

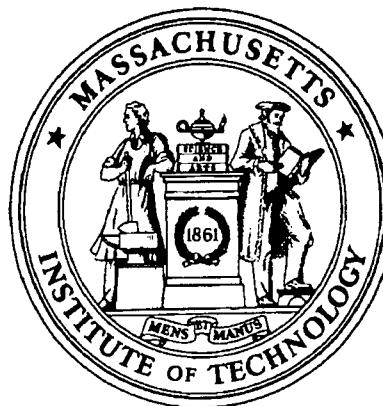
REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4382, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

| | | | | |
|--|---|--|--|--|
| 1. AGENCY USE ONLY (Leave blank) | | | 2. REPORT DATE February 21, 1995 | 3. REPORT TYPE AND DATES COVERED Final 1 Nov 91-31 Oct 94 |
| 4. TITLE AND SUBTITLE Basic and Applied Research in the Field of Electronics and Communications | | | 5. FUNDING NUMBERS DAAL03-92-C-0001 | |
| 6. AUTHOR(S) Jonathan Allen | | | PERFORMING ORGANIZATION REPORT NUMBER <i>REF ID: A64253</i> | |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Research Laboratory of Electronics Massachusetts Institute of Technology 77 Massachusetts Avenue Cambridge, MA 02139-4307 | | | 10. SPONSORING/MONITORING AGENCY REPORT NUMBER ARO 28925.166-EL-JSEP | |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U. S. Army Research Office P. O. Box 12211 Research Triangle Park, NC 27709-2211 | | | | |
| 11. SUPPLEMENTARY NOTES The view, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation. | | | | |
| 12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited | | | 12b. DISTRIBUTION CODE | |
| 13. ABSTRACT (Maximum 200 words) The MIT Research Laboratory of Electronics Joint Services Program comprises seventeen work units (see below) that span a broad array of topics in high-speed optics, surface and phase transitions, submicron structures and quantum-effect devices, the electrical behavior of interconnect structures, and atomic and molecular physics. The work units include: InGaAlAs Quantum Heterostructures for High-Performance Devices; InAlAs/InGaAs Heterostructure Field-Effect Transistors for Telecommunications; Chemical Beam Epitaxy of II-VI/III-V Quantum Wells; Sub-100nm Structures: Technology and Electronics; Single-Electron Transistors; Quantum Transport in Low-Dimensional Disordered Systems; Statistical Mechanics of Quantum Dots; Femtosecond Quantum Optics; Ultrafast Optical and Electronic Processes; Excitations, Ground State Properties, and Phase Transitions of Surfaces; Synchrotron X-ray Studies of Surface Disorder; Statistical Mechanics of Surface Systems and Quantum-Correlated Systems; Step Structures and Epitaxy; Molecular Beam Etching of and Deposition on Silicon; Optical Frequency Metrology; Precision Instrumentation; Electromagnetic Waves in Multilayer Media. | | | | |
| 14. SUBJECT <i>19950308 069</i> | | | 15. NUMBER OF PAGES 22 | |
| | | | 16. PRICE CODE | |
| 17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED | 18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED | 19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED | 20. LIMITATION OF ABSTRACT UL | |

**Final Report to the
U.S. Army Research Office
for**



| | | |
|--------------------------------------|------------------------|-------------------------------------|
| Accesion For | | |
| NTIS | CRA&I | <input checked="" type="checkbox"/> |
| DTIC | TAB | <input type="checkbox"/> |
| Unannounced <input type="checkbox"/> | | |
| Justification _____ | | |
| By _____ | | |
| Distribution / _____ | | |
| Availability Codes | | |
| Dist | Avail and / or Special | |
| A-1 | | |

**Contract DAAL03-92-C-0001
“Basic and Applied Research in the Field of
Electronics and Communications”
November 1, 1991 - October 31, 1994**

**Research Laboratory of Electronics
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139-4307**

**Submitted by
Professor Jonathan Allen, Principal Investigator
February 1995**

**Approved for public release;
Distribution unlimited**

**Overview of the
MIT Research Laboratory of Electronics
Joint Services Electronics Program
for the period
November 1, 1991 - October 31, 1994**

The MIT Research Laboratory of Electronics Joint Services Program comprises seventeen work units that span a broad array of topics in high-speed optics, surface and phase transitions, submicron structures and quantum-effect devices, the electrical behavior of interconnect structures, and atomic and molecular physics.

The RLE program has developed and utilized state-of-the-art epitaxial growth techniques for high-performance devices that use indium gallium aluminum arsenide quantum heterostructures, as well as indium aluminum arsenide/indium gallium arsenide heterostructure field-effect transistors for high-speed, high-power telecommunication applications. The RLE program is unique in that it provides II-VI and II-V integrated growth facilities for a variety of projects, most notably the metalorganic molecular beam epitaxy of zinc selenide for blue light-emitter applications.

The RLE program continues to provide a strong array of capabilities in the sub-100-nanometer structure area, which is essential for our research in quantum-effect devices. Our x-ray nanolithography capability continues to expand. This will lead to the ability to grow extremely small MOSFETs with channels less than one-tenth of a micron in length. The acquisition of an electron beam lithographic capability has complemented our x-ray facilities. This has enhanced both our direct-write and mask masking capabilities.

Experiments with the single-electron transistor, which were previously reported, are aimed at developing new techniques to decrease the scale of these devices. This will enable these devices to operate at higher temperatures. Theoretical efforts have also been directed at single-electron transistors with a view towards understanding basic theory and revealing possibilities for new directions. The theoretical research is also focused on the statistical mechanics properties of quantum dots and how they can be utilized for new device applications.

Femtosecond optical capability is aimed at the provision of all-optical networks and all-optical switching by using compact, solid-state lasers that exhibit additive pulse modelocking. Soliton transmissions have been studied and implemented in these networks, thus permitting extremely long distances between repeaters in practical systems. The femtosecond optical capability is also utilized to probe electronic materials and to optimize transport properties in extremely fast electronic devices.

Surfaces are central to modern electronic and optical devices, and the RLE program continues its strong theoretical effort to characterize surface phase transitions, impurities, and stress. Realistic surface profiles are computed, and defect complexes on surfaces have been realistically characterized. Experimentally, synchrotron x-ray diffraction studies using high-power x-ray facilities have revealed new surface phenomena, including the ability to move plateaus on silicon surfaces through the introduction of surface currents. A detailed understanding of the atomic

mechanisms of surface reconstruction has been obtained. The understanding of surface roughness, which is essential for many applications, has led to a better understanding of new fabrication techniques. By using accelerated neutral halogen atoms, surface reactions (similar to those found in reactive ion etching) have been studied in detail. New techniques that avoid high pressure and associated surface defects have been devised for surface etching.

Many electronic and optical systems require extremely high-precision measurements and standards. The RLE JSEP program has pioneered the development of optical frequency standards. These developments can then be exploited in many electronic systems that involve the synchronization and coordination of worldwide systems. Highly accurate techniques to measure mass are now available for ultrahigh-resolution studies of electronic and optical materials. These techniques also provide a uniform and portable ultraprecision standard for mass.

RLE participates with other JSEP universities in electromagnetic studies. The focus at RLE is on propagation through multilayer media, such as that found in computer interconnect structures. Direct solutions in the time domain have provided a new understanding and the capability to decrease the delays imposed by these networks.

A continuing direction of the RLE program is the study and exploitation of individual atoms and molecules, as well their contribution to the behavior of practical electronic and optical devices. The direct control of individual charge carriers is now feasible, and there is an increased understanding of possibilities for new quantum-effect devices based on cavity quantum electrodynamics in solid-state Coulomb blocking effects. The RLE program continues its efforts to realize new, practical devices with outstanding performance to exploit these effects.

**Principal Investigators
Supported by the
Joint Services Electronic Program**

Contract DAAL03-92-C-0001

November 1, 1991 - October 31, 1994

Jonathan Allen
Boris L. Altshuler
A. Nihat Berker
Robert J. Birgeneau
Sylvia T. Ceyer
Jesús del Alamo
Clifton G. Fonstad, Jr.
James G. Fujimoto
Hermann A. Haus
Erich P. Ippen
John D. Joannopoulos
Marc A. Kastner
Daniel Kleppner
Leslie A. Kolodziejski
Jin Au Kong
Patrick A. Lee
Simon G.J. Mochrie
David E. Pritchard
Henry I. Smith

Degrees Awarded under Joint Services Support
November 1, 1991 - October 31, 1994
Contract DAAL-03-92-C-0001

InGaAlAs Quantum Heterostructures for High-Performance Devices

Broekaert, T.P.E., Ph.D., 1992

InAlAs/InGaAs Heterostructure Field-Effect Transistors for Telecommunications

Bahl, S.R., Ph.D., 1993

Chemical Beam Epitaxy of II-VI/III-V Quantum Wells

No degrees reported.

Sub-100nm Structures: Technology and Electronics

Modiano, A.M., Ph.D., 1992

Moolji, A.A., S.B., 1993

Olster, D.B., S.B., 1992

Single-Electron Transistors

No degrees reported.

Quantum Transport in Low-Dimensional Disordered Systems

No degrees reported.

Statistical Mechanics of Quantum Dots

No degrees reported.

Femtosecond Quantum Optics

Hall, K.L., Ph.D., 1993

Khatri, F.I., S.M., 1992

Ultrafast Optical and Electronic Processes

No degrees reported.

Excitations, Ground State Properties, and Phase Transitions of Surfaces

No degrees reported.

