

James J Coleman

University of Illinois

Intel Alumni Endowed Chair in Electrical and Computer Engineering (2003-)
Franklin W. Woeltge Professor of Electrical and Computer Engineering (2002-2003)
Professor of Electrical and Computer Engineering (1984-present)
Professor of Materials Science and Engineering (1990-present)
Associate Professor of Electrical Engineering (1982-1984)



Dr. Coleman has established a laboratory for the development of III-V semiconductor lasers and photonic devices grown by metalorganic chemical vapor deposition (MOCVD). He and his students are involved in the study of quantum dots, quantum well heterostructures, and low threshold and high power single mode index guided lasers and arrays. They have demonstrated reliable low threshold index guided lasers, integrable distributed feedback lasers, and high power laser arrays ($\lambda > 1\mu\text{m}$) from lattice-mismatched strain-accommodated InGaAs-GaAs heterostructures. This work established the counter-intuitive conclusion that In_xGa_{1-x}As-GaAs strained layer lasers are indeed reliable in the 980 nm wavelength range and then extended the proof of reliability to the point that now many vendors of Al_xGa_{1-x}As-GaAs have begun to intentionally incorporate In into their laser active regions wherever possible, simply to enhance the reliability of the structures. Strained layer 980 nm pump lasers are a critical component of the erbium-doped fiber amplifier that is now a basic component of all fiber optic telecommunications systems.

Rockwell International, Anaheim

Member of Technical Staff (1978-1982)

While at Rockwell, Professor Coleman contributed to the development of the metalorganic chemical vapor deposition (MOCVD) growth method and to the processing and testing of various high speed electronic and photonic devices, such as lasers, avalanche photodetectors, high efficiency heteroface solar cells and epitaxial Gunn oscillators. At Rockwell, he reported the first demonstration of the Al_xGa_{1-x}As-GaAs self-aligned laser structure. This structure is presently being used in approximately 50% (~2.5M lasers/month, Rohm Corporation, Japan) of the world commercial market of compact disc lasers and high power lasers for optical storage and medical applications.

Bell Laboratories, Murray Hill

Member of Technical Staff (1976-1978)

While at Bell Labs Dr. Coleman studied the growth and processing of long wavelength lasers and developed high performance room-temperature cw 1.3 μm lasers for early fiber optic telecommunications systems.

University of Illinois

Research Associate (1975-1976)
Research Assistant (1972-1975)

Dr. Coleman's graduate research was in the area of visible wavelength laser diodes and included the first report of a room temperature visible laser diode at wavelengths around 645 nm and the first proof that In-compound materials would be suitable for room temperature visible diode lasers.

Education

Ph.D. in Electrical Engineering, University of Illinois, Urbana, 1975
M.S. in Electrical Engineering, University of Illinois, Urbana, 1973
B.S. in Electrical Engineering (with High Honors), University of Illinois, Urbana, 1972

Honors

IEEE David Sarnoff Award (2008) "for leadership in the development of highly reliable strained-layer lasers"
IEEE Lasers and Electro-Optics Society Distinguished Service Award (2008)
Teachers Ranked as Excellent (Spring 2008)
Teachers Ranked as Excellent (Spring 2007)

Nick Holonyak, Jr. Award, Optical Society of America (2006) “for a career of contributions to quantum well and strained-layer semiconductor lasers through innovative epitaxial growth methods and novel device designs”
 Cecil N. Coleman Award (2006) “for outstanding contributions to public safety at the University of Illinois”
 Teachers Ranked as Excellent (Spring 2006)
 Teachers Ranked as Excellent (Fall 2005 - ECE444)
 Teachers Ranked as Excellent (Fall 2005 - ECE532)
 Outstanding Advisor's List (2005)
 ISCS Heinrich Welker Award (2004) “for the demonstration of reliable strained layer lasers leading to 980 nm Er fiber pumps”
 Teachers Ranked as Excellent (Fall 2003)
 Who's Who in America (2003)
 Intel Alumni Endowed Chair in Electrical and Computer Engineering (2003)
 Outstanding Advisor's List (2003)
 Franklin W. Woeltge Named Professorship in Electrical and Computer Engineering (2002)
 Outstanding Advisor's List (2002)
 Teachers Ranked as Excellent (Spring 2001)
 William Streifer Scientific Achievement Award, IEEE Lasers and Electro-Optics Society (2000) “for pioneering research in high reliability strained layer semiconductor lasers”
 Fellow, American Physical Society (2000)
 Outstanding Advisor's List (1999)
 Distinguished Lecturer, IEEE Lasers and Electro-Optics Society (1998-1999)
 Teachers Ranked as Excellent (Spring 1998)
 Distinguished Lecturer, IEEE Lasers and Electro-Optics Society (1997-1998)
 Fellow, American Association for the Advancement of Science (1997)
 Fellow, Optical Society of America (1994)
 Fellow, Institute of Electrical and Electronic Engineers (1992) “for contributions to semiconductor lasers through innovative epitaxial growth techniques and device designs”
 Outstanding Advisor's List (1993)
 J. Arthur Rank Prize Funds Lecturer (1992)
 Outstanding Advisor's List (1991)
 Beckman Research Award (1982)
 Xerox Postdoctoral Fellowship (1976)
 University of Illinois Fellowship in Electrical Engineering (1972-1973)
 Eta Kappa Nu
 Tau Beta Pi
 Sigma Xi

