HAILIN WANG

Department of Physics, University of Oregon, Eugene, OR 97403
Voice 541-346-4758, Fax 541-346-4315, Email: hailin@uoregon.edu

Educational Background

B.S. in Physics, University of Science and Technology of China, 1982
M.S. in Physics, University of Michigan, Ann Arbor, 1986
Ph.D. in Physics, University of Michigan, Ann Arbor, 1990

Employment History

University of Michigan, Ann Arbor, Department of Physics
Lecture/Research Investigator, 1991 – 1993
AT&T Bell Laboratories, Holmdel, New Jersey
Consulting member of technical Staff, 1993 – 1995
University of Oregon, Department of Physics
Assistant Professor, 1995 – 2001
Associate Professor, 2001 – 2005
Professor, 2005 – current
Director, Oregon Center for Optics, 2006 – current

Honors and Awards

NSF Early Career Development Award (condensed matter physics), 1998 – 2002
Fellow, Optical Society of America (elected 2005)
Fellow, American Physical Society (elected 2006)
Richard A. Bray Faculty Fellow, University of Oregon (2007)
Fund for Faculty Excellence, University of Oregon (2008)

Research Interest

Quantum optics in semiconductor nanostructures
Cavity QED with quantum dots and defect centers

Selected Professional Activities

Organizer, Symposium on microcavity physics, OSA annual meeting, 1997
Member, Program committee for Radiative Processes and Dephasing in Semiconductors, 1998
Member, Program committee for Quantum Electronics and Laser Science (QELS), 1999
Organizer, Symposium on coherence in semiconductors, OSA annual meeting, 1999
Member, Program committee for Quantum Electronics and Laser Science (QELS), 2001
Chair, Program subcommittee for Quantum Electronics and Laser Science (QELS), 2002
Organizer, Symposium on cavity QED in semiconductors, OSA annual meeting, 2003
Member, Program committee for Quantum Electronics and Laser Science (QELS), 2005
Chair, Fundamental optical processes in semiconductors (FOPS), 2007
Program co-chair, Quantum Electronics and Laser Science (QELS), 2008
Co-editor, Journal of the Optical Society of America, special issue on slow light, 2008

Journal Articles

1. J.T. Remillard, Hailin Wang, D.G. Steel, J. Oh, J. Pamulapati, and P.K. Bhattacharya, "*High resolution nonlinear laser spectroscopy of the heavy hole exciton in a GaAs/AlGaAs quantum well structure: A direct measure of the exciton line shape*," Phys. Rev. Lett. **62**, 2861 (1989).
2. J.T. Remillard, Hailin Wang, M.D. Webb, D.G. Steel, J. Oh, J. Pamulapati, P.K. Bhattacharya, "*High resolution nonlinear laser spectroscopy of room temperature GaAs quantum well structures: Observation of interference effects*," Optics Lett. **14**, 1131 (1989).
3. J.T. Remillard, Hailin Wang, M.D. Webb, D.G. Steel, "*Optical phase conjugation and nonlinear optical band pass filter characteristics in CdSe microcrystallite doped glass*," IEEE J. Quant. Elec. **25**, 408, (1989).
4. Hailin Wang, M. Jiang, and D. G. Steel, "*Measurement of phonon assisted migration of localized excitons in GaAs/AlGaAs multiple quantum well structures*," Phys. Rev. Lett. **65**, 1255 (1990).
5. Hailin Wang, J.T. Remillard, M.D. Webb, and D.G. Steel, "*High resolution laser spectroscopy of relaxation and the excitation line shape of excitons in GaAs quantum well structures*," Surf. Sci. **228**, 69 (1990).
6. J.T. Remillard, Hailin Wang, M.D.Webb, D.G. Steel, *"Frequency domain four-wave mixing spectroscopy of temperature and optical intensity dependent relaxation in CdSe microcrystallite doped glass*," J. Opt. Soc. Am. B**7**, 897 (1990).
7. Hailin Wang and D. G. Steel, "*Effects of spectral diffusion on frequency domain four wave mixing spectroscopy*," Phys. Rev. A **43**, 3823 (1991).
8. Hailin Wang and D. G. Steel, "*High resolution laser spectroscopy of exciton relaxation in GaAs quantum wells*," Applied Physics A**53**, 514 (1991).
9. Hailin Wang, M. Jiang, R. Merlin, and D.G. Steel, "*Spin-flip induced hole burning in GaAs quantum wells: Measurement of exciton Zeeman splitting*," Phys. Rev. Lett. **69**, 804 (1992).
10. S.T. Cundiff, Hailin Wang, and D.G. Steel, "*Polarization dependent picosecond excitonic nonlinearities and the complexities of disorder*," Phys. Rev. B**46** Rapid Comm., 7248 (1992).
11. M. Jiang, Hailin Wang, and D.G. Steel, "*Nonlinear optical absorption and dynamics in quantum wells*," Appl. Phys. Lett. **61**, 1301 (1992).
12. Joseph V. Mersol, Hailin Wang, Duncan G. Steel, and Ari Gafni, "*Consideration of dipole orientation angles yields accurate equations for energy transfer rates in the rapid diffusion limit*," Biophysical Journal **61**, 1647 (1992).
13. Hailin Wang, M.J. Freeman, and D.G. Steel, "*Squeezed light from injection-locked quantum well lasers*," Phys. Rev. Lett. **71**, 3951 (1993).
14. Hailin Wang, K.B. Ferrio, D.G. Steel, Y.Z. Hu, R. Binder, and S.W. Koch, *"Transient nonlinear optical response from excitation induced dephasing in GaAs*," Phys. Rev. Lett. **71**, 1261 (1993).