Synchrotron X-ray Studies of Surface Disordering

Nuttal, W.J., Ph.D., 1993

Statistical Mechanics of Surface Systems and Quantum-Correlated Systems

No degrees reported.

Step Structures and Epitaxy

Abernathy, D.L., Ph.D., 1993

Molecular Beam Etching of and Deposition on Silicon

Yang, J.J., Ph.D., 1993

Optical Frequency Metrology

No degrees reported.

Precision Instrumentation

No degrees reported.

Electromagnetic Waves in Multilayer Media

Tassoudji, M.A., Ph.D., 1994

Publications Acknowledging Joint Services Support

November 1, 1991 - October 31, 1994

Contract DAAL03-92-C-0001

1.1.1 Published Journal Articles

- Abernathy, D.L., D. Gibbs, G. Grubel, K.G. Huang, S.G.J. Mochrie, A.R. Sandy, and D.M. Zehner. "Reconstruction of the (111) and (001) Surfaces of Au and Pt: Thermal Behavior." *Surf. Sci.* 283: 260 (1993).
- Abernathy, D.L., R.J. Birgeneau, K.I. Blum, and S.G.J. Mochrie. "Critical Behavior at Chiral Melting: Disordering of the Si(113)-(3x1) Reconstruction." *Phys. Rev. Lett.* 71(5): 750-753 (1993).
- Abernathy, D.L., S. Song, K.I. Blum, R.J. Birgeneau, and S.G.J. Mochrie. "Chiral Melting of the Si(113) Reconstruction." *Phys. Rev. B* 49: 2691 (1994).
- Abernathy, D.L., S.G.J. Mochrie, D.M. Zehner, G. Grubel, and D. Gibbs. "Orientational Epitaxy and Lateral Structure of the Hexagonally-Reconstructed Pt(001) Surface." *Phys. Rev. B* 45: 9272 (1992).
- Abernathy, D.L., S.G.J. Mochrie, D.M. Zehner, G. Grubel, and D. Gibbs. "Thermal Roughness of a Close-Packed Metal Surface: Pt(001)." *Phys. Rev. Lett.* 69: 941 (1992).
- Acioli, L.H., M. Ulman, E.P. Ippen, J.G. Fujimoto, H. Kong, B.S. Chen, and M. Cronin-Golomb. "Femtosecond Temporal Encoding in Barium Titanate." *Opt. Lett.* 16(24):1984-1986 (1991).
- Acioli, L.H., M. Ulman, F. Vallee, and J.G. Fujimoto. "Femtosecond Carrier Dynamics in the Presence of a Cold Plasma in GaAs and AlGaAs." *Appl. Phys. Lett.* 63(5): 666-668 (1993).
- Alexander, S.B., R.S. Bondurant, D. Byrne, V.W.S. Chan, S.G. Finn, R. Gallager, B.S. Glance, H.A. Haus, P. Humblet, R. Jain, I.P. Kaminow, M. Karol, R.S. Kennedy, A. Kirby, H.Q. Le, A.A.M. Saleh, B.A. Schofield, J.H. Shapiro, N.K. Shankaranarayanan, R.E. Thomas, R.C. Williamson, and R.W. Wilson. "A Precompetitive Consortium on Wide-band All-optical Networks." *J. Lightwave Technol.* 11(5/6): 714-734 (1993).
- Arias, T.A., M.C. Payne, and J.D. Joannopoulos. "Ab initio Molecular-Dynamics Techniques Extended to Large-Length-Scale Systems." *Phys. Rev. B* 45(4): 1538-1549 (1992).
- Arias, T.A., M.C. Payne, and J.D. Joannopoulos. "Ab Initio Molecular Dynamics: Analytically Continued Energy Functionals and Insights into Iterative Solutions." *Phys. Rev. Lett.* 69(7): 1077-1080 (1992).
- Ashoori, R.C., H.L. Stormer, J.S. Weiner, L.N. Pfeiffer, K.W. Baldwin, and K.W. West. "N-Electron Ground State Energies of a Quantum Dot in Magnetic Field." *Phys. Rev. Lett.* 71(4): 613-616 (1993).
- Ashoori, R.C., H.L. Stormer, J.S. Weiner, L.N. Pfeiffer, S.J. Pearton, K.W. Baldwin, and K.W. West. "Single-Electron Capacitance Spectroscopy of Discrete Quantum Levels." *Phys. Rev. Lett.* 68(20): 3088-3091 (1992).

- Bagwell, P.F., S.L. Park, A. Yen, D.A. Antoniadis, H.I. Smith, T.P. Orlando, and M.A. Kastner. "Magnetotransport in Multiple Narrow Silicon Inversion Channels Opened Electrostatically into a Two-dimensional Electron Gas." *Phys. Rev. B* 45(16): 9214-9221 (1992).
- Bahl, S.R., and J.A. del Alamo. "Elimination of Mesa-Sidewall Gate Leakage in InAlAs/InGaAs Heterostructures by Selective Sidewall Recessing." *IEEE Electron Devices Lett.* 13(4): 195-197 (1992).
- Bahl, S.R., and J.A. del Alamo. "Breakdown Voltage Enhancement from Channel Quantization in InAlAs/n⁺-InGaAs Heterostructure Field-Effect Transistors." *IEEE Electron Devices Lett.* 13(2): 123-125 (1992).
- Bahl, S.R., and J.A. del Alamo. "A New Drain-Current Injection Technique for the Measurement of Off-State Breakdown Voltage in FET's." *IEEE Trans. Electron Devices* 40(8): 1558-1560 (1993).
- Bahl, S.R., B.R. Bennett, and J.A. del Alamo. "Doubly-Strained In_{0.41}Al_{0.59}As/n⁺-In_{0.65}Ga_{0.35}As HFET with High Breakdown Voltage." *IEEE Electron Devices Lett.* 14(1): 22-24 (1993).
- Bahl, S.R., J.A. del Alamo, J. Dickmann, and S. Schildberg. "Physics of Breakdown in InAlAs/InGaAs MODFETs." *IEEE Trans. Electron Devices* 40(11): 2110-2111 (1993).
- Bahl, S.R., M.H. Leary, and J.A. del Alamo. "Mesa-Sidewall Gate Leakage in InAlAs/InGaAs Heterostructure Field-Effect Transistors." *IEEE Trans. Electron Devices* 39(9): 2037-2043 (1992).
- Berker, A.N. "Absence of Temperature-Driven First-Order Phase Transitions in Systems with Random Bonds." *J. Appl. Phys.* 70(10): 5941-5945 (1991).
- Berker, A.N. "Critical Behavior Induced by Quenched Disorder." *Physica A* 194(1): 72-76 (1993).
- Berker, A.N., and K. Hui. "Phase Diagram of the Ising Model on the Square Lattice with Crossed Diagonal Bonds." *Phys. Rev. B* 48(17): 12393-12398 (1993).
- Boivin, L., F.X. Kartner, and H.A. Haus. "Analytical Solution to the Quantum Field Theory of Self-Phase Modulation with a Finite Response Time." *Phys. Rev. Lett.* 73(2): 240-243 (1994).
- Brommer, K., B. Larson, M. Needels, and J.D. Joannopoulos. "Modeling Large Surface Reconstructions on the Connection Machine." *J. Appl. Phys.* 32: 1360 (1993).
- Brommer, K.D., B.E. Larson, M. Needels, and J.D. Joannopoulos. "Implementation of the Car-Parrinello Algorithm for Ab Initio Total Energy Calculations on a Massively Parallel Computer." *Comput. Phys.* 7(3): 350-362 (1993).
- Brommer, K.D., M. Needels, B.E. Larson, and J.D. Joannopoulos. "Ab-Initio Theory of the Si(111)-(7x7) Surface Reconstruction - A Challenge for Massively Parallel Computation." *Phys. Rev. Lett.* 68(9): 1355-1358 (1992).
- Carter, J.M., D.B. Olster, M.L. Schattenburg, A. Yen, and H.I. Smith. "Large-area, Free-Standing Gratings for Atom Interferometry Produced Using Holographic Lithography." *J. Vac. Sci. Technol. B* 10(6): 2909-2911 (1992).
- Chamon, C. deC., C.K. Sun, H.A. Haus, and J.G. Fujimoto. "Femtosecond Time Division Interferometry Technique for Measuring the Tensor Components of X₍₃₎." *Appl. Phys. Lett.* 60(5): 533-535 (1992).