Scholarly Activity

400 journal publications
 7 US patents and 1 Canadian patent
 13 book chapters
 8 edited volumes and special issues
 88 invited presentations
 6 short courses
 Twenty-six students have completed the Ph.D. degree
 Forty-six students have completed the M.S. degree
 More than 1,500 students have received classroom instruction

Professional Society Activities

President-Elect IEEE Photonics Society (2009)
 Chair, Awards Committee, IEEE Nanotechnology Council (2008)
 Member, IEEE LEOS Distinguished Lecturer Selection Committee (2008)
 Chair, Fellows Committee, IEEE Nanotechnology Council (2007)
 Chair, Fellows Committee, IEEE Nanotechnology Council (2006)
 Vice-President (Publications) IEEE Lasers and Electro-Optics Society (2004-2006)
 Chair IEEE Lasers and Electro-Optics Society Semiconductor Lasers Technical Committee (2002-2003)
 Member IEEE Lasers and Electro-Optics Society Semiconductor Lasers Technical Committee (2002-2004)

Elected Member IEEE Lasers and Electro-Optics Society Board of Governors (2000-2003)
 Chair IEEE Lasers and Electro-Optics Society Optoelectronics Materials and Processing Technical Committee (1998-2000)
 Academic Advisor National Technological University (1997-2004)
 Member IEEE Lasers and Electro-Optics Society Optoelectronics Materials and Processing Technical Committee (1996-2001)
 Member IEEE Joint Council on Quantum Electronics (1995-2005)
 Associate Editor *IEEE Photonics Technology Letters* (1994-2003)
 Associate Editor *IEEE Transactions on Electron Devices*, Associate Editor for Optoelectronic Devices (1990-1993)
 Advisory committee SemiTOP, Semiconductor Technology Operator Program (1990-1991)

Conference Activities

Program committee Optoelectronics Materials and Processing Committee, IEEE Lasers and Electro-Optics Society Annual Meeting (2008)
 LEOS Representative, Conference on Lasers and Electro-Optics (2008-2010)
 Program committee Optoelectronics Materials and Processing Committee, IEEE Lasers and Electro-Optics Society Annual Meeting (2007)
 Program committee SPIE Optics East (2007)
 Program committee IEEE Conference on Nanotechnology (2007)
 Program committee Opto-electronics & Communications Conference and International Conference on Integrated Optics and Optical Fiber Communication (2007)
 Co-chair IEEE/LEOS Semiconductor Laser Workshop (2007)
 Program committee Conference on Lasers and Electro-Optics (CLEO) (2007)
 Program committee Optoelectronics Materials and Processing Committee, IEEE Lasers and Electro-Optics Society Annual Meeting (2006)
 International Advisory Committee Conference on Optoelectronic and Microwave Materials and Devices (COMMAD) (2006)
 Program committee SPIE Optics East (2006)
 Chair Active Devices Subcommittee, Integrated Photonics Research and Applications Meeting (2006)
 Program committee IEEE Conference on Nanotechnology (2006)
 Program committee Conference on Lasers and Electro-Optics (CLEO) (2006)
 International Advisory Committee Conference on Optoelectronic and Microwave Materials and Devices (COMMAD) (2005)
 Program committee Symposium on Technology Fusion of Optoelectronics and Communications (2005)
 Program committee SPIE Optics East (2005)
 Program committee IEEE Conference on Nanotechnology (2005)
 Program committee Conference on Lasers and Electro-Optics (CLEO) (2005)
 Program committee Integrated Photonics Research and Applications Meeting (2005)
 Organizing committee International Conference on Metalorganic Vapor Phase Epitaxy (2004)
 Program committee International Conference on Metalorganic Vapor Phase Epitaxy (2004)
 Program committee IEEE International Semiconductor Laser Conference (2004)
 Chair Semiconductor Laser Program Committee, IEEE Lasers and Electro-Optics Society Annual Meeting (2002)
 Chair IEEE/LEOS Semiconductor Laser Workshop (2002)
 Organizing committee International Symposium on Compound Semiconductors (2000)
 International Advisory Committee International Symposium on Compound Semiconductors (1999)
 Chair IEEE Topical Workshop on Nanostructures and Quantum Dots (1999)
 Chair Optoelectronics Materials and Processing Committee, IEEE Lasers and Electro-Optics Society Annual Meeting (1999)
 Organizing committee International Symposium on Compound Semiconductors (1999)
 Chair Optoelectronics Materials and Processing Committee, IEEE Lasers and Electro-Optics Society Annual Meeting (1998)
 Program committee International Conference on Metalorganic Vapor Phase Epitaxy (1998)
 Program committee IEEE International Semiconductor Laser Conference (1998)
 Chair Optoelectronics Materials and Processing Committee, IEEE Lasers and Electro-Optics Society Annual Meeting (1997)
 Program committee Advanced Semiconductor Lasers and Applications Topical Meeting (1997)
 Program committee Gallium Nitride Materials Processing and Devices Topical Meeting (1997)

