 4-9, 2013.

3. *Rare-Earth Doped Materials for Quantum Information, Optical Signal Processing, Laser Frequency Stabilization, Ultra-sharp Filters, and Medical Imaging Technology*, R. L. Cone, C. W. Thiel, Yongchen Sun, Thomas Böttger, and R. M. Macfarlane, 11th International Conference on Hole Burning, Single Molecule and Related Spectroscopies: Science and Applications, University of Tübingen, Germany, August 27-30, 2012.

4. INVITED CONFERENCE TALK *Rare-Earth-Doped Materials with Application to Optical Signal Processing, Quantum Information Science, and Medical Imaging Technology"*, Rufus L. Cone, Charles W. Thiel, Yongchen Sun, Thomas Böttger, and Roger M. Macfarlane, Photonics West Conference, San Francisco, January 21-26, 2012.

5. *Wide Bandwidth Laser Phase Noise Suppression Using Dynamic Spectral Hole Filters in High Optical Density Materials*, C. W. Thiel, Thomas Böttger, R. Krishna Mohan, Z. Barber, and R. L. Cone, Optical Science & Engineering Conference, Montana State University, Bozeman, Montana, August 2011.

6. PHYSICS COLLOQUIUM, *Laser Frequency Stabilization Based On Rare-Earth-Doped Materials*, Thomas Böttger, C. W. Thiel, and R. L. Cone, San Francisco State University, California, December 6, 2010.

7. INVITED CONFERENCE TALK *From 20 Hz to Hundreds of Electron Volts: Band Structure, New Materials, and Applications of Rare Earth Ions to Optical Signal Processing, Quantum Information Science, and Lasers*, R. L. Cone, C. W. Thiel, R. M. Macfarlane, Y. Sun, and Thomas Böttger, 218th Meeting of the Electro Chemical Society, Las Vegas, Nevada, October 10-15, 2010.

8. *Spectroscopy and Dynamics of Er^{3+}:$LiNbO_3$ at 1.5 Microns for Quantum Information and Signal Processing Applications*, C. W. Thiel, R. M. Macfarlane, R. L. Cone, Y. Sun, T. Böttger, K. D. Merkel, and W. R. Babbitt, Tenth International Conference on Hole Burning, Single Molecule and Related Spectroscopies: Science and Applications, Palm Cove, Australia, June 22-27, 2009.

9. *Optical Decoherence, Spectral Diffusion, and ^{169}Tm Hyperfine Structure of Tm^{3+}:$LiNbO_3$ at 794 nm for Quantum Computing and Signal Processing Applications*, C. W. Thiel, Y. Sun, T. Böttger, W. R. Babbitt, and R. L. Cone, Tenth International Conference on Hole Burning, Single Molecule and Related Spectroscopies: Science and Applications, Palm Cove, Australia, June 22-27, 2009.

Pre-tenure:

10. KEYNOTE CONFERENCE LECTURE *Wide Bandwidth Material Design by Controlled Compositional Disorder in Er^{3+}:Eu^{3+}:Y_2SiO_5 at 1.5 μm*, Thomas Böttger, C. W. Thiel, R. L. Cone, and Y. Sun, 15th International Conference on Luminescence and Optical Spectroscopy of Condensed Matter, Lyon, France, July 7-11, 2008.

    Keynote lectures emphasize the most recent developments and provide a broader presentation of the current state of the art.

11. *Spectroscopy and Dynamics of Tm^{3+}:$LiNbO_3$ for Quantum Information and Signal Processing Applications*, C. W. Thiel, Y. Sun, Thomas Böttger, W. R. Babbitt, and R. L. Cone, Workshop on the Storage and Manipulation of Quantum Information in Optically-Addressed Solids, Bozeman, Montana, January 25-27, 2008.

12. *Spectroscopy and Dynamics of Er^{3+}:$LiNbO_3$ for Quantum Information and Signal Processing Applications*, C. W. Thiel, R. L. Cone, Thomas Böttger, Y. Sun, W. R. Babbitt, and K. D. Merkel, Workshop on the Storage and Manipulation of Quantum Information in Optically-Addressed Solids, Bozeman, Montana, January 25-27, 2008.