- Chen, J.C., H.A. Haus, and E.P. Ippen. "Stability of Lasers Mode Locked by Two Saturable Absorbers." *IEEE J. Quantum Electron.* 29(4): 1228-1232 (1993).
- Cheng, T.K., L.H. Acioli, J. Vidal, H.J. Zeiger, G. Dresselhaus, M.S. Dresselhaus, and E.P. Ippen. "Modulation of a Semiconductor-to-Semimetal Transition at 7 THz via Coherent Lattice Vibrations." *Appl. Phys. Lett.* 62(16): 1901-1903 (1993).
- Cho, K., and J.D. Joannopoulos. "Tip-Surface Interactions in Scanning Tunneling Microscopy." *Phys. Rev. Lett.* 71(9): 1387-1390 (1993).
- Cho, K., T.A. Arias, J.D. Joannopoulos, and P.K. Lam. "Wavelets in Electronic Structure Calculations." *Phys. Rev. Lett.* 71(12): 1808-1811 (1993).
- Chu, W., C.C. Eugster, A. Moel, E.E. Moon, J.A. del Alamo, H.I. Smith, M.L. Schattenburg, K.W. Rhee, M.C. Peckerar, and M.R. Melloch. "Conductance Quantization in a GaAs Electron Waveguide Device Fabricated by X-ray Lithography." *J. Vac. Sci. Technol. B* 10(6): 2966-2969 (1992).
- Chu, W., H.I. Smith, S.A. Rishton, D.P. Kern, and M.L. Schattenburg. "Fabrication of 50 nm Line-and-Space X-ray Masks in Thick Au Using a 50 keV Electron Beam System." *J. Vacuum Sci. Tech. B* 10(1): 118-121 (1992).
- Cornell, E.A., K.R. Boyce, D.L.K. Fygenson, and D.E. Pritchard. "Two Ions in a Penning Trap: Implications for Precision Mass Spectroscopy." *Phys. Rev. A* 45(5): 3049-3059 (1992).
- Coronado, C.A., E. Ho, and L.A. Kolodziejski. "Effect of Laser on MOMBE ZnSe Using Gaseous and Solid Sources." *J. Cryst. Growth* 127: 323-326 (1993).
- Coronado, C.A., E. Ho, L.A. Kolodziejski, and C.A. Huber. "Photoassisted Metalorganic Molecular Beam Epitaxy of ZnSe." *Appl. Phys. Lett.* 61(5): 534-536 (1992).
- Coronado, C.A., E. Ho, P.A. Fisher, J.L. House, K. Lu, G.S. Petrich, and L.A. Kolodziejski. "Gas Source Molecular Beam Epitaxy of ZnSe and ZnSe:N." *J. Electron. Mater.* 23(3): 269-273 (1994).
- Dal Pino, Jr., A., A.M. Rappe, and J.D. Joannopoulos. "Ab Initio Investigation of Carbon Related Defects in Silicon." *Phys. Rev. B* 47(19): 554-556 (1993).
- DiFilippo, F., V. Natarajan, K.R. Boyce, and D.E. Pritchard. "Classical Amplitude Squeezing for Precision Measurements." *Phys. Rev. Lett.* 68(19): 2859-2862 (1992).
- Doerr, C.R., F.I. Khatri, and M. Shirasaki. "Simulation of Pulsed Squeezing in Optical Fiber with Chromatic Dispersion." *J. Opt. Soc. Am. B* 11(1): 143-149 (1994).
- Doerr, C.R., H.A. Haus, E.P. Ippen, M. Shirasaki, and K. Tamura. "Additive-pulse Limiting." *Opt. Lett.* 19(1): 33-36 (1994).
- Ekstrom, C.R., D.W. Keith, and D.E. Pritchard. "Atom Optics Using Microfabricated Structures." *Appl. Phys. B* 54: 369-374 (1992).
- Fleischer, S.B., E.P. Ippen, G. Dresselhaus, M.S. Dresselhaus, A.M. Rao, P. Zhou, and P.C. Eklund. "Femtosecond Optical Dynamics of C_{60} and M_3C_{60} ." *Appl. Phys. Lett.* 62: 3241-3243 (1993).

- Gabbeta, G., D. Huang, J. Jacobson, M. Ramaswamy, E.P. Ippen, and J.G. Fujimoto. "Femtosecond Pulse Generation in Ti:Al₂O₃ Using a Microdot Mirror Mode Locker." *Opt. Lett.* 16(22):1756-1758 (1991).
- Ghanbari, R.A., M. Burkhardt, D.A. Antoniadis, H.I. Smith, M.R. Melloch, K.W. Rhee, and M.C. Peckerar. "Comparative Mobility Degradation in Modulation-doped GaAs Devices after E-beam and X-ray Irradiation." *J. Vac. Sci. Technol. B* 10(6): 2890-2892 (1992).
- Ghanbari, R.A., W. Chu, E.E. Moon, M. Burkhardt, K. Yee, D.A. Antoniadis, H.I. Smith, M.L. Schattenburg, K.W. Rhee, R. Bass, M.C. Perkerar, and M.R. Melloch. "Fabrication of Parallel Quasi-one-dimensional Wires Using a Novel Conformable X-ray Mask Technology." *J. Vac. Sci. Technol. B* 10(6): 3196-3199 (1992).
- Grishchuk, L., H.A. Haus, and K. Bergman. "Generation of Squeezed Radiation from Vacuum in the Cosmos and the Laboratory." *Phys. Rev. D* 46(4): 1440-1449 (1992).
- Grubel, G., D. Gibbs, S.M. Zehner, D.L. Abernathy, A.R. Sandy, and S.G.J. Mochrie. "Phase Behavior of Au and Pt Surfaces." *Surf. Sci.* 287/288: 842 (1993).
- Gu, Q., Y.E. Yang, and M.A. Tassoudji. "Modeling and Analysis of Vias in Multilayered Integrated Circuits." *IEEE Trans. Microwave Theory Tech.* 41(2): 206-214 (1993).
- Gupta, N., S.D. Hector, K.W. Rhee, and H.I. Smith. "Fabrication of 100nm T-gates for Monolithic Microwave Integrated Circuits Using X-ray Lithography." *J. Vac. Sci. Technol. B* 11(6): 2625-2628 (1993).
- Hall, K.L., A.M. Darwish, E.P. Ippen, U. Koren, and G. Raybon. "Femtosecond Index Nonlinearities in InGaAsP Optical Amplifiers." *Appl. Phys. Lett.* 62(12): 1320-1322 (1993).
- Hall, K.L., G. Lenz, and E.P. Ippen. "Femtosecond Time Domain Measurements of Group Velocity Dispersion in Diode Lasers at 1.5 μm." *J. Lightwave Technol.* 10(5): 616-619 (1992).
- Hall, K.L., G. Lenz, E.P. Ippen, and G. Raybon. "Heterodyne Pump-Probe Technique for Time-Domain Studies of Optical Nonlinearities in Waveguides." *Opt. Lett.* 17(12): 874-876 (1992).
- Hall, K.L., G. Lenz, E.P. Ippen, U. Koren, and G. Raybon. "Carrier Heating and Spectral Hole Burning in Strained-Layer Quantum-Well Laser Amplifiers at 1.5 μm." *Appl. Phys. Lett.* 61(21): 2512-2514 (1992).
- Haus, H.A. "Control Filters for Repeaterless Soliton Transmission." *Fiber Integrat. Opt.* 12: 187-197 (1993).
- Haus, H.A. "Optical Fiber Solitons, Their Properties and Uses." *IEEE Proc.* 81(7): 970-983 (1993).
- Haus, H.A. "Molding Light into Solitons." *IEEE Spectrum* 30(3): 48-53 (1993).
- Haus, H.A., and A. Mecozzi. "Noise of Mode-Locked Lasers." *IEEE J. Quantum Electron.* 29(3): 983-996 (1993).
- Haus, H.A., and A. Mecozzi. "Long-term Storage of a Bit Stream of Solitons." *Opt. Lett.* 17(21): 1500-1502 (1992).
- Haus, H.A., and W. Huang. "Coupled-Mode Theory." *IEEE Proc.* 79(10): 1505-1518 (1991).

- Haus, H.A., and Y. Lai. "Theory of Cascaded Quarter Wave Shifted Distributed Feedback Resonators." *IEEE J. Quantum Electron.* 28(1): 205-213 (1992).
- Haus, H.A., and Y. Lai. "Narrow-Band Optical Channel-Dropping Filter." *J. Lightwave Technol.* 10(1): 57-62 (1992).
- Haus, H.A., E.P. Ippen, and K. Tamura. "Additive-Pulse Modelocking in Fiber Lasers." *IEEE J. Quantum Electron.* 30(1): 200-208 (1994).
- Haus, H.A., J.D. Moores, and L.E. Nelson. "Effect of Third-Order Dispersion on Passive Mode Locking." *Opt. Lett.* 18(1): 51-53 (1993).
- Haus, H.A., J.G. Fujimoto, and E.P. Ippen. "Analytic Theory of Additive Pulse and Kerr Lens Mode Locking." *IEEE J. Quantum Electron.* 28(10): 2086-2096 (1992).
- Hector, S.D., M.L. Schattenburg, E.H. Anderson, W. Chu, V.V. Wong, and H.I. Smith. "Modeling and Experimental Verification of Illumination and Diffraction Effects on Image Quality in X-ray Lithography." *J. Vac. Sci. Technol. B* 10(6): 3164-3168 (1992).
- Held, G.A., D.M. Goodstein, R.M. Feenstra, M.J. Ramstad, D.Y. Noh, and R.J. Birgeneau. "Pinned and Unpinned Step Dynamics on Vicinal Silver (110) Surfaces." *Phys. Rev. B* 48: 8458 (1993).
- Hirayama, Y., J.H. Smet, L.H. Peng, C.G. Fonstad, and E.P. Ippen. "Observations of $1.798 \mu\text{m}$ Intersubband Transition in InGaAs/AlAs Pseudomorphic Quantum Well Heterostructures." *Appl. Phys. Lett.* 63: 1663-1665 (1993).
- Houston, W., and A.N. Berker. "Dimensionality Effects on the Multicritical Phase Diagrams of the Blume-Emery-Griffiths Model with Repulsive Biquadratic Coupling: Mean-field." *J. Appl. Phys.* 70(10): 6101-6103 (1991).
- Huang, D., M. Ulman, L.H. Acioli, H.A. Haus, and J.G. Fujimoto. "Self-Focusing Induced Saturable Loss for Laser Modelocking." *Opt. Lett.* 17(7): 511-513 (1992).
- Jacobson, J.M., K. Naganuma, H.A. Haus, J.G. Fujimoto, and A.G. Jacobson. "Femtosecond Pulse Generation in a Ti:Al₂O₃ Laser by Using Second- and Third-Order Intracavity Dispersion." *Opt. Lett.* 17(22): 1608-1610 (1992).
- Kartner, F.X., D. Dougherty, H.A. Haus, and E.P. Ippen. "Raman Noise and Soliton Squeezing." *J. Opt. Soc. Am. B* 11(7): 1267-1276 (1994).
- Kastner, M.A. "The Single-Electron Transistor." *Rev. Mod. Phys.* 64(3): 849-858 (1992).
- Kaxiras, E., O. Alerhand, J. Wang, and J.D. Joannopoulos. "Theoretical Modeling of Heteroepitaxial Growth Initiation." *Mat. Sci. Eng. B* 14: 245 (1992).
- Ketterle, W., and D.E. Pritchard. "Trapping and Focusing Ground State Atoms with Static Fields." *Appl. Phys. B* 54: 403-406 (1992).
- Ketterle, W., and D.E. Pritchard. "Atom Cooling by Time-Dependent Potentials." *Phys. Rev. A* 46(7): 4051-4054 (1992).
- Khatri, F.I., G. Lenz, J.D. Moores, H.A. Haus, and E.P. Ippen. "Extension of Coupled-cavity Additive Pulse Mode-locked Laser Theory." *Opt. Commun.* 110: 131-136 (1994).