Program committee International Conference on Indium Phosphide and Related Materials (1997)
 Chair Optoelectronics Materials and Processing Committee, IEEE Lasers and Electro-Optics Society Annual Meeting (1996)
 Program committee Integrated Photonics Research Topical Meeting (1996)
 Co-chair IEEE/LEOS Semiconductor Laser Workshop (1996)
 Program committee IEEE International Semiconductor Laser Conference (1996)
 Program committee International Conference on Indium Phosphide and Related Materials (1995)
 Chair Epitaxy Area Committee, International Conference on Indium Phosphide and Related Materials (1994)
 Program committee IEEE International Semiconductor Laser Conference (1994)
 Organizing committee International Conference on Metalorganic Vapor Phase Epitaxy (1992)
 Co-chair IEEE/LEOS Semiconductor Laser Workshop (1992)
 Program committee International Conference on Metalorganic Vapor Phase Epitaxy (1992)
 Program committee IEEE Lasers and Electro-Optics Society Annual Meeting (1991)
 Program committee International Meeting on Advanced Processing and Characterization Technologies (1991)
 Program committee IEEE Topical Meeting on Integrated Optoelectronics (1990)
 Organizing committee Interdisciplinary Laser Science Conference (1990)
 Co-chair IEEE/LEOS Semiconductor Laser Workshop (1990)
 Program committee IEEE Lasers and Electro-Optics Society Annual Meeting (1990)
 Program committee SPIE Conference on Laser Diode Technology and Applications (1989)
 Program committee IEEE International Electron Devices Meeting (1989)
 Program committee International Meeting on Advanced Processing and Characterization Technologies (1989)
 Program committee SPIE Conference on Laser Diode Technology and Applications (1988)
 Program committee IEEE International Electron Devices Meeting (1988)
 Program committee Southwest Optics Conference (1987)
 Co-chair IEEE/LEOS Semiconductor Laser Workshop (1986)
 Program committee International Conference on Metalorganic Vapor Phase Epitaxy (1986)
 Program committee IEEE International Semiconductor Laser Conference (1984)
 Program committee IEEE International Electron Devices Meeting (1984)
 Program committee IEEE International Electron Devices Meeting (1983)

University Committees

CSL Policy & Planning Committee (2008-2009)
 CSL Director's Evaluation Committee (2008)
 President's Resources Summit (2007)
 Chair, Advisory Committee on the Administration of Sponsored Projects (2007-2008)
 CSL Policy & Planning Committee (2007-2008)
 Guiding Principles and Processes for Resource Allocation Subcommittee of the Council of Deans Budget and Resource Allocation Advisory Group (2006)
 Steering Committee, Illinois Informatics Initiative (2006)
 Rate and Funding Working Group, Campus Network Upgrade Project (2006-2007)
 Advisory Committee on the Administration of Sponsored Projects (2006-2007)
 Micro and Nanotechnology Laboratory Policy and Planning Committee (2006-2008)
 Provost Search Committee (2005)
 Campus Budget Oversight Committee (2005)
 Faculty Advisor, ECE Alumni Association (2004-present)
 Chair, Campus Budget Oversight Committee (2001-2003)
 Chair, Department of Physics Head Search Committee (2000-2001)
 Chair, Department of Public Safety, Campus Risk Manager Search (2000)
 Campus Budget Oversight Committee (2000-2003)
 Chair, Department of Chemistry Head Search Committee (1999-2000)
 ECE Faculty Search Committee (1999-present)
 Chair, Vice Chancellor for Admin and Human Resources Public Safety Advisory Committee (1998)
 MRL Director Search Committee (1998-1999)
 Department of Electrical and Computer Engineering Advisory Committee (1995-1997)
 ECE Departmental Head Search Committee (1994-1995)
 MRL Director Search Committee (1994)
 JSEP Internal Advisory Committee (1993-1998)

Faculty Advisor, University of Illinois Student Chapter of the Optical Society of America (1993-1998)
 Chancellor's Committee on Fire Safety and Emergency Medical Services (1992)
 MRL Director's Council (1990-1996)
 CCSM Policy and Planning Committee (1990-1995)
 Department of Electrical and Computer Engineering Advisory Committee (1989-1993)
 Chair, CCSM Director Search Committee (1988)
 CSL Director Search Committee (1988)
 ECE Faculty Search Committee (1987 - 1995)
 CSL Policy and Planning Committee (1987-1989)
 ECE Graduate Committee (1986-1987)
 Department of Electrical and Computer Engineering Advisory Committee (1985-1987)
 CSL Policy and Planning Committee (1985-1987)
 College Freshman Chemistry Liaison Committee (1985-present)
 Department of Electrical and Computer Engineering, Microelectronic Instrumentation Committee (1985-present)
 Faculty Advisor - SYNTON, the University of Illinois student Amateur Radio Society (1983-present)
 Materials Research Laboratory, Programs Committee (1983-1999)
 University of Illinois Police Bicycle Appeals Board (1983-1990)

Public Service

Monticello (IL) Community Unit School District #25 Board of Education
 President (2001-2009)
 Vice-President (1997-2001)
 Member (1995-1996)