15. M. Jiang, Hailin Wang, R. Merlin, M. Cardona, and D.G. Steel, "*Nonlinear optical spectroscopy in GaAs: Magnetic free out of excitons*," Phys. Rev. B**48** Rapid Comm., 15476 (1993).

16. M.J. Freeman, Hailin Wang, D.G. Steel, R. Craig, and D.R. Scifers, "*Wavelength-tunable amplitude squeezed light from a room temperature quantum well laser*," Optics Lett. **18**, 2141 (1993).

17. M.J. Freeman, Hailin Wang, D.G. Steel, R. Craig, and D.R. Scifers, "*Amplitude squeezed light from quantum well lasers*," Optics Lett. **18**, 379 (1993).

18. Hailin Wang, Jagdeep Shah, T.C. Damen, and L. Pfeiffer, "*Polarization dependent coherent nonlinear optical response in GaAs quantum wells: Dominant effects of two-photon coherence between the ground and biexciton states*," Solid State Comm. **91**, 869 (1994).

19 Hailin Wang, K.B. Ferrio, D.G. Steel, P.R. Berman, Y.Z. Hu, R. Binder, and S.W. Koch, "*Transient four wave mixing line shapes: Effects of excitation induced dephasing*," Phys. Rev. A**49** Rapid Comm., 1551 (1994).

20. Y.Z. Hu, R. Binder, S.W. Koch, S.T. Cundiff, Hailin Wang, and D.G. Steel, "*Excitation and polarization effects in semiconductor four-wave-mixing spectroscopy*," Phys. Rev. B**49**, 14382 (1994).

21. Hailin Wang, Jagdeep Shah, T.C. Damen, S. Pierson, T. Reinecke, and L. Pfeiffer, "*Carrier-distribution dependent band gap renormalization in modulation-doped GaAs quantum wells*," Phys. Rev. B**52** Rapid Comm., 17013 (1995).

22. Hailin Wang, Jagdeep Shah, T.C. Damen, and L. Pfeiffer, "*Spontaneous emission of excitons in GaAs quantum wells: the role of momentum scattering*," Phys. Rev. Lett. **74**, 3065 (1995).

23. Hailin Wang, Jagdeep Shah, T.C. Damen, W.Y. Jan, J.E. Cunningham, and M.H. Hong, "*Coherent oscillations in semiconductor microcavities*," Phys. Rev. B**51**, 14713 (1995).