- Lee, C.F., R.T. Shin, and J.A. Kong. "Time Domain Modeling of Impedance Boundary Condition." *IEEE Trans. Microwave Theory Tech.* 40(9): 1847-1850 (1992).
- Li, K., C.F. Lee, S.Y. Poh, R.T. Shin, and J.A. Kong. "Application of FDTD Method to Analysis of Electromagnetic Radiation from VLSI Heatsink Configurations." *IEEE Trans. Electromagn. Compat.* 35(2): 204-214 (1993).
- McEuen, P.L., E.B. Foxman, J. Kinaret, U. Meirav, M.A. Kastner, N.S. Wingreen, and S.J. Wind. "Self-consistent Addition Spectrum of a Coulomb Island in the Quantum Hall Regime." *Phys. Rev. B* 45(19): 11419-11422 (1992).
- Meade, R.D., A.M. Rappe, K.D. Brommer, and J.D. Joannopoulos. "Nature of the Photonic Band Gap: Some Insights from a Field Analysis." *J. Opt. Soc. Am. B* 10(2): 328-332 (1993).
- Meade, R.D., A.M. Rappe, K.D. Brommer, and J.D. Joannopoulos. "Accurate Theoretical Analysis of Photonic Band-Gap Materials." *Phys. Rev. B* 48(11): 8434-8437 (1993).
- Meade, R.D., K.D. Brommer, A.M. Rappe, and J.D. Joannopoulos. "Electromagnetic Bloch Waves at the Surface of a Photonic Crystal." *Phys. Rev. B* 44(19):10961-10964 (1991).
- Meade, R.D., K.D. Brommer, A.M. Rappe, and J.D. Joannopoulos. "Photonic Bound States in Periodic Dielectric Materials." *Phys. Rev. B* 44(24):13772-13774 (1991).
- Meade, R.D., K.D. Brommer, A.M. Rappe, J.D. Joannopoulos. "Existence of a Photonic Bandgap in Two Dimensions." *Appl. Phys. Lett.* 61(4): 495-497 (1992).
- Mecozzi, A., and H.A. Haus. "Effect of Filters on Soliton Interactions in WDM Systems." *Opt. Lett.* 17(14): 988-990 (1992).
- Mecozzi, A., J.D. Moores, H.A. Haus, and Y. Lai. "Modulation and Filtering Control of Soliton Transmission." *J. Opt. Soc. Am. B.* 9(8): 1350-1357 (1992).
- Mecozzi, A., J.D. Moores, H.A. Haus, and Y. Lai. "Soliton Transmission Control." *Opt. Lett.* 16(23):1841-1843 (1991).
- Moel, A., W. Chu, K. Early, Y-C. Ku, E.E. Moon, F. Tsai, H.I. Smith, M.L. Schattenburg, C.D. Fung, F.W. Griffith, and L.E. Haas. "Fabrication and Characterization of High-Flatness Mesa-Etched Silicon Nitride X-ray Masks." *J. Vac. Sci. Technol. B* 9(6): 3287-3291 (1991).
- Moolji, A.A., S.R. Bahl, and J.A. del Alamo. "Impact Ionization in InAlAs/InGaAs HFET's." *IEEE Electron Dev. Lett.* 15(8): 313-315 (1994).
- Natarajan, V., K.R. Boyce, F. DiFilippo, and D.E. Pritchard. "Precision Penning Trap Comparison of Nondoublets: Atomic Masses of H, D, and the Neutron." *Phys. Rev. Lett.* 71(13): 1998-2001 (1993).
- Needels, M., A.M. Rappe, P.D. Bristowe, and J.D. Joannopoulos. "Ab Initio Study of a Grain Boundary in Gold." *Phys. Rev. B* 46(15): 9768-9771 (1992).
- Netz, R.R. "New Phases and Multiple Reentrance of the Blume-Emery-Griffiths Model with Repulsive Biquadratic Coupling:Monte Carlo Renormalization-Group Theory." *Europhys. Lett.* 17(4): 373-377 (1992).

- Netz, R.R. "Symmetry-Breaking Fields in Frustrated Ising Systems on Square and Cubic Lattices." *Phys. Rev. B* 46(2): 61-64 (1992).
- Netz, R.R., and A.N. Berker. "Hard-spin Mean-field Theory: Formulation for Ising, XY, and Other Models." *J. Appl. Phys.* 70(10): 6074-6076 (1991).
- Netz, R.R., and A.N. Berker. "Renormalization-group Theory of an Internal Critical Endpoint Structure: The Blume-Emery-Griffiths Model with Biquadratic Repulsion." *Phys. Rev. B* 47(22): 15019-15022 (1993).
- Netz, R.R., and A.N. Berker. "Smectic-C Order, In-Plane Domains, and Nematic Reentrance in a Microscopic Model of Liquid Crystals." *Phys. Rev. Lett.* 68(3): 333-336 (1992).
- Noh, D.Y., K.I. Blum, M.J. Ramstad, and R.J. Birgeneau. "Faceting, Roughness, and Step Disordering of Vicinal Si(111) Surfaces: An X-ray-scattering Study." *Phys. Rev. B* 48(3): 1612-1625 (1993).
- Noh, D.Y., K.I. Blum, M.J. Ramstad, and R.J. Birgeneau. "Long-range Coherence and Macroscopic Phase Separation of Steps on Vicinal Si(111)." *Phys. Rev. B* 44(19): 10969-10972 (1991).
- Nuttal, W.J., K.P. Fahey, M.J. Young, B. Keimer, R.J. Birgeneau, and H. Suematsu. "A Synchrotron X-ray Diffraction Study of the Structural Phase Behavior of Multilayer Xenon on Single-Crystal Graphite." *J. Phys. Condens. Matt.* 5: 8159 (1993).
- Paye, J., M. Ramaswamy, J.G. Fujimoto, and E.P. Ippen. "Measurement of the Amplitude and Phase of Ultrashort Light Pulses by Spectrally Resolved Autocorrelation." *Opt. Lett.* 18(22): 1946-1948 (1993).
- Payne, M.C., M.P. Teter, D.C. Allan, T.A. Arias, and J.D. Joannopoulos. "Iterative Minimization Techniques for Ab Initio Total-energy Calculations: Molecular Dynamics and Conjugate Gradients." *Rev. Mod. Phys.* 64(4): 1045-1098 (1992).
- Ramaswamy, M., A.S. Gouveir-Neto, D.K. Negus, J.A. Izatt, and J.G. Fujimoto. "2.3-ps Pulses from a Kerr-lens Mode-locked Lamp-pumped Nd:YLF Laser with a Microdot Mirror." *Opt. Lett.* 18(21): 1825-1827 (1993).
- Ramaswamy, M., M. Ulman, J. Paye, and J.G. Fujimoto. "Cavity-dumped Femtosecond Kerr-lens Mode-locked Ti:Al₂O₃ Laser." *Opt. Lett.* 18(21): 1822-1824 (1993).
- Ramstad, M.J., R.J. Birgeneau, K.I. Blum, D.Y. Noh, B.O. Wells, and M.J. Young. "DC Current Dependent Faceting of Vicinal Si(111)." *Europhys. Lett.* 24: 653 (1993).
- Rappe, A.M., A. Dal Pino, Jr., M. Needels, and J.D. Joannopoulos. "Mixed-Basis Pseudopotential Method Applied to Iterative Diagonalization Techniques." *Phys. Rev. B* 46(12): 7353-7357 (1992).
- Rappe, A.M., J.D. Joannopoulos, and P.A. Bash. "A Test of the Utility of Plane Waves for the Study of Molecules from First Principles." *J. Am. Chem. Soc.* 114(16): 6466-6469 (1992).
- Rhee, K.W., D.I. Ma, M.E. Peckerar, R.A. Ghanbari, and H.I. Smith. "Proximity Effect Reduction in X-ray Mask Making Using Thin Silicon Dioxide Layers." *J. Vac. Sci. Technol. B* 10: 3062-3066 (1992).