Key Publications

- Pulsed room-temperature operation of InGaPAs double heterojunction lasers at high energy (6470Å, 1.916 eV), J J Coleman, N. Holonyak Jr, M J Ludowise, P D Wright, R Chin, W O Groves and D L Keune, *Appl. Phys. Lett.* **29**, 167 (1976)
 This was the first report of a room temperature visible laser diode at such short wavelength and the first proof that In-compound materials would be suitable for room temperature visible diode lasers.
- Single longitudinal mode MOCVD self aligned GaAlAs-GaAs double heterostructure lasers, J J Coleman and P D Dapkus, *Appl. Phys. Lett.* **37**, 262 (1980)
 This was the first demonstration of the Al_xGa_{1-x}As-GaAs self-aligned laser structure. This structure was used for years in approximately 50% (~2.5M lasers/month, Rohm Corporation, Japan) of the world commercial market of compact disc lasers and high power lasers for optical storage and medical applications.
- Single interface enhanced mobility structures by metalorganic chemical vapor deposition, J J Coleman, P D Dapkus and J J J Yang, *Electronics Lett.* **17**, 606 (1981)
 This paper was the first to show the suitability of the MOCVD process for two-dimensional electron gas structures and the high electron mobility transistor (HEMT). The MOCVD process is presently the process of choice for commercial production of HEMT devices by Sony and others in Japan.
- Characterization of InGaAs-GaAs strained-layer lasers with quantum wells near the critical thickness, K J Beernink, P K York, J J Coleman, R G Waters, J Kim and C M Wayman, *Appl. Phys. Lett.* **55**, 2167 (1989)
- Dependence of threshold current density on quantum well composition for strained-layer InGaAs-GaAs lasers by metalorganic chemical vapor deposition, K J Beernink, P K York and J J Coleman, *Appl. Phys. Lett.* **55**, 2585 (1989)
- Viable strained layer laser at $\lambda = 110\text{nm}$, R G Waters, P K York, K J Beernink and J J Coleman, *J. Appl. Phys.* **67**, 1132 (1990)
- Reliable InGaAs quantum well lasers at 1.1 μm , S L Yellen, R G Waters, P K York, K J Beernink, and J J Coleman, *Electronics Lett.* **27**, 552 (1991)

These papers completely characterized the range of parameters of strained layer In_xGa_{1-x}As-GaAs quantum well heterostructure lasers in the wavelength range of 0.9-1.1 μm . They were the first papers to indicate that such a wide range of emission wavelengths was available, that the threshold current

densities were substantially lower than for comparable $\text{Al}_x\text{Ga}_{1-x}\text{As}$ quantum well heterostructure lasers over this range, and that these lasers are reliable despite the strain in the structures.

- Strained layer InGaAs-GaAs-AlGaAs buried heterostructure quantum well lasers by three-step selective-area metalorganic chemical vapor deposition, T M Cockerill, D V Forbes, J A Dantzig and J J Coleman, *IEEE J. Quantum Electron.* **30**, 441 (1994)
- Submilliampere threshold buried-heterostructure InGaAs/GaAs single quantum well lasers grown by selective-area epitaxy, R M Lammert, T M Cockerill, D V Forbes, G M Smith and J J Coleman, *Photon. Tech. Lett., IEEE Photon. Tech. Lett.* **6**, 1073 (1994)

These papers are the first in a series that demonstrate a large number of different integrable photonic components based on a high performance buried heterostructure grown by selective-area epitaxy (SAE). The SAE process allows design of quantum well thickness and transition energy anywhere on the wafer by simple lithographic processing.

- Room-temperature operation of patterned quantum-dot lasers fabricated by electron beam lithography and selective area metal-organic chemical vapor deposition, V.C. Elarde, R. Rangarajan, J.J. Borchardt, and J.J. Coleman, *IEEE Photon. Tech. Lett.* **17**, 935 (2005)

This paper is the first demonstration of a quantum dot laser in which the active layer is formed by an engineered pattern rather than natural self-assembly.