13. *Overview of Rare Earth Materials for SHB, SSH, EIT, and Quantum Information*, R.L. Cone, C. W. Thiel, R. M. Macfarlane, Thomas Böttger, and Y. Sun, Workshop on the Storage and Manipulation of Quantum Information in Optically-Addressed Solids, Bozeman, Montana, January 25-27, 2008.

14. *Orientation-Dependent Magnetic Properties and Optical Decoherence in Er^{3+}:Y_2SiO_5 at 1.5 μm*, Thomas Böttger, C. W. Thiel Y. Sun, and R. L. Cone, Workshop on the Storage and Manipulation of Quantum Information in Optically-Addressed Solids, Bozeman, Montana, January 25-27, 2008.

15. *Narrow Homogeneous Linewidths for S2 Applications using Erbium-Doped Glass and Optical Fibers*, R. L. Cone, Y. Sun, R. M. Macfarlane, P. B. Sellin, Thomas Böttger, L. Bigot, and B. Jacquier, Optical Science and Laser Technology Conference, Bozeman, Montana, September 18-19, 2006.

16. *Rare Earth Materials and Stable Lasers for High-Bandwidth Optical Signal Processing*, R. L. Cone, C. W. Thiel, P. B. Sellin, Thomas Böttger, and Y. Sun, Ninth International Conference on Hole Burning, Single Molecule and Related Spectroscopies: Science and Applications, Aussois, France, June 24-29, 2006.

17. *Exceptionally Narrow Homogeneous Linewidths in Erbium-Doped Glass*, Y. Sun, Thomas Böttger, R. L. Cone, L. Bigot, and B. Jacquier, Ninth International Conference on Hole Burning, Single Molecule and Related Spectroscopies: Science and Applications, Aussois, France, June24-29, 2006.

18. *Laser frequency stabilization at 1.5 microns by use of ultranarrow inhomogeneous absorption profiles in* Er^{3+}*:*$LiYF_4$, Thomas Böttger, G. J. Pryde, C. W. Thiel, and R. L. Cone, Ninth International Conference on Hole Burning, Single Molecule and Related Spectroscopies: Science and Applications, Aussois, France, June 24-29, 2006.

19. INVITED CONFERENCE TALK *From 20 Hz to Hundreds of Electron VoltsRare Earth Materials for High-Bandwidth Optical Signal Processing, Lasers, and Phosphors*, Rufus L. Cone, Charles W. Thiel, Peter B. Sellin, Thomas Böttger, Yongchen Sun, and Roger M. Macfarlane, Photonics West 2006, San Jose, California, January 21–26, 2006.

20. *Optical homogeneous linewidths and spectral diffusion at 1.5 microns in mixed* Er^{3+}*:*Eu^{3+}*:*Y_2SiO_5 *studied by photon echoes*, R. L. Cone, T. Böttger, C. W. Thiel, and Y. Sun, American Physical Society March Meeting, Los Angeles, California, March 21-25, 2005.

21. *Optimizing Erbium doped materials for optical processing, memory, and laser frequency stabilization applications at 1.5* μm, Thomas Böttger, C. W. Thiel, Y. Sun, and R. L. Cone, Conference on Lasers and Electro-Optics (CLEO), San Francisco, California, May 16-21, 2004.

22. INVITED CONFERENCE TALK, *Ultra-narrow spectral holes in rare-earth-doped crystals as sub-kHz frequency references for active stabilization of diode lasers at 1.5* μm *and 793 nm*, R. L. Cone, Thomas Böttger, C. W. Thiel, P. B. Sellin, G. J. Pryde, and Y. Sun, 227th American Chemical Society National Meeting, Anaheim, California, March 28 - April 1, 2004.

<u>Pre-USF:</u>

23. *Spectral Diffusion in Erbium-Doped Transient Spectral Hole Burning Materials*, C. W. Thiel, T. Böttger, Y. Sun, and R. L. Cone, 8th International Meeting on Hole Burning, Single Molecule, and Related Spectroscopies: Science and Applications, Bozeman, Montana, July 27 – 31, 2003.

24. *Spectral Hole Burning with a Mode-Locked Laser*, Joe A. Fischer, Thomas Böttger, Mingzhen Tian, R. L. Cone, and Wm. Randall Babbitt, 8th International Meeting on Hole Burning, Single Molecule, and Related Spectroscopies: Science and Applications, Bozeman, Montana, July 27 – 31, 2003.