- Rittenhouse, G.E., K. Early, B.S. Meyerson, H.I. Smith, and J.M. Graybeal. "Novel Vertical Silicon-Membrane Structure and Its Application to Josephson Devices." *J. Vac. Sci. Technol. B* 10: 2860-2863 (1992).
- Robertson, W., G. Arjavalingam, R. Meade, K. Brommer, A. Rappe, and J.D. Joannopoulos. "Measurement of the Photo Dispersion Relation in 2D Ordered Dielectric Arrays." *J. Opt. Soc. Am. B* 10: 322 (1993).
- Robertson, W., G. Arjavalingam, R. Meade, K. Brommer, A. Rappe, and J.D. Joannopoulos. "Observation of Surface Photons on Periodic Dielectric Arrays." *Opt. Lett.* 18: 528 (1993).
- Smith, H.I., S.D. Hector, M.L. Schattenburg, and E.H. Anderson. "A New Approach to High Fidelity E-Beam and Ion-Beam Lithography Based on an in situ Global-Fiducial Grid." *J. Vac. Sci. Technol. B* 9(6): 2992-2995 (1991).
- Song, S., and S.G.J. Mochrie. "Tricriticality in the Orientational Phase Diagram of Stepped Si(113) Surfaces." *Phys. Rev. Lett.* 73(7): 995-998 (1994).
- Sun, C-K., H.K. Choi, C.A. Wang, and J.G. Fujimoto. "Studies of Carrier Heating in InGaAs/AlGaAs Strained-Layer Quantum-Well Diode Lasers Using a Multiple Wavelength Pump Probe Technique." *Appl. Phys. Lett.* 62(7): 747-749 (1993).
- Sun, C-K., F. Vallee, L. Acioli, E.P. Ippen, and J.G. Fujimoto. "Femtosecond Investigation of Electron Thermalization in Gold." *Phys. Rev. B* 48(16): 365-368 (1993).
- Sun, C-K., H.K. Choi, C.A. Wang, and J.G. Fujimoto. "Femtosecond Gain Dynamics in InGaAs/AlGaAs Strained-Layer Single-Quantum-Well Diode Lasers." *Appl. Phys. Lett.* 63(1): 96-98 (1993).
- Tamura, K., C.R. Doerr, H.A. Haus, and E.P. Ippen. "Soliton Fiber Ring Laser Stabilization and Tuning with a Broad Intracavity Filter." *IEEE Photonic Technol. Lett.* 6(6): 697-699 (1994).
- Tamura, K., C.R. Doerr, L.E. Nelson, H.A. Haus, and E.P. Ippen. "Technique for Obtaining High-energy Ultrashort Pulses from an Additive-pulse Mode-locked Erbium-doped Fiber Ring Laser." *Opt. Lett.* 19(1): 46-48 (1994).
- Tamura, K., E.P. Ippen, H.A. Haus, and L.E. Nelson. "77-fs Pulse Generation from a Stretched-pulse Mode-locked All-fiber Ring Laser." *Opt. Lett.* 18(13): 1080-1082 (1993).
- Tamura, K., H.A. Haus, and E.P. Ippen. "Self-starting Additive Pulse Modelocked Erbium Fiber Ring Laser." *Electron. Lett.* 28(24): 2226-2227 (1993).
- Tamura, K., J. Jacobson, E.P. Ippen, H.A. Haus, and J.G. Fujimoto. "Unidirectional Ring Resonators for Self-starting Passively Modelocked Lasers." *Opt. Lett.* 18(3): 220-222 (1993).
- Tamura, K., L.E. Nelson, H.A. Haus, and E.P. Ippen. "Soliton Versus Non-soliton Operation of Fiber Ring Lasers." *Appl. Phys. Lett.* 64(2): 149-151 (1994).
- Tsuk, M.J., and J.A. Kong. "A Hybrid Method for the Calculation of the Resistance and Inductance of Transmission Lines with Arbitrary Cross Sections." *IEEE Trans. Microwave Theory Tech.* 39(8): 1338-1347 (1991).
- Turchette, Q.A., D.E. Pritchard, and D.W. Keith. "Numerical Model of a Multiple Grating Interferometer." *J. Opt. Soc. Am. A* 9(9): 1601-1606 (1992).

- Ulman, M., D.W. Bailey, L.H. Acioli, F.G. Vallee, C.J. Stanton, E.P. Ippen, and J.G. Fujimoto. "Femtosecond Tunable Nonlinear Absorption Spectroscopy in $\text{Al}_{0.1}\text{Ga}_{0.9}\text{As}$." *Phys. Rev. B* 47(16): 10267-10278 (1993).
- Wang, J., T.A. Arias, and J.D. Joannopoulos. "Dimer Vacancies and Dimer-vacancy Complexes on the Si(100) Surface." *Phys. Rev. B* 47(16): 10497-10508 (1993).
- Wang, J., T.A. Arias, J.D. Joannopoulos, G.W. Turner, and O.L. Alerhand. "Scanning-tunneling-microscopy Signatures and Chemical Identifications of the (110) Surface of Si-doped GaAs." *Phys. Rev. B* 47(16): 10326-10334 (1993).
- Wong, V.V., W-Y. Choi, J.M. Carter, C.G. Fonstad, H.I. Smith, Y. Chung, and N. Dagli. "Ridge-waveguide Sidewall-grating Distributed Feedback Structures Fabricated by X-ray Lithography." *J. Vac. Sci. Technol. B* 11(6): 2621-2624 (1993).
- Yen, A., H.I. Smith, M.L. Schattenburg, and G.N. Taylor. "An Anti-Reflection Coating for Use with PMMA at 193 nm." *J. Electrochem. Soc.* 139(2): 616-619 (1992).
- Yen, A., M.L. Schattenburg, and H.I. Smith. "Proposed Method for Fabricating 50 nm-period Gratings by Achromatic Holographic Lithography." *Appl. Opt.* 31(16): 2972-2973 (1992).
- Yen, A., E.H. Anderson, R.A. Ghanbari, M.L. Schattenburg, and H.I. Smith. "Achromatic Holographic Configuration for 100-nm-period Lithography." *Appl. Opt.* 31(22): 4540-4545 (1992).
- Yueh, S.H., and J.A. Kong. "Analysis of Diffraction from Chiral Gratings." *J. Electro Waves Appl.* 5(7): 701-714 (1991).
- Zhao, Y., D.C. Tsui, M. Santos, M. Shayegan, R.A. Ghanbari, D.A. Antoniadis, and H.I. Smith. "Magneto-optical Absorption in a Two Dimensional Electron Grid." *Appl. Phys. Lett.* 12: 1510-1512 (1992).

1.1.2 Journal Articles Accepted for Publication

- Bergman, K., H.A. Haus, E.P. Ippen, and M. Shirasaki. "Squeezing in a Fiber Interferometer with a GHz Pump." *Opt. Lett.*
- Berker, A.N., and K. Hui. "Phase Diagram of the Ising Model on the Square Lattice with Crossed Diagonal Bonds." *Phys. Rev. B*.
- Boivin, L., F.X. Kartner, and H.A. Haus. "Integrable Quantum Theory of Self-phase Modulation with Finite Response Time." *Phys. Rev. Lett.*
- Bouma, B., A. Gouveia-Neto, J.A. Izatt, J. Russell, R. Sierra, U. Keller, and J.G. Fujimoto. "Hybrid Modelocking of a Flashlamp Pumped Ti: Al_2O_3 Laser." *Opt. Lett.*
- Burkhardt, M., H.I. Smith, D.A. Antoniadis, T.P. Orlando, M.R. Melloch, K.W. Rhee, and M.C. Peckerar. "Fabrication Using X-ray Nanolithography and Measurement of Coulomb Blockade in a Variable-Sized Quantum Dot." *J. Vac. Sci. Technol. B*.