Publications

- 1 Luminescence, laser, and carrier-lifetime behavior of constant-temperature LPE InGaP ($x=0.52$) grown on (100) GaAs, J C Campbell, W R Hitchens, N Holonyak Jr, M H Lee, M J Ludowise and J J Coleman, *Appl. Phys. Lett.* **24**, 327 (1974)
- 2 Liquid phase epitaxial (LPE) grown junction InGaP ($x=0.63$) laser of wavelength 5900Å (2.10 eV, 77K), W R Hitchens, N Holonyak Jr, M H Lee, J C Campbell, J J Coleman, W O Groves and D L Keune, *Appl. Phys. Lett.* **25**, 327 (1974)
- 3 Liquid phase epitaxial InGaPAs/GaAsP quaternary (LPE)-ternary (VPE) heterojunction lasers ($x=0.70$, $z=0.01$, $y=0.40$, 6300Å, 77K), J J Coleman, W R Hitchens, N Holonyak Jr, M J Ludowise, W O Groves and D L Keune, *Appl. Phys. Lett.* **25**, 725 (1974)
- 4 Index dispersion above the fundamental band edge in nitrogen-doped GaAsP ($y=0.38$), J J Coleman, N Holonyak Jr, M J Ludowise, A B Kunz, M Altarelli, W O Groves and D L Keune, *Phys. Rev. Lett.* **33**, 1566 (1974)
- 5 Resonant Enhancement (?) of the recombination probability at the nitrogen- trap, Γ -band edge crossover in GaAsP:N, J J Coleman, N Holonyak Jr, A B Kunz, W O Groves, D L Keune and M G Craford, *Sol. State Comm.* **16**, 319 (1975)
- 6 Optical properties of resonant impurity states in N-doped semiconductor alloys, M Altarelli, J J Coleman, N Holonyak Jr, M J Ludowise, W O Groves and D L Keune, *Bull. Am. Phys. Soc.* **20**, 493 (1975)
- 7 Liquid phase epitaxial InGaPAs heterojunction lasers, J J Coleman, N. Holonyak Jr, M J Ludowise, P D Wright, W O Groves and D L Keune, *IEEE J. Quantum Elect.* **QE-11**, 471 (1975)
- 8 Heterojunction laser operation of N-free and N-doped GaAsP ($y=0.42-0.43$, 6200Å, 77K) near the direct-indirect transition ($y=0.46$), J J Coleman, N. Holonyak Jr, M J Ludowise, P D Wright, W O Groves, D L Keune and M G Craford, *J. Appl. Phys.* **46**, 3556 (1975)
- 9 Low threshold LPE InGaPAs/InGaPAs/InGaPAs yellow double-heterojunction laser diodes (77K), W R Hitchens, N. Holonyak Jr, P D Wright and J J Coleman, *Appl. Phys. Lett.* **27**, 245 (1975)
- 10 Heterojunction laser operation of GaAsP: N on NN-pair and A-line transition near the direct band edge, J J Coleman, N Holonyak Jr, M J Ludowise, R J Nelson, P D Wright, W O Groves, D L Keune and M G Craford, *J. Appl. Phys.* **46**, 4835 (1975)
- 11 Melt removal and planar growth of InGaPAs heterojunctions, J J Coleman, N. Holonyak Jr and M J Ludowise, *Appl. Phys. Lett.* **28**, 363 (1975)
- 12 Yellow InGaPAs double heterojunction lasers, J J Coleman, N Holonyak Jr, M J Ludowise and P D Wright, *J. Appl. Phys.* **47**, 2015 (1976)
- 13 Effect of composition and pressure on the nitrogen isoelectronic trap in GaAsP, R J Nelson, N Holonyak Jr, J J Coleman, D Lazarus, W O Groves, D L Keune, M G Craford, D J Wolford and B G Streetman, *Phys. Rev.* **B14**, 685 (1976)
- 14 Homogeneous or inhomogeneous line broadening in a semiconductor laser: observation on InGaPAs double heterojunctions in an external grating cavity, P D Wright, J J Coleman, N Holonyak Jr, M J Ludowise and G E Stillman, *Appl. Phys. Lett.* **29**, 18 (1976)
- 15 Pulsed room-temperature operation of InGaPAs double heterojunction lasers at high energy (6470Å, 1.916 eV), J J Coleman, N. Holonyak Jr, M J Ludowise, P D Wright, R Chin, W O Groves and D L Keune, *Appl. Phys. Lett.* **29**, 167 (1976)
- 16 InGaPAs double heterojunction laser operation (77 K, yellow) in an external grating cavity, P D Wright, J J Coleman, N Holonyak Jr, M J Ludowise and G E Stillman, *J. Appl. Phys.* **47**, 3580 (1976)
- 17 A direct study of the nature of nitrogen bound states in GaAsP:N, G G Kleinman, R J Nelson, N Holonyak Jr and J J Coleman, *Phys. Rev. Lett.* **37**, 375 (1976)
- 18 Pressure study of the N bound state interaction in nitrogen-doped GaAsP, R J Nelson, N Holonyak Jr, J J Coleman, D Lazarus, D L Keune, W O Groves and M G Craford, *Phys. Rev.* **B14**, 3511 (1976)
- 19 Pressure study of the external quantum efficiency of N-doped GaAsP light emitting diodes, R J Nelson, N Holonyak Jr, J J Coleman, D Lazarus, D L Keune, A H Herzog, W O Groves and G G Kleinman, *Appl. Phys. Lett.* **29**, 615 (1976)
- 20 Room temperature visible InGaPAs heterojunction lasers, J J Coleman, N. Holonyak Jr, R Chin, B L Marshall, W O Groves, A H Herzog and D L Keune, North American GaAs and Related Compounds Conference (St. Louis, 1976). *Inst. of Phys. Conf. Series* **33b**
- 21 Limitations of the direct-indirect transition of InGaPAs heterojunctions, N Holonyak Jr, R Chin, J J Coleman, D L Keune and W O Groves, *J. Appl. Phys.* **48**, 635 (1977)
- 22 Observations of the upper branch of the nitrogen isoelectronic trap in GaAsP, N Holonyak Jr, R J Nelson, J J Coleman, P D Wright, D Finn, W O Groves and D L Keune, *J. Appl. Phys.* **48**, 1963 (1977)