24. Hailin Wang, Jagdeep Shah, T.C. Damen, L.N. Pfeiffer, and J.E. Cunningham, "*Femtosecond dynamics of excitons in quantum wells and quantum well microcavities*," Phys. Stat. Sol. b**188**, 381 (1995).

25. T.C. Damen, M. Fritze, A. Kastalsky, J.E. Cunningham, R.N. Pathak, Hailin Wang, J. Shah, "*Time-resolved study of carrier capture and recombination in monolayer Be δ-doped GaAs*," Appl. Phys. Lett. **67**, 515 (1995).

26. Hailin Wang, Jagdeep Shah, T.C. Damen, A. Ivanov, and L. Pfeiffer, "*Transient optical emission from excitonic molecules in GaAs quantum wells: coherent quantum evolution in momentum space*," Solid State Comm. **98**, 807 (1996).

27. A. Ivanov, Hailin Wang, Jagdeep Shah, T.C. Damen, L.V. Keldysh, H. Haug, and L. Pfeiffer, "*Coherent transient in photoluminescence of excitonic molecules in GaAs quantum wells*," Phys. Rev. B**56**, 3941 (1997).

28. Xudong Fan, Hailin Wang, H.Q. Hou, and B.E. Hammons, "*Laser emission from semiconductor microcavities: the role of cavity-polaritons*," Phys. Rev. A**56**, 3233 (1997).

29. Xudong Fan, Hailin Wang, H.Q. Hou, and B.E. Hammons, "*Laser emission from semiconductor microcavities: transition from nonperturbative to perturbative regimes*," Phys. Rev. B**56**, 15256 (1997).

30. Hailin Wang, Y.-T. Chough, S.E. Palmer, and H. Carmichael, "*Normal mode oscillation in the presence of inhomogeneous broadening*," Optics Express **1**, 370 (1997).

31. Hailin Wang, H.Q. Hou, and B.E. Hammons, "*Coherent dynamics of excitonic nonlinear optical response in the nonperturbative regime*," Phys. Rev. Lett. **81**, 3255 (1998).

32. Xudong Fan, Andrew Doran, and Hailin Wang, "*High-Q whispering gallery modes from a composite system of GaAs quantum well and fused silica microsphere*," Appl. Phys. Lett. **73**, 3190 (1998).

33. Xudong Fan, T. Takagahara, J.E. Cunningham, and Hailin Wang, "*Pure dephasing induced by exciton-phonon interactions in narrow GaAs quantum wells*," Solid State Comm. **108**, 857 (1998).

34. Xudong Fan, Hailin Wang, H.Q. Hou, and B.E. Hammons, "*Biexcitonic effects in the nonperturbative regime of semiconductor microcavities*," Phys. Rev. B**57** Rapid Comm., 9451 (1998).

35. Mark Phillips and Hailin Wang, "*Coherent oscillations in four-wave mixing of interacting excitons*," Solid State Comm. **108**, 857 (1999).

36. Xudong Fan, Scott Lacey, and Hailin Wang, "*Microcavities combining a semiconductor heterostructures with a fused silica microsphere*," Opt. Lett. **24**, 771 (1999).

37. T. A. Brun and Hailin Wang, "*Coupling nanocrystals to high-Q silica microspheres: entanglement in quantum dots via photon exchange*," Phys. Rev. A**61**, 323071 (2000).

38. D.G. Steel and Hailin Wang, "*Dephasing of optically induced excitonic coherence in semiconductor heterostructures*," Appl. Phys. A**71**, 519 (2000).

39. Xudong Fan, Scott Lacey, Phedon Palinginis, Hailin Wang, and Mark Lonergan "*Coupling semiconductor nanocrystals to a fused silica microsphere: A quantum dot microcavity with extremely high Q-factors*," Opt. Lett. **25**, 1600 (2000).

40. T. Meier, S.W. Koch, Mark Phillips, and Hailin Wang, "*Strong coupling of heavy- and light-hole excitons induced by many-body correlations*," Phys. Rev. B**62**, 12605 (2000).

41. Phedon Palinginis and Hailin Wang, "*High resolution spectral hole burning in CdSe/ZnS core/shell nanocrystals*," Appl. Phys. Lett. **78**, 1541 (2001).