- Burkhardt, M., S. Silverman, H.I. Smith, D.A. Antoniadis, K.W. Rhee, and M.C. Peckerar. "Gap Control in the Fabrication of Quantum-Effect Devices Using X-ray Nanolithography." *J. Microelectron. Eng.*
- Damask, J.N., and H.A. Haus. "WDM System Design Using Integrated Resonant Filters." *J. Lightwave Technol.*
- Damask, J.N., H.A. Haus, and H.I. Smith. "A Deterministic Analysis of the Coherence-Degradation Effects of Stitching Errors Along a DBR Grating." *IEEE J. Quant. Electron.*
- DiFilippo, F., V. Natarajan, K.R. Boyce, and D.E. Pritchard. "Accurate Atomic Masses for Fundamental Metrology." *Phys. Rev. Lett.*
- Doerr, C.R., H.A. Haus, and E.P. Ippen. "Asynchronous Soliton Mode Locking." *Opt. Lett.*
- Doerr, C.R., K. Tamura, M. Shirasaki, H.A. Haus, and E.P. Ippen. "Orthogonal Polarization Fiber Gyroscope with Increased Stability and Resolution." *Appl. Opt.*
- Falicov, A., and A.N. Berker. "Finite-Temperature Phase Diagram of the tJ Model: Renormalization-Group Theory." *Phys. Rev. B*.
- Foxman, E.B., P.L. McEuen, U. Meirav, N.S. Wingreen, Y. Meir, P.A. Belk, N.R. Belk, and M.A. Kastner. "The Effects of Quantum Levels on Transport Through a Coulomb Island." *Phys. Rev. Lett.*
- Foxman, E.B., U. Meirav, P.L. McEuen, M.A. Kastner, O. Klein, P.A. Belk, D.M. Abusch, and S.J. Wind. "Crossover from Single- to Multi-level Transport in Artificial Atoms." *Phys. Rev. B*.
- Hall, K.L., G. Lenz, A.M. Darwish, and E.P. Ippen. "Subpicosecond Gain and Index Nonlinearities in InGaAsP Diode Lasers." *Opt. Commun.*
- Haus, H.A., E.P. Ippen, and K. Tamura. "Additive Pulse Modelocking in Fiber Lasers." *IEEE J. Quant. Electron.*
- Haus, H.A., and Y. Lai. "Narrow-Band Optical Channel-Dropping Filter." *J. Lightwave Technol.*
- Hector, S.D., V.V. Wong, H.I. Smith, M.A. McCord, and K.W. Rhee. "Printability of Sub-150 nm Features in X-ray Lithography: Theory and Experiments." *J. Vac. Sci. Technol. B*.
- Ho, E., P.A. Fisher, J.L. House, G.S. Petrich, and L.A. Kolodziejski. "The Doping of ZnSe Using Gas Source Molecular Beam Epitaxy." *SPIE Proc.*
- Li, Y., D.P. Pullman, J.J. Yang, and S.T. Ceyer. "Structure and Reactivity of Fluorinated Si(100)." *J. Chem. Phys.*
- Li, Y.L., D.P. Pullman, J.J. Yang, A.A. Tsekouras, D.B. Gosalvez, K.B. Laughlin, M.T. Schulberg, D.J. Gladstone, M. McGonigal, and S.T. Ceyer. "Observation of a New Mechanism for Dissociative Chemisorption: F Atom Abstraction on Si(100)." *Phys. Rev. Lett.*
- Meade, R.D., K.D. Brommer, A.M. Rappe, and J.D. Joannopoulos. "Photonic Bound States in Periodic Dielectric Materials." *Phys. Rev. B*.
- Mondol, M.K., H. Li, G. Owen, and H.I. Smith. "Uniform-Stress Tungsten on X-ray Mask Membranes via He-Backside Temperature Homogenization." *J. Vac. Sci. Technol. B*.

- Pullman, D.P., and S.T. Ceyer. "New Mechanisms of Dissociative Chemisorption on Surfaces: Analysis of the O₂/Al(111) and F₂/Si(100) Reactions." *J. Chem. Phys.*
- Pullman, D.P., Y. Li, J.J. Yang, A.A. Tsekouras, D.B. Gosalvez, and S.T. Ceyer. "Analytical and Monte Carlo Models for Atom Abstraction by Surfaces." *J. Chem. Phys.*
- Ramaswamy-Paye, M., and J.G. Fujimoto. "Compact Dispersion-Compensating Geometry for Kerr-Lens Modelocked Femtosecond Lasers." *Opt. Lett.*
- Shirasaki, M., I. Lyubomirsky, and H.A. Haus. "Noise Analysis of Mach-Zehnder Squeezer for Non-classical Input State." *J. Opt. Soc. Am. B.*
- Sun, C-K., F. Vallee, L.H. Acioli, E.P. Ippen, and J.G. Fujimoto. "Femtosecond Tunable Measurement of Electron Thermalization in Gold." *Phys. Rev. B.*
- Tamura, K., E.P. Ippen, and H.A. Haus. "Theory of Ultrashort Pulse from All-fiber Ring Laser." *J. Opt. Soc. Am. B.*
- Wong, V.V., J. Ferrera, J.N. Damask, J.M. Carter, E.E. Moon, H.A. Haus, H.I. Smith, and S. Rishton. "Spatial-Phase-Locked E-Beam Lithography and X-ray Lithography for Fabricating First-Order Gratings on Rib Waveguides." *J. Vac. Sci. Technol. B.*
- Yang, I.Y., H. Hu, L.T. Su, V.V. Wong, M. Burkhardt, E.E. Moon, J.M. Carter, D.A. Antoniadis, H.I. Smith, K.W. Rhee, and W. Chu. "High Performance Self-Aligned Sub-100 nm MOSFETs Using X-ray Lithography." *J. Vac. Sci. Technol. B.*

1.1.3 Books/Chapters In Books

- Bagwell, P.F., A. Kumar, and R. Lake. "Scattering and Quantum Localization of Electrons in a Waveguide by Static and Time-Varying Potentials." In *Quantum Effect Physics, Electronics and Applications*, 2: 45. Eds. I.T. Ikoma and H.I. Smith. Philadelphia: Institute of Physics Publishing, 1992.
- Berker, A.N., and K. Hui. "Absence of Temperature-Driven First-Order Phase Transitions in Systems with Random Bonds." In *Science and Technology of Nanostructured Magnetic Materials*, pp. 411-417. Eds. G.C. Hadjipanayis and G.A. Prinz. New York: Plenum Press, 1991.
- Berker, A.N., R.G. Cafisch, and M. Kardar. "Statistical Mechanics of Phase Transitions with a Hierarchy of Structures." In *Hierarchically Structured Materials*. Ed. I.A. Aksay. Pittsburgh, Pennsylvania: Materials Research Society, 1992.
- Ceyer, S.T., D.J. Gladstone, M. McGonigal, and M.T. Schulberg. "Molecular Beams: Probes of the Dynamics of Reactions on Surfaces." In *Physical Methods of Chemistry, Vol. IX A, Investigations of Surfaces and Interfaces*, pp. 83-452. Eds. B.W. Rossiter and R.C. Baetzold. New York: Wiley, 1993.
- Cheng, T.K., J. Vidal, H.J. Zeiger, E.P. Ippen, G. Dresselhaus, and M.S. Dresselhaus. "Displacive Excitation of Coherent Phonons." In *Springer Series in Chemical Physics, Ultrafast Phenomena VIII*, 55: 66-67. Eds. J-L. Martin, A. Migus, G.A. Mourou, A.H. Zewail. Berlin Heidelberg: Springer-Verlag, 1993.

Fujimoto, J.G. "Femtosecond Techniques for the Characterization of Nonlinear and Linear Properties of Waveguide Devices and Studies of All Optical Switching." In *Waveguide Optoelectronics*, pp. 327-360. Eds. J.H. March and R.M. DeLaRue. Dordrecht, the Netherlands: Kluwer Academic Publishers, 1992.

Haus, H.A. "Short Pulse Generation." In *Compact Sources of Ultrashort Pulses*. Ed. I. Duling. New York: Cambridge University Press. Forthcoming, 1993.

Ippen, E.P. "Modelocking, Stabilizing, and Starting Ultrashort Pulse Lasers." In *Springer Series in Chemical Physics, Ultrafast Phenomena VIII*, 55: 155-159. Eds. J-L. Martin, A. Migus, G.A. Mourou, A.H. Zewail. Berlin Heidelberg: Springer-Verlag, 1993.

Ismail, K., T. Ikoma, and H.I. Smith, eds. *Quantum Effect Physics, Electronics and Applications*, Institute of Physics Conference Series No. 127. Philadelphia: Institute of Physics Publishing, 1992.

Kastner, M.A., E.B. Foxman, P.L. McEuen, U. Meirav, A. Kumar, and S.J. Wind. "Transport Spectroscopy of a Coulomb Island." In *Nanostructures and Mesoscopic Systems*. Eds. W.P. Kirk and M.A. Reed. San Diego, California: Academic Press, 1992.

Netz, R.R. "Microscopic Theory of the Ripple Phase." In *The Structure and Conformation of Amphiphilic Membranes*. Eds. R. Lipowsky, D. Richter, and K. Kremer. Berlin: Springer-Verlag, 1992.

Netz, R.R., and A.N. Berker. "Microscopic Liquid Crystal Theory of Nematic Reentrance, Smectic C Ordering, and In-Plane Domain Formation." In *Phase Transitions in Liquid Crystals*. Eds. S. Martellucci and A.N. Chester. New York: Plenum Press, 1992.

Rappe, A.M., and J.D. Joannopoulos. "The Design of Convergent and Transferable Ab Initio Pseudopotentials." In *Computer Simulation in Materials Science*, pp. 409-422. Eds. M. Meyer and V. Pontikis. Dordrecht, the Netherlands: Kluwer Academic Publishers, 1991.

Smith, H.I., and M.L. Schattenburg. "Lithography for Manufacturing at 0.25 Micrometer and Below." In *Crucial Issues in Semiconductor Materials and Processing Technologies*, 222: 153. Eds. S. Coffa, F. Priolo, E. Rimini, and J.M. Poate. NATO ASI Series E, 1992.

Smith, H.I., and M.L. Schattenburg. "X-ray Nanolithography: Limits, and Application to Sub-100 NM Manufacturing." In *Nanolithography: A Borderland between STM, EB, IB, and X-Ray Lithographies*, pp. 103-119. Eds. M. Gentili et al. Dordrecht, the Netherlands: Kluwer Academic Publishers, 1994.

1.1.4 Theses

Abernathy, D.L. *An X-ray Scattering Study of the Si(113) Surface: Structure and Phase Behavior*. Ph.D. diss., Dept. of Physics, MIT, 1993.

Bahl, S.R. *Physics and Technology of InAlAs/n-InGaAs Heterostructure Field-Effect Transistors*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1993.

Broekaert, T.P.E. *Characterization of InGaAlAs Resonant Tunneling Transistors*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1992.

Hall, K.L. *Femtosecond Nonlinearities in InGaAsP Diode Lasers*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1993.