- 23 Controlled barrier height InP Schottky diodes prepared by sulfur diffusion, J J Coleman, *Appl. Phys. Lett.* **31**, 283 (1977)
- 24 Physical and electrical properties of plasma-grown oxide on GaAlAs, R P H Chang, C C Chang, J J Coleman, R L Kauffman, W R Wagner and L C Feldman, *J. Appl. Phys.* **48**, 5384 (1977)
- 25 A new method of fabricating gallium arsenide MOS devices, R P H Chang and J J Coleman, *Appl. Phys. Lett.* **32**, 332 (1978)
- 26 Arsenic and gallium distribution coefficients in liquid-phase epitaxial GaInPAs, J J Coleman, *Appl. Phys. Lett.* **32**, 388 (1978)
- 27 The effect of interface arsenic domains on the electrical properties of GaAs MOS structures, R P H Chang, T T Sheng, C C Chang and J J Coleman, *Appl. Phys. Lett.* **33**, 341 (1978)
- 28 Zinc contamination and misplaced p-n junctions in InP-GaInPAs double heterojunction lasers, J J Coleman and F R Nash, *Electronic Lett.* **14**, 558 (1978)
- 29 Growth and characterization of InP-GaInPAs heterostructure lasers, J J Coleman, P W Foy, R B Zetterstrom, S Sumski, H C Casey Jr and G A Rozgonyi, *Inst. Phys. Conf. Ser.* **45**, 380 (1979)
- 30 Application of selective chemical reaction concept for controlling the properties of oxides on GaAs, R P H Chang, J J Coleman, A J Polak, L C Feldman and C C Chang, *Appl. Phys. Lett.* **34**, 237 (1979)
- 31 Be doping of liquid-phase-epitaxial InP, E B Abrams, S Sumski, W A Bonner and J J Coleman, *J. Appl. Phys.* **50**, 4469 (1979)
- 32 Fabrication of gallium arsenide MOS devices, C C Chang, R P H Chang, J J Coleman and T T Sheng, *US Patent 4,144,634*
- 33 Stacked multiple-bandgap solar cells prepared by CVD techniques, R D Dupuis, P D Dapkus, R P Ruth, J J Coleman, W I Simpson, H T Yang and S W Zehr, *Proceedings of the 1980 Photovoltaics Specialists Conference* (IEEE, San Diego, 1980)
- 34 Hot Electrons and phonons in quantum-well AlGaAs-GaAs heterostructures, K Hess, N Holonyak Jr, W D Laidig, B A Vojak, J J Coleman and P D Dapkus, *Solid State Comm.* **34**, 749 (1980)
- 35 Induced phonon-sideband laser operation of large quantum-well AlGaAs-GaAs heterostructures, J J Coleman, P D Dapkus, B A Vojak, W D Laidig, N Holonyak Jr and K Hess, *Appl. Phys. Lett.* **37**, 15 (1980)
- 36 Phonon contribution of double-heterojunction laser operation, N Holonyak Jr, B A Vojak, W D Laidig, K Hess, J J Coleman and P D Dapkus, *Appl. Phys. Lett.* **37**, 136 (1980)
- 37 Single longitudinal mode MOCVD self aligned GaAlAs-GaAs double heterostructure lasers, J J Coleman and P D Dapkus, *Appl. Phys. Lett.* **37**, 262 (1980)
- 38 A non-lattice-matched monolithic multicolor solar cell, S W Zehr, H T Yang, J J Yang, J J Coleman, D L Miller W J Schaffer, P J Stocker and J S Harris Jr, *Proc. International Solar Energy Soc. Solar Jubilee Meeting* p. 986 (Phoenix, June 2-6, 1980)
- 39 The exciton in recombination in AlGaAs-GaAs quantum-well heterostructures, B A Vojak, N Holonyak Jr, W D Laidig, K Hess, J J Coleman and P D Dapkus, *Solid State Commun.* **35**, 477 (1980)
- 40 Alloy clustering in AlGaAs-GaAs quantum-well heterostructures, N Holonyak Jr, W D Laidig, B A Vojak, K Hess, J J Coleman, P D Dapkus and J Bardeen, *Phys. Rev. Lett.* **45**, 1703 (1980)
- 41 Monolithic multicolor solar conversion, S W Zehr, H T Yang, J J Coleman, D L Miller, J J Yang, R P Ruth and J S Harris Jr, *Proceedings of the 24th annual Technical Symposium of the SPIE* (San Diego, 1980) p. 125
- 42 Phonon contribution to MOCVD AlGaAs-GaAs quantum-well heterostructure laser operation, B A Vojak, N Holonyak Jr, W D Laidig, K Hess, J J Coleman and P D Dapkus, *J. Appl. Phys.* **52**, 959 (1981)
- 43 Continuous room temperature photopumped laser operation of modulation-doped AlGaAs-GaAs superlattices, P D Dapkus, J J Coleman, W D Laidig, N Holonyak Jr, B A Vojak and K Hess, *Appl. Phys. Lett.* **38**, 118 (1981)
- 44 High-barrier cluster-free AlGaAs-AlAs-GaAs quantum-well heterostructure laser, J J Coleman, P D Dapkus, W D Laidig, B A Vojak and N Holonyak Jr, *Appl. Phys. Lett.* **38**, 63 (1981)
- 45 High-energy (visible-red) stimulated emission in GaAs, B A Vojak, W D Laidig, N Holonyak Jr, M D Camras, J J Coleman and P D Dapkus, *J. Appl. Phys.* **52**, 621 (1981)
- 46 Device-quality epitaxial AlAs by metalorganic chemical vapor deposition, J J Coleman, P D Dapkus, N Holonyak Jr and W D Laidig, *Appl. Phys. Lett.* **38**, 894 (1981)
- 47 Quenching of stimulated phonon emission on AlAs-GaAs quantum well heterostructures, W D Laidig, N Holonyak Jr, M D Camras, B A Vojak, J J Coleman and P D Dapkus, *Solid State Commun.* **38**, 301 (1981)
- 48 Transient and noise characteristics of quantum well heterostructure lasers, E R Anderson, B A Vojak, N Holonyak Jr, G E Stillman, J J Coleman and P D Dapkus, *Appl. Phys. Lett.* **38**, 585 (1981)
- 49 Disorder of an AlAs-GaAs superlattice by impurity diffusion, W D Laidig, N Holonyak Jr, M D Camras, K Hess, J J Coleman, P D Dapkus and J Bardeen, *Appl. Phys. Lett.* **38**, 776 (1981)