25. *Transient and Permanent Spectral Hole Burning in Erbium-Doped Glasses*, Laurent Bigot, Samuel Choblet, Anne-Marie Jurdyc, Bernard Jacquier, Thomas Böttger, Yongchen Sun, and Rufus Cone, 8th International Meeting on Hole Burning, Single

Molecule, and Related Spectroscopies: Science and Applications, Bozeman, Montana, July 27 – 31, 2003.

26. PHYSICS COLLOQUIUM, *Diode Lasers Stabilized to Spectral Holes and Material Optimization of $Er^{3+}:Y_2SiO_5$ at 1.5 microns*, Thomas Böttger, University of San Francisco, San Francisco, California, February 13, 2003.

27. *Material Optimization of $Er^{3+}:Y_2SiO_5$ at 1.5 μm for optical processing, memory, and laser frequency stabilization applications*, Thomas Böttger, Yongchen Sun, Charles W. Thiel, and Rufus L. Cone, Photonics West 2003, San Jose, California, January 26 - 31, 2003.

28. *Spectroscopy of $Er^{3+}:Y_2SiO_5$ at 1.5μm*, T. Böttger, C. W. Thiel, Y. Sun, and R. L. Cone, Optical Science and Laser Technology Conference, Montana State University, Bozeman, Montana, September 13 - 14, 2002.

29. INVITED CONFERENCE TALK, *Coherent Spectroscopy of Er^{3+} - Doped Crystals for 1.5 μm Optical Signal Processing and Laser Frequency Stabilization*, R. L. Cone, Y. Sun, T. Böttger, G. Reinemer, C. W. Thiel, T. L. Harris, G. J. Pryde, N. Strickland, R. W. Equall, R. L. Hutcheson, R. C. C. Ward, and Glynn Jones, 23rd Rare Earth Research Conference, University of California, Davis, California, July 13-18, 2002.

30. *Dynamic Accumulation of Spectral Holograms in $Er^{3+}:Y_2SiO_5$ at 4.2 K*, Z. Cole, T. Böttger, R. Krishna Mohan, R. Reibel, W. R. Babbitt, R. L. Cone, and K. D. Merkel, Conference on Lasers and Electro-Optics (CLEO), Long Beach, California, May 19 - 24, 2002.

31. INVITED CONFERENCE TALK, *Analog Optical Processing of High Bandwidth, Large Dynamic Range Signals using Spectral Hole Burning: A Range Correlator*, Z. Cole, T. Böttger, R. Krishna Mohan, R. Reibel, W. R. Babbitt, R. L. Cone, and K. D. Merkel, 32nd Winter Colloquium on The Physics of Quantum Electronics, Snowbird, Utah, January 6 - 10, 2002.

32. INVITED CONFERENCE TALK, *Lasers Stabilized to Spectral Holes: Experiment, Modeling, and Material Optimization*, Thomas Böttger, G. J. Pryde, C. W. Thiel, Y. Sun R. L. Cone, 32nd Winter Colloquium on The Physics of Quantum Electronics, Snowbird, Utah, January 6 - 10, 2002.

33. *Semiconductor Lasers Stabilized to Spectral Holes in Rare Earth Crystals to a Part in 10^{13} and Their Application to Devices and Spectroscopy*, G. J. Pryde, T. Böttger, Y. Sun, and R. L. Cone, 7th International Meeting on Hole Burning, Single Molecule, and Related Spectroscopies, Academia Sinica, Taipei, Taiwan, November 18 - 23, 2001.

34. INVITED TALK, *Lasers Stabilized to Spectral Holes in Rare Earth Doped Crystals*, Thomas Böttger, Montana Board of Research and Commercialization Technology, Butte, Montana, November 16, 2001.

35. *Compact Frequency Stabilized Laser at 1.5μm for Spectral Holeburning Applications*, T. Böttger, G. J. Pryde, N. M. Stricland, R. L. Cone, Optical Science and Laser Technology Conference, Montana State University, Bozeman, Montana, August 22 - 23, 2001.

36. *Measurement and Control of Spectral Diffusion at 1.5 Microns in Er^{3+} doped Materials for Spectral Holeburning Applications*, T. Böttger, Y. Sun, G. J. Pryde, G. Reinemer, R. L. Cone, R. W. Equall, Optical Science and Laser Technology Conference, Montana State University, Bozeman, Montana, August 22 - 23, 2001.