- Khatri, F.I. *Numerical Studies of Additive Pulse Mode-locked Laser with Empty Cavity*. S.M. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1992.
- Modiano, A.M. *An Aligner for X-ray Nanolithography*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1992.
- Moolji, A.A. *Regimes of Operation of InAlAs/n⁻-InGaAs HFETs*. S.B. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1993.
- Nuttal, W.J. *Synchrotron X-ray Scattering Studies of Xenon Adsorbed on Single Crystals of Graphite*. Ph.D. diss., Dept. of Physics, MIT, 1993.
- Olster, D.B. *Refining the Process of Achromatic Holographic Lithography*. S.B. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1992.
- Schulberg, M.T. *The Reaction of Molecular Fluorine with Silicon (100): Adsorption, Desorption, and Scattering Dynamics*. Ph.D. diss., Dept. of Chem., MIT, 1990.
- Tassoudji, M.A. *Electromagnetic Interference in Electronic Circuits and Systems*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1994.
- Yang, J.J. *Reaction Dynamics of F₂ with Si(100): I. A New Mechanism for Dissociative Chemisorption: Atom Abstraction II. Translationally Activated Etching*. Ph.D. diss., Dept. of Chem., MIT, 1993.

1.1.5 Technical Reports

- Arias, T.A., B.E. Larson, M. Galvan, and J.D. Joannopoulos. *Ab initio Condensed Matter Calculations on the QCD Teraflops Computer*. RLE TR-576. MIT, 1993.
- Chu, W. *Inorganic X-ray Mask Technology for Quantum-Effect Devices*. RLE TR-577. MIT, 1993.
- Ghanbari, R.A. *Physics and Fabrication of Quasi-One-Dimensional Conductors*. RLE TR-578. MIT, 1993.

1.1.6 Meeting Papers Presented

- Advanced Heterostructure Transistors Conference*, Keauhou-Kona, Hawaii, November 29-December 4, 1992.
- del Alamo, J.A., S.R. Bahl, and D.R. Greenberg. "In-P-Based High Breakdown Voltage HFETs."
- Hu, Q., C. Eugster, and J.A. del Alamo. "Photon-assisted Quantum Transport in Quantum Point Contacts."
- American Chemical Society Meeting*, Denver, Colorado, March 23, 1993.
- Ceyer, S.T. "A New Mechanism for Dissociative Chemisorption on Si: Atom Abstraction."
- American Chemical Society Meeting*, Washington, DC, August 24-28, 1992.

- Pullman, D.P., Y.L. Li, J.J. Yang, and S.T. Ceyer. "Reaction Dynamics of F₂ on Si(100)." *American Physical Society Meeting*, Annual, Washington, DC, April 14, 1993.
- Pritchard, D.E. "Single Ion Mass Spectroscopy."
- American Physical Society Meeting*, Indianapolis, Indiana, March 16-20, 1992.
- Aalberts, D.P., and A.N. Berker. "Hard-Spin Mean-Field Theory: Variational Free Energy and First-Order Phase Transitions."
- Berker, A.N., and R.R. Netz. "Smectic C Order, In-Plane Domains, and Nematic Reentrance in a Frustrated Microscopic Model of Liquid Crystals."
- Kumar, A. "Electron States and Potentials in Quantum Dot Structures."
- Netz, R.R. "Symmetry-Breaking Fields in Frustrated Ising Systems on Square and Cubic Lattices."
- Zhao, Y., D.C. Tsui, K. Hirakawa, M. Santos, M. Shayegan, R. Ghanbari, D.A. Antoniadis, and H.I. Smith. "Far Infrared Magneto-Absorption by the 2 DEG in GaAs/AlGaAs Heterostructures with Grid Gates."
- American Physical Society Meeting*, Pittsburgh, Pennsylvania, March 21-25, 1994.
- Hui, K., and A.N. Berker. "Analytic Expression for the Exact Boundary of the Superantiferromagnetic Phase of the Ising Model with Nearest- and Next-Nearest-Neighbor Interactions on the Square Lattice."
- Falicov, A., and A.N. Berker. "Finite-Temperature Phase Diagram of the tJ Model: Renormalization-Group Theory."
- American Physical Society Meeting*, Seattle, Washington, March 22-26, 1993.
- Berker, A.N., and K. Hui. "Phase Diagram of the Ising Model on the Square Lattice with Crossed Diagonal Bonds."
- Meade, R.D., and J.D. Joannopoulos. "Photonic BandGap Material for Laser Applications."
- Netz, R.R., and A.N. Berker. "Renormalization-Group Theory of an Internal Critical Endpoint Structure: The Blume-Emery-Griffiths Model with Biquadratic Repulsion."
- American Vacuum Society Meeting*, Chicago, Illinois, November 9-13, 1992.
- Pullman, D.P., Y.L. Li, J.J. Yang, and S.T. Ceyer. "Reaction Dynamics of F₂ on Si(100)." *ALAA Space Programs and Technologies Conference*, Huntsville, Alabama, March 24-27, 1992.
- Canizares, C.R., D. Dewey, E.B. Galton, T.H. Markert, H.I. Smith, M.L. Schattenburg, B.E. Woodgate, and S. Jordan. "The MIT High Resolution X-ray Spectroscopy Instruments on AXAF."
- CLEO/QELS-Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science*, Anaheim, California, May 10-15, 1992.
- Jacobson, J.M., A.G. Jacobson, K. Naganuma, H.A. Haus, and J.G. Fujimoto. "Generation of 28-fs Pulses from a Ti:Al₂O₃ Laser Using Second- and Third-Order Intracavity Dispersion Compensation."
- Pritchard, D.E. "Atom Interferometry."
- Swanson, E., M. Hee, D. Huang, J.A. Izatt, J.G. Fujimoto, C.P. Lin, J.S. Schuman, and C.A. Puliafito. "Optical Coherence Tomography."

Ulman, M., L.H. Acioli, C.J. Stanton, E.P. Ippen, and J.G. Fujimoto. "Studies of Intervalley Scattering Using Tunable Femtosecond Pulses."

CLEO/QELS-Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science, Anaheim, California, May 8-13, 1994.

Cheng, T.K., M.S. Dresselhaus, and E.P. Ippen. "Direct Observation of Ultrafast Ionic Screening."

CLEO/QELS-Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science, Baltimore, Maryland, May 2-7, 1993.

Ramaswamy, M., M. Ulman, J. Jacobson, and J.G. Fujimoto. "Femtosecond Cavity-dumped Kerr Lens Mode-locked Ti:Al₂O₃ Laser."

Electronic Materials Conference, Santa Barbara, California, June 21-23, 1993.

Bahl, S.R., J.A. del Alamo, J. Dickmann, and S. Schildberg. "Physics of Breakdown in InAlAs/InGaAs MODFETs."

European Workshop on Compound Semiconductor Devices and Integrated Circuits, Parma, Italy, May 31-June 2, 1993.

del Alamo, J.A., and S. Bahl. "InAlAs/InGaAs HFETs with High Breakdown Voltage."

General Conference of the Condensed Matter Division of the European Physical Society, 13th, Regensburg, Germany, March 29-April 2, 1993.

Netz, R.R., and A.N. Berker. "Renormalization-Group Theory of the Blume-Emery-Griffiths Model with Repulsive Biquadratic Coupling."

Gordon Research Conference on Aspects of Disorder in Condensed Matter Physics, Wolfeboro, New Hampshire, June 28-July 2, 1993.

Berker, A.N., and R.R. Netz. "Hard-Spin Mean-Field Theory and Frustrated Systems in d=2 and d=3."

Gordon Research Conference on Gas-Surface Dynamics, Andover, New Hampshire, August 2, 1993.

Ceyer, S.T. "A New Mechanism for Dissociative Chemisorption on Si: Atom Abstraction."

International Conference on the Physics of Semiconductors, 21st, Beijing, China, August 10-14, 1992.

Zhao, Y., D.C. Tsui, K. Hirakawa, M. Santos, M. Shayegan, R. Ghanbari, D.A. Antoniadis, and H.I. Smith. "Far Infrared Magneto-Absorption by the 2 DEG in GaAs/AlGaAs Heterostructures with Grid Gates."

International Conference on InP and Related Materials, Fourth, Newport, Rhode Island, May 21-24, 1992.

Bahl, S.R., B.R. Bennett, and J.A. del Alamo. "A High-Voltage, Doubly-Strained In_{0.41}Al_{0.59}As/n⁺-In_{0.65}Ga_{0.35}As HFET."

International Conference on Laser Spectroscopy, Eleventh, Hot Springs, Virginia, June 13-18, 1993.

Pritchard, D.E. "Atom Interferometry."

International Conference on Solid State Devices and Materials, Tsukuba, Japan, August 26-28, 1992.

Smith, H.I., and D.A. Antoniadis. "Mesoscopic Devices: Will They Supersede Transistors in ULSI?"

International Conference on Thermodynamics and Statistical Mechanics, Berlin, Germany, August 2-8, 1992.

Berker, A.N. "Critical Behavior Induced by Quenched Disorder."

Netz, R.R., and A.N. Berker. "Smectic C/A₂ Order, Domains, Reentrance in a Microscopic Model of Liquid Crystals."

International Symposium on Electron, Ion and Photon Beams, 38th, New Orleans, Louisiana, May 31-June 3, 1994.

Burkhardt, M., H.I. Smith, D.A. Antoniadis, T.P. Orlando, M.R. Melloch, K.W. Rhee, and M.C. Peckerar. "Fabrication Using X-ray Nanolithography and Measurement of Coulomb Blockade in a Variable-sized Quantum Dot."