- 50 GaAlAs-GaAs avalanche photodetectors, H D Law, K Nakano and J J Coleman, *Proceedings of the 25th Annual Technical Symposium of the SPIE* (Los Angeles, 1981)
- 51 Alloy clustering in AlGaAs, N Holonyak Jr, W D Laidig, K Hess, J J Coleman and P D Dapkus, *Phys. Rev. Lett.* **46**, 1042 (1981)
- 52 IR-red GaAs-AlAs superlattices laser monolithically integrated in a yellow-gap cavity, N Holonyak Jr, W D Laidig, M D Camras, J J Coleman and P D Dapkus, *Appl. Phys. Lett.* **39**, 102 (1981)
- 53 The growth and characterization of metalorganic chemical vapor deposition quantum well transport structures, J J Coleman, P D Dapkus, D E Thompson and D R Clarke, *J. Crystal Growth* **55**, 207 (1981)
- 54 Controlled Zn diffusion for low threshold narrow stripe GaAlAs-GaAs DH lasers, C S Hong, Y Z Liu, P D Dapkus and J J Coleman, *Electron Dev. Lett.* **EDL-2**, 225 (1981)
- 55 Gunn oscillation in GaAs optically triggered by 1.06 μm radiation, R Chin, K Nakano, J J Coleman and P D Dapkus, *Elect. Dev. Lett.* **EDL-2**, 248 (1981)
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Invited Presentations

1. 1981 International Electron Devices Meeting, December 7-9, 1981, Washington, DC (with P.D. Dapkus and N. Holonyak Jr)
2. 1983 Conference on Lasers and Electro-Optics, May 17-20, 1983, Baltimore (with P.D. Dapkus and N. Holonyak Jr)
3. 1985 Conference on Lasers and Electro-Optics, May 21-24, 1985, Baltimore
4. Workshop on the Future of Microstructure Technology, October 14-16, 1985, Seabrook Island
5. Workshop on High Speed Optical Processes and Optoelectronic Devices, May 27-29, 1987, Ann Arbor
6. 172nd Meeting of the Electrochemical Society, October 19-23, 1987, Honolulu
7. Conference on Compound Semiconductors: Growth, Processing, and Devices, October 26-28, 1987, Gainesville
8. 1989 Conference on Lasers and Electro-Optics, April 24-28, 1989, Baltimore (with J. G. Eden)
9. Fifth Interdisciplinary Laser Science Conference, August 27-31, 1989, Palo Alto
10. International Workshop on Fast, Low Current and High Power Heterostructures Lasers, October 16-21, 1989, Plovdiv, Bulgaria
11. 1989-90 Seminar Series of the Boston Section of the IEEE Lasers and Electro-Optics Society, December 14, 1989, Boston
12. SPIE Technical Symposium on High Power Lasers and Optical Computing, January 14-19, 1990, Los Angeles
13. 1990 Conference on Optical Fiber Communication, January 22-26, 1990, San Francisco
14. American Physical Society New York State Symposium on the Physics of Advanced Materials, April 6-7, 1990, Alfred University, Alfred
15. 1990 Conference on Lasers and Electro-Optics, May 21-25, 1990, Anaheim (with R. G. Waters)
16. Second International School of Modern Epitaxial Technologies, May 25-31, 1990, Plovdiv, Bulgaria
17. 5th International Conference on Metalorganic Vapor Phase Epitaxy, June 18-21, 1990, Aachen, Germany
18. Workshop on MQW Mixing and its Application to Optoelectronic Devices, September 18-21, 1990, Jersey, UK
19. IEEE/LEOS '90 Laser and Electro-Optics Society Annual Meeting, November 4-8, 1990, Boston
20. IEEE International Electron Devices Meeting, December 10-13, 1990, San Francisco
21. OE/Lase '91: Optics, Electro-Optics and Laser Applications in Science and Engineering Conference, January 20-25, 1991, Los Angeles
22. International Workshop on Thin Film Science and Technology for the 21st Century, July 28-August 2, 1991, Evanston