42. Xudong Fan, Mark Lonergan, Y. Zhang, and Hailin Wang, "*Controlling optical interactions in semiconductor microcavities using whispering gallery optical cavities*," Phys. Rev. B**64**, 115310 (2001).

43. Scott Lacey and Hailin Wang, "*Directional emission from whispering-gallery modes in deformed fused-silica microspheres*," Opt. Lett. **26**, 1943-1945 (2001).

44. Mark Phillips and Hailin Wang, "*Spin coherence and electromagnetically induced transparency via exciton correlations*," Phys. Rev. Lett. **89**, 186401 (2002).

45. Mark Phillips and Hailin Wang, "*Electromagnetically induced transparency due to intervalence band coherence in semiconductors,"* Optics Lett. **28**, 831 (2003).

46. Phedon Palinginis, Sahsa Tavenner, Mark Lonergan, and Hailin Wang, "*Spectral hole burning and zero-phonon linewidth in semiconductor nanocrystals,"* Phys. Rev. B**67** Rapid Comm., 201307 (2003).

47. Scott Lacey, Hailin Wang, David Foster, Jens Noeckel, "*Directional evanescent escape from nearly spherical optical resonators*," Phys. Rev. Lett. **91**, 033902 (2003).

48. Mark Phillips, Hailin Wang, I. Rumyantsev, N.H. Kwong, R. Takayama, and R. Binder, "*Electromagnetically induced transparency in semiconductors via biexciton coherence,"* Phys. Rev. Lett. **91**, 183602 (2003).

49. Tao Li, Hailin Wang, N.H. Kwong, and R. Binder, "*Electromagnetically induced transparency from electron spin coherence in a quantum well waveguide,"* Opt. Express **11**, 3298 (2003).

50. Phedon Palinginis and Hailin Wang, "*Vanishing and emerging of absorption quantum beats from electron spin coherence in GaAs quantum wells,"* Phys. Rev. Lett. **92**, 037402 (2004).

51. Mark Phillips and Hailin Wang, "*Exciton spin coherence and electromagnetically induced transparency in the transient optical response of GaAs quantum wells*," Phys. Rev. B**69**, 115337 (2004).

52. P.C. Ku, F. G. Sedgwick, C. J. Chang-Hasnain, Phedon Palinginis, Tao Li, Hailin Wang, S. W. Chang, and S. L. Chuang "*Slow light via population oscillation in semiconductor quantum wells*," Opt. Lett. **29**, 2291 (2004).

53. S. W. Chang, S. L. Chuang, P.C. Ku, C. J. Chang-Hasnain, Phedon Palinginis, and Haillin Wang, "*Slow light and polarization dependence of population oscillation in GaAs quantum wells*," Phys. Rev. B **70**, 235333 (2004).

54. Phedon Palinginis, Hailin Wang, Serguei Gupalov, D.S. Citrin, M. Dobrowolska, and J. Furdyna, "*Exciton dephasing in self-assembled CdSe quantum dots,"* Phys. Rev. B. **70**, 073302 (2004).

55. Phedon Palinginis and Hailin Wang, "*Coherent Raman resonance from electron spin coherence in GaAs quantum wells,"* Phys. Rev. B**70**, 153307 (2004).

56. Susanta Sarkar, Phedon Palinginis, P.C. Ku, C. J. Chang-Hasnain, N.H. Kwong, R. Binder, and Hailin Wang, *"Inducing electron spin coherence in a quantum well waveguide: Spin coherence without spin precession*," Phys. Rev. B72, 035343 (2005).

57. Phedon Palinginis, Shanna Crankshaw, Forrest Sedgwick, Eui-Tae Kim, Michael Moewe, Connie J. Chang-Hasnain, Hailin Wang, and Shun-Lien Chuang, "*Ultraslow light (<200 m/s) propagation in a semiconductor nanostructure*," Appl. Phys. Lett. **87**, 171102 (2005).

58. Yumin Shen, A. Goebel, G. Khitrova, H. Gibbs, and Hailin Wang, "*Nearly degenerate time-resolved Faraday rotation in an interacting exciton system*," Phys. Rev. B72, 233307 (2005).