37. *Spectral hole and laser dynamics: What happens when a laser is stabilized to a regenerative spectral hole frequency reference?,* G. J. Pryde, T. Böttger and R. L. Cone, International Conference on Dynamical Processes in Excited States of Solids, Lyon, France, July 1 - 4, 2001.

38. *Spectral Diffusion at 1.5 microns in Er^{3+} Compounds Measured with a Diode Laser Frequency Stabilized to a Spectral Hole,* T. Böttger, G. J. Pryde, G. Reinemer, Y. Sun, and R. L. Cone, International Conference on Dynamical Processes in Excited States of Solids, Lyon, France, July 1 - 4, 2001.

39. *Compact Laser Frequency Stabilization at 1.5μm Using Spectral Hole Burning,* T. Böttger, G. J. Pryde, N. M. Strickland, and R. L. Cone, 2001 Quantum Electronics and Laser Science Conference, Baltimore, Maryland, May 6 - 11, 2001.

40. PHYSICS COLLOQUIUM, *Semiconductor Lasers Stabilized to Spectral Holes in Rare Earth Crystals,* G. J. Pryde, T. Böttger, R. L. Cone, N. M. Strickland, Y. Sun, P. B. Sellin, and J. L. Carlsten, Physics Department, Montana State University, Bozeman, Montana, March 2, 2001.

41. INVITED CONFERENCE TALK, *Semiconductor Lasers Stabilized to Spectral Holes in Rare Earth Crystals,* R. L. Cone, T. Böttger, G. J. Pryde, N.M. Strickland, Y. Sun, P. B. Sellin, and J. L. Carlsten, Photonics West 2001, San Jose, California, January 20 - 26, 2001.

42. INVITED CONFERENCE TALK, *Compact Laser Frequency Stabilization at 1.5μm using Spectral Hole Burning,* G. J. Pryde, T. Böttger, and R. L. Cone, 31st Winter Colloquium on The Physics of Quantum Electronics, Snowbird, Utah, January 7 - 11, 2001.

43. PHYSICS COLLOQUIUM *Rare Earth Spectroscopy, Materials for Spectral Hole Burning Devices, and Laser Frequency Stabilization to Ultranarrow Spectral Holes,* T. Böttger, R. L. Cone and G. J. Pryde, Physics Department, Yale University, New Haven, Connecticut, October 27, 2000.

44. *Numerical studies of frequency stabilization using transient spectral holes in rare-earth crystals,* G. J. Pryde, T. Böttger and R. L. Cone, Optical Society of America Annual

Meeting, Providence, Rhode Island, October 22 - 26, 2000.

45. *Laser Frequency Stabilization at 1.5μm Using Spectral Hole Burning*, T. Böttger, G. J. Pryde, P. B. Sellin, N. M. Strickland, J. L. Carlsten, and R. L. Cone, Optical Society of America Annual Meeting, Providence, Rhode Island, October 22 - 26, 2000.

46. *Photon Echo Characterization in the Electro-Optic Material Er^{3+}:KTP at 1.5 Microns*, G. Reinemer, T. Böttger, Y. Sun, and R. L. Cone, Optical Science and Laser Technology Conference, Montana State University, Bozeman, Montana, August 14 - 15, 2000.

47. *Stabilizing Lasers* to *Spectral Holes: Experiments, Materials, and Simulations*, G. J. Pryde, T. Böttger, and R. L. Cone, Optical Science and Laser Technology Conference, Montana State University, Bozeman, Montana, August 14 - 15, 2000.

48. *Spectroscopy of Rare Earth Materials from 20 Hz to Hundreds of Electron Volts*, R. L. Cone, Y. Sun, G. J. Pryde, A. Braud, C. W. Thiel, T. L. Harris, T. Böttger, G. Reinemer, G. J. Lapeyre, R. W. Equall, and R. L. Hutcheson, 2000 Optical Science and Laser Technology Conference, Montana State University, Bozeman, Montana, August 14 - 15, 2000.

49. *Lasers Stabilized at 1.5 Microns*, G. J. Pryde, T. Böttger, and R. L. Cone, Workshop on Applications of Spectral Hole Burning 2000, Big Sky, Montana, July 9 - 12, 2000.