Hector, S.D., V.V. Wong, H.I. Smith, M.A. McCord, A. Wagner, and K.W. Rhee. "Printability of sub-150 nm Features in X-ray Lithography: Theory and Experiments."

Mondol, M., H. Li, G. Owen, and H.I. Smith. "Uniform-Stress Tungsten on X-ray Mask Membranes via He-Backside Temperature Homogenization."

Wong, V.V., J. Ferrera, J. Damask, J. Carter, E. Moon, H.A. Haus, H.I. Smith, and S. Rishton. "Spatial-Phase Locked E-Beam Lithography and X-ray Lithography for Fabricating First-Order Gratings on Rib Waveguides."

Yang, I.Y., H. Hu, L.T. Su, V.V. Wong, M. Burkhardt, E. Moon, J. Carter, D.A. Antoniadis, H.I. Smith, K.W. Rhee, and W. Chu. "High Performance Self-Aligned Sub-100 nm MOSFETs Using X-ray Lithography."

International Symposium on Integrated Optics Conference on Nanofabrication Technologies and Device Integration, Lindau, Germany, April 11-15, 1994.

Damask, J.N., J. Ferrera, V.V. Wong, H.I. Smith, L.A. Kolodziejski, and H.A. Haus. "Limitations and Solutions for the Use of Integrated QWS-DBR Resonators in WDM Applications."

Istanbul Technical University Statistical Physics Days, Istanbul, Turkey, July 14-15, 1994.

Falicov, A., and A.N. Berker. "Finite-Temperature Phase Diagram of the tJ Model: Renormalization-Group Theory."

IEEE Lasers and Electro-Optics Society Meeting, Annual, San Jose, California, November 15-18, 1993.

Tamura, K., L.E. Nelson, H.A. Haus, and E.P. Ippen. "Femtosecond Fiber Lasers (invited talk)."

Journees Microelectronique et Optoelectronique III-V, Fourth, Al Grande Motte, France, October 21-23, 1992.

Dumas, J.M., P. Audren, M.P. Favennec, S. Praquin, S.R. Bahl, and J.A. del Alamo. "Une Etude des Niveaux Profonds dans le Transistor à Effet de Champ de Puissance à Heterostructure InAlAs/n⁺-InGaAs."

New England Molecular Beam Epitaxy Workshop, Seventh, Cambridge, Massachusetts, May 13, 1992.

Bahl, S.R., B.R. Bennett, and J.A. del Alamo. "High Quality Heterostructures for Doubly-Strained InAlAs/InGaAs HFETs."

Optcon '92, Boston, Massachusetts, November 15-20, 1992.

Smith, H.I. "History of X-ray Lithography."

Optical Society of America Meeting, Annual, Albuquerque, New Mexico, September 20-25, 1992.

Fujimoto, J.G. "Femtosecond Lasers and Ultrafast Measurement Techniques."

Optical Society of America Meeting, Annual, Toronto, Canada, October 3-8, 1993.

Fujimoto, J.G., J.A. Izatt, M.R. Hee, D. Huang, E.A. Swanson, C.P. Lin, and C.A. Puliafito. "Biological Imaging Using Optical Coherence and Transillumination Tomography."

Physical Electronics Conference, Irvine, California, June 20-25, 1992.

Li, Y.L., J.J. Yang, D.P. Pullman, and S.T. Ceyer. "Reaction Dynamics of F₂ on Si(100)."

Statistical Mechanics Meeting, 70th, New Brunswick, New Jersey, December 15-17, 1993.

Berker, A.N. "Hard-Spin Mean-Field Theory."

Falicov, A., and A.N. Berker. "Finite-Temperature Phase Diagram of the tJ Model: Renormalization-Group Theory."

Statistical Mechanics Meeting, 71th, New Brunswick, New Jersey, May 11-13, 1994.

Aalberts, D.P., and A.N. Berker. "Spin-Wave Bound-State Energies from an Ising Model."

Falicov, A., and A.N. Berker. "A Correlated Random-Chemical-Potential Model for the Phase Transitions of Helium Mixtures in Porous Media."

Hui, K., and A.N. Berker. "Expression for the Superantiferromagnetic Boundary of the Ising Model with Nearest- and Next-Nearest-Neighbor Interactions on the Square Lattice."

Summer School on Recent Developments in Statistical Physics, Istanbul, Turkey, July 26-August 6, 1993.

Berker, A.N. "Phase Transitions in Disordered Systems."

SPIE International Society for Optical Engineering, Los Angeles, California, January 16-23, 1993.

Hee, M.R., J.A. Izatt, J.M. Jacobson, E.A. Swanson, and J.G. Fujimoto. "Time-Gated Imaging with Femtosecond Transillumination Optical Coherence Tomography."

SPIE International Symposium on Optical Engineering and Photonics, San Jose, California, March 7-9, 1992.

Smith, H.I., and M.L. Schattenburg. "Why Bother with X-ray Lithography?"

Topics in Statistical Physics Meeting, Antigonish, Nova Scotia, Canada, October 1-3, 1993.

Berker, A.N. "Hard-Spin Mean-Field Theory."

Towards Teraflop Computing Conference, Baton Rouge, Louisiana, February 9-12, 1994.

Cho, K., and J.J. Joannopoulos. "The Enchanting World of Surfaces."

Workshop on Compound Semiconductor Microwave Materials and Analog Devices, San Antonio, Texas, February 17-19, 1992.

Bahl, S.R., B.R. Bennett, and J.A. del Alamo. "Doubly-Strained InAlAs/n⁺-InGaAs HFETs."

1.1.7 Published Meeting Papers

- Arias, T., and J.D. Joannopoulos. "The View of Grain Boundaries and Segregation from the Computational Leading Edge." *Proceedings of the Electrochemical Society Meeting*
- Bahl, S.R., and J.A. del Alamo. "Physics of Breakdown in InAlAs/n⁺-InGaAs HFETs." *Proceedings of the Fifth International Conference on Indium Phosphide and Related Materials*, Paris, France, April 18-22, 1993.
- Coronado, C.A., E. Ho, L.A. Kołodziejski, and C.A. Huber. "Laser-Assisted Growth of ZnSe by Metalorganic Molecular Beam Epitaxy." *Proceedings of the Material Research Society Symposium*, 263: 181-186, San Francisco, California, April 27-May 1, 1992.
- Dickmann, J., S. Schildberg, H. Dambkes, S.R. Bahl, and J.A. del Alamo. "Characterization of the Breakdown Behavior of Pseudomorphic InAlAs/In_xGa_{1-x}As/InP HEMTs with High Breakdown Voltages." *Proceedings of the 20th International Symposium on Gallium Arsenide and Related Compounds*, Freiburg, Germany, August 29-September 2, 1993.
- Dumas, J.M., P. Audren, M.P. Favennec, D. Lecrosnier, S.R. Bahl, and J.A. del Alamo. "An Investigation of Deep Levels in InAlAs/n⁺-InGaAs Heterostructure FETs." *Proceedings of the Fifth International Conference on Indium Phosphide and Related Materials*, Paris, France, April 18-22, 1993.
- Fisher, P.A., E. Ho, G.S. Petrich, L.A. Kolodziejski, M.S. Brandt, and N.M. Johnson. "N- and P-Type Doping of ZnSe Using Gas Source Molecular Beam Epitaxy." *Proceedings of the Material Research Society Symposium*, San Francisco, California, March 1994.
- Haus, H.A., and F.X. Kartner. "On the Theory of Quantum Measurement." *Proceedings of the Third International Workshop on Squeezed States and Uncertainty Relations*, Baltimore, Maryland, August 10-13, 1993.
- Hultgren, C.T., K.L. Hall, D.J. Dougherty, G. Lenz, and E.P. Ippen. "Spectral-Hole Burning and Carrier Heating Nonlinearities in Active Waveguides." *Proceedings of the Optical Society of America Topical Meeting on Ultrafast Electronics and Opto-electronics*, San Francisco, California, January 25-27, 1993.
- Natarajan, V., K.R. Boyce, F. DiFilippo, and D.E. Pritchard. "Improved Precision Mass Comparison in a Penning Trap - Techniques and Results." *Proceedings of the Ninth International Conference on Atomic Masses and Fundamental Constants*, Bernkastel-Kues, Germany, July 19-24, 1992. Institute of Physics Conference Series.
- Pritchard, D.E. "Atom Interferometers." *Proceedings of the International Conference on Atomic Physics, 13th*, Munich, Germany, August 3-7, 1992.
- Pritchard, D.E., and W. Ketterle. "Atom Traps and Atom Optics." *Proceedings of the Enrico Fermi International School of Physics*, Varenna, Italy, June 1993.
- Schattenburg, M.L., K. Li, R.T. Shin, J.A. Kong, D.B. Olster, and H.I. Smith. "Electromagnetic Calculation of Soft X-ray Diffraction from 0.1 μm-scale Gold Structures." *Proceedings of the 35th International Symposium on Electron, Ion, and Photon Beams*, Seattle, Washington, May 28-31, 1991, Paper E84.
- Schattenburg, M.L., J. Carter, W. Chu, R.C. Fleming, R.A. Ghanbari, M. Mondol, N. Polce, and H.I. Smith. "Mask Technology for X-ray Nanolithography." *Proceedings of the Materials Research Society Spring Meeting Symposium*, San Francisco, California, April 12-16, 1993.