59. Susanta Sarkar, Yan Guo, and Hailin Wang, *"Tunable optical delay via carrier induced exciton dephasing*," Opt. Express **14**, 2845 (2006).

60. Young-Shin Park, Andrew Cook, and Hailin Wang, "*Strong coupling cavity QED with defect centers and silica resonators*," Nano Letters **6**, 2075 (2006).

61. Sasha Kruger, Young-Shin Park, Mark Lonergan, and Hailin Wang, "*Zero-phonon linewidth in CdSe/ZnS core/shell nanorods*," Nano Letters **6**, 2154 (2006).

62. Yumin Shen, A. Goebel, and Hailin Wang, "*Control of quantum beats from electron spin coherence in semiconductor quantum wells*," Phys. Rev. B **75**, 045341 (2007).

63. Shannon O'Leary, Hailin Wang, and J. Prineas, "*Coherent Zeeman resonance from electron spin coherence in a mixed type GaAs quantum wells*," Opt. Lett. **32**, 569 (2007).

64. S. W. Chang, S. L. Chuang, Haillin Wang, C. J. Chang-Hasnain, "*Slow Light Using Spin Coherence and V-type EIT in [110] Strained Quantum Well*," J. Opt. Soc. Am. B **24**, 849 (2007).

65. Young-Shin Park and Hailin Wang, "*Regenerative pulsation in silica microspheres*," Opt. Lett. **32**, 3104 (2007).

66. Young-Shin Park and Hailin Wang, "*Radiation pressure driven mechanical oscillation in deformed silica microspheres via free space evanescent excitation*," Opt. Express, **15**, 16471 (2007).

67. Yumin Shen, Timothy M. Sweeney, and Hailin Wang, "*Zero-phonon linewidth of single nitrogen vacancy centers in diamond nanocrystals*," Phys. Rev. B **77**, 033201 (2008).

68. Shannon O'Leary and Hailin Wang, "*Manipulating nonlinear optical responses from spin-polarized electrons in a 2D electron gas via exciton injection*," Phys. Rev. B. **77**, 165309 (2008).

69. Mats Larsson, Nima Dyniri, and Hailin Wang, "Composite optical microcavity of Diamond nanopillar and silica microsphere," Submitted to Nano Letters (2008)

70. Scott Lacey, Jens Noeckel, and Hailin Wang "Direct comparison between free space coupling and prism coupling in a deformed silica microsphere," submitted to Optics Express (2008).

71. S. Crankshaw, F. G. Sedgwick, M. Moewe, C. Chang-Hasnain, H. Wang, S.L. Chuang, "*Electron spin polarization induced by linearly polarized light in a (110) GaAs quantum well waveguide*," submitted to Phys. Rev. Lett. (2008).

72. Carey Phelps, Timothy M. Sweeney, and Hailin Wang, "*Coherent ultrafast electron spin flip in two dimensional electron gas*," submitted to Phys. Rev. Lett. (2008).

Book Chapters

D.G. Steel, H. Wang, J.T. Remillard, and M. Jiang, "*Application of high resolution nonlinear laser spectroscopy to the study of excitons in GaAs/AlGaAs quantum well structures*," in Laser Optics of Condensed Matter, edited by Elsa Garmire, Alexei A. Maradudin, Karl K. Rebane (Plenum, New York 1991).

D.G. Steel, Hailin Wang, and Steve T. Cundiff "*Coherent nonlinear laser spectroscopy of semiconductor heterostructures*," in Optics of Semiconductor Nanostructures, edited by F. Henneberger, S. Schmitt-Rink, and E.O. Goebel (Akademie Verlag, Berlin 1993).

D.G. Steel, Steve T. Cundiff, and Hailin Wang, "*Nonlinear optical spectroscopy of semiconductor heterostructures*," in Optical Phenomena in Semiconductor Structures of Reduced Dimensions, edited by D.J. Lockwood and A. Pinczuk (Kluwer Akademic, Dordrecht, 1993).