50. *New Studies of Materials*, Y. Sun, G. J. Pryde, C. W. Thiel, Flurin Könz, G. Reinemer, T. L. Harris, T. Böttger, R. L. Cone, R. W. Equall, R. L. Hutcheson, Workshop on Applications of Spectral Hole Burning 2000, Big Sky, Montana, July 9 - 12, 2000.

51. *Stabilized Lasers and Hole Burning Materials*, R. L. Cone, T. Böttger, G. J. Pryde, and N. M. Strickland, Workshop on Applications of Spectral Hole Burning 2000, Big Sky, Montana, July 9 - 12, 2000.

52. *Laser Frequency Stabilization Using Regenerative Spectral Hole Burning*, P. B. Sellin, N. M. Strickland, T. Böttger, J. L. Carlsten, and R. L. Cone, Conference on Lasers and Electro-Optics, Conference on Lasers and Electro-Optics (CLEO), San Francisco, California, May 7 - 12, 2000.

53. INVITED CONFERENCE TALK, *Characterization and Development of New Rare Earth Optical Materials*, Y. Sun, R. L. Cone, C. W. Thiel, T. L. Harris, T. Böttger, G. Reinemer, and R. W. Equall, 30th Winter Colloquium on The Physics of Quantum Electronics, Snowbird, Utah, January 9 - 12, 2000.

54. INVITED CONFERENCE TALK, *Lasers Stabilized Using Spectral Holes*, P. B. Sellin, N. M. Strickland, T. Böttger, J. L. Carlsten, R. L. Cone, 30th Winter Colloquium on The Physics of Quantum Electronics, Snowbird, Utah, January 9 - 12, 2000.

55. INVITED CONFERENCE TALK, *New Rare Earth Materials, Material Concepts, and*

Demonstrations of Spectral Hole Burning Applications, R. L. Cone, Y. Sun, F. Könz, N. M. Strickland, T. L. Harris, C. W. Thiel, T. Böttger, G. Reinemer, W. R. Babbitt, R. W. Equall, R. L. Hutcheson, R. M. Macfarlane, and J. A. Ritcey, 6th International Conference on Hole-Burning and Related Spectroscopies, Hourtin, France, September 18 - 23, 1999.

56. *Frequency Stabilization of an External Cavity Diode Laser Operating at 1.5 μm for Spectral Hole Burning Applications*, T. Böttger, T. L. Harris, G. C. Dodge, P. B. Sellin, N. M. Strickland, and R. L. Cone, 1999 Optical Science and Laser Technology Conference, Montana State University, Bozeman, Montana, August 16 - 17, 1999.

57. *Frequency Stabilization of an External Cavity Diode Laser Operating at 1550nm for Spectral Hole Burning Applications*, T. Böttger, T. L. Harris, G. C. Dodge, P. B. Sellin, and R. L. Cone, Fifth International Workshop on Applications of Spectral Hole Burning, Montana State University, Bozeman, Montana, March 7 - 10, 1999.

58. INVITED CONFERENCE TALK, *New Rare Earth Materials, Material Concepts, and Prototype Devices*, R. L. Cone, Y. Sun, F. Könz, N. M. Strickland, T. L. Harris, C.W. Thiel, T. Böttger, G. Reinemer, and W. R. Babbitt, R. W. Equall, R. L. Hutcheson, R. M. Macfarlane, and J. A. Ritcey, Fifth International Workshop on Applications of Spectral Hole Burning, Montana State University, Bozeman, Montana, March 7 - 10, 1999.

59. *Localized Spin Heating by Photoexcited Carriers in ZnSe/ZnMnSe Quantum Well Structures*, V.V. Rossin, T. Böttger, F. Henneberger, and J. Puls, 23'rd International Conference on the Physics of Semiconductors, Berlin, Germany, July 21 - 26, 1996.

60. *Interface Luminescence in ZnSe/ZnMnSe Heterostructures*, V.V. Rossin, T. Böttger, F. Henneberger, and J. Puls, 23'rd International Conference on the Physics of Semiconductors, Berlin, Germany, July 21 - 26, 1996.

Referee for the following scientific journals:

- *Physical Review Letters*
- *Physical Review B*
- *Optics Letters*
- *Journal of the Optical Society of America B (JOSA B)*
- *Journal of Luminescence*
- *Applied Optics*
- *Physica*
- *Chinese Optics Letters*