D.G. Steel, Hailin Wang, Min Jiang, Kyle B. Ferrio, and Steve T. Cundiff, "*Coherent optical spectroscopy of excitons*," in Coherent Optical Interactions in Semiconductors, edited by R.T. Philips (Plenum, New York 1994).

Hailin Wang, "*Cavity QED of quantum dots with dielectric microsphere*," in Coherence, Correlations, and Decoherence in Semiconductor Nanostructures, edited by T. Takagahara (Academic Press, 2003).

Mark Phillips and Hailin Wang, "*Electromagnetically induced transparency in semiconductors,"* in Nonequilibrium Dynamics of Semiconductor and Nanostructures, Edited by K.T. Tzen, (Marcel Dekker, New York 2005).

Invited Conference Presentations since 1997

Physics of Quantum Electronics (Snowbird, UT, 1997)
NSF/AFOSR Workshop on Functional Meso-Optics (Crest Butte, CO, 1997)
Santa Barbara Workshop on Quantum Dynamics in Systems far from Equilibrium (Santa Barbara, CA, 1997)
Photonics West (San Jose, CA, 1998)
Optical Society of America Annual Meeting (Baltimore, MD, 1998)
NRL Workshop on Quantum Dots for Quantum Computing (Washington, DC, 1999)
Physics of Quantum Electronics (Snowbird, UT, 1999)
Quantum Electronics and Laser Sciences (San Francisco, CA, 2000)
American Chemical Society Annual Meeting (Washington, DC, 2000)
Materials Research Society Fall Meeting (Boston, MA, 2000)
American Physical Society March Meeting (Seattle, WA, 2001)
Fundamental Optical Processes in Semiconductors (Girdwood, Alaska, 2001)
Annual meeting of the Southwest Quantum Information and Technology Network (Denver, CO, 2002)
The Second International Conference on Quantum Dots (Tokyo, Japan, 2002)
Physics of Quantum Electronics (Snowbird, UT, 2003)
International Symposium on Nanotechnology and Optoelectronics (Tokyo, Japan, 2003)
Miami University Nanotechnology Center Inaugural Symposium (Miami, OH, 2003)
Joint US-Australia Workshop on Solid State and Optical Approaches to Quantum Information Science (Sidney, Australia, 2003)
DARPA Slow Light Workshop (Orlando, FL, 2003)
Photonics West (San Jose, CA, 2004)
DARPA Advanced Technology Symposium (New Orleans, 2004)
International Quantum Electronics Conference (San Francisco, CA, 2004)
Cooperative Phenomena in Optics and Transport in Nanostructures (Dresden, Germany, 2004)

Workshop on semiconductor quantum optics (Sellin, Germany, 2004)
The 4th International Conference on Light-Matter Coupling in Nanostructures (St. Petersburg, Russia, 2004)
Fundamental Optical Processes in Semiconductors (Estes Park, CO, 2004)
Physics of Quantum Electronics, Plenary Talk (Snowbird, UT, 2004)
USTC International Workshop on Quantum Information (Hefei, China, 2005).
Berkeley Workshop on Nano-Optoelectronics (Berkeley, 2005).
Physics of Quantum Electronics (Snowbird, Utah, 2006).
Photonics West (San Jose, CA, 2006).
International Workshop on Nonlinear Optics and Excitation kinetics in Semiconductors (Muenster, Germany, 2006).
Optical Society of America Annual meeting (Rochester, 2006).
Optical Society of America Slow and Fast Light Topical Conference (Washington, DC, 2006)
Berkeley Nanooptics Workshop and Summer School (Berkeley, 2006)
Austin Symposium on Cavity QED in Condensed Matter Systems (Austin, 2006)
Quantum Electronics and Laser Science Conferences, Baltimore (May, 2007)
Fundmantal Optical Processes in Semiconductors, Big Sky, Montana (July, 2007)
International Workshop and Summer School on Nano-Optoelectronics, Beijing, China (2007)
Photonics West (San Jose, CA, 2008)
OSA annual meeting (Rochester, NY, 2008)
Interntational Workshop on fundamentals of optical interactions (Recife, Brazil, 2008)