23. Workshop on Strained Layer Semiconductor Materials and Devices, August 23-24, 1991, Buffalo
24. Tutorial: Strained Layer Quantum Well Lasers, 1991 Annual Meeting of the Optical Society of America, November 3-8, 1991, San Jose
25. 1992 Conference on Optical Fiber Communication, February 3-7, 1992, San Jose
26. 1992 Workshop on Compound Semiconductor Materials and Devices, February 16-19, 1992, San Antonio
27. The Rank Prize Funds Symposium on Strained Layer Materials in Optoelectronic and Electronic Devices, July 6-9, 1992, English Lake District, UK
28. High Speed Optoelectronic Devices and Circuits II, August 9-13, 1992, Banff, Canada
29. 1992 Canadian Semiconductor Technology Conference, August 11-13, 1992, Ottawa, Canada
30. Tutorial: Quantum Well Heterostructure Lasers, 1992 Annual Meeting of the Optical Society of America, September 20-25, 1992, Albuquerque
31. OE/Lase '93: Optics, Electro-Optics and Laser Applications in Science and Engineering Conference, January 18-22, 1993, Los Angeles
32. International Symposium on Nanostructures: Physics and Technology, June 14-17, 1993, St. Petersburg, Russia
33. Conference on Optoelectronic Materials and Devices, December 7-9, 1993, Canberra, Australia
34. Annual Meeting of the Australia Section of the IEEE Lasers and Electro-Optics and Electron Devices Society, December 7, 1993, Canberra, Australia
35. OE/Lase '94: Optoelectronics for Information and Microwave Systems Conference, January 22-29, 1994, Los Angeles
36. Engineering Foundation Conference on High Speed Optoelectronic Devices for Communications, August 14-19, 1994, San Luis Obispo
37. March Meeting of the American Physical Society, March 20-24, 1995, San Jose
38. Spring Meeting of the Materials Research Society, April 17-21, 1995, San Francisco
39. 1995 Trilateral Materials Workshop, May 4-5, 1995, Saltillo, Mexico
40. Tutorial: Quantum Well Heterostructure Lasers, 1995 Conference on Lasers and Electro-Optics, May 22-26, 1995, Baltimore
41. 1995 Annual Meeting of the Optical Society of America, September 11-14, 1995, Portland
42. Photonics East '95: Laser Diode Chip and Packaging Technology Conference, October 22-26, 1995, Philadelphia
43. Tutorial: Electronic Materials, March Meeting of the American Physical Society, March 17-21, 1996, St. Louis
44. Engineering Foundation Conference on High Speed Optoelectronic Devices for Communications, August 11-15, 1996, Snow Bird, Utah
45. SPIE Photonics East: Emerging Components and Technologies for All-Optical Photonic Systems II, November 18-22, 1996, Boston
46. SPIE Photonics West: Optoelectronics '97, February 12-14, San Jose
47. International Conference on Indium Phosphide and Related Materials, Tutorial on MOCVD growth of InP-based structures, May 11-15, 1997, Hyannis, Massachusetts
48. Workshop on Rail Defect Detection and Removal Policies and Broken Rail Detection Technologies, July 22-23, 1997, Pueblo, CO
49. Washington-Northern Virginia Chapter of the IEEE Lasers and Electro-Optics Society, Distinguished Lecturer, September 16, 1997, College Park, MD
50. Dallas-Fort Worth Chapter of the IEEE Lasers and Electro-Optics Society, Distinguished Lecturer, October 16, 1997, Dallas
51. Orlando Chapter of the IEEE Lasers and Electro-Optics Society, Distinguished Lecturer, December 4, 1997, Orlando
52. SPIE Photonics West: Optoelectronics '98, January 25-30, 1998 San Jose
53. Sacramento Chapter of the IEEE Lasers and Electro-Optics Society, Distinguished Lecturer, January 29, 1998, Sacramento
54. University of Southern California, IEEE Lasers and Electro-Optics Society, Distinguished Lecturer, March 3, 1998, Los Angeles
55. Ottawa Chapter of the IEEE Lasers and Electro-Optics Society, Distinguished Lecturer, March 23, 1998, Ottawa
56. Toronto Chapter of the IEEE Lasers and Electro-Optics Society, Distinguished Lecturer, March 24, 1998, Toronto
57. Scotland Chapter of the IEEE Lasers and Electro-Optics Society, Distinguished Lecturer, April 21, 1998, Glasgow
58. London Chapter of the IEEE Lasers and Electro-Optics Society, Distinguished Lecturer, April 25, 1998, London
59. Phoenix Chapter of the IEEE Lasers and Electro-Optics Society, Distinguished Lecturer, May 27, 1998, Tempe
60. Denver Chapter of the IEEE Lasers and Electro-Optics Society, Distinguished Lecturer, May 28, 1998, Denver
61. Annual meeting of the IEEE Lasers and Electro-Optics Society, December 1-4, 1998, Orlando
62. Albuquerque Chapter of the IEEE Lasers and Electro-Optics Society, February 11, 1999, Albuquerque
63. Australia Chapter of the IEEE Lasers and Electro-Optics Society, February 22, 1999, Canberra
64. Hampton Roads Chapter of the IEEE Lasers and Electro-Optics Society, March 18, 1999, Norfolk, VA
65. Princeton Chapter of the IEEE Lasers and Electro-Optics Society, March 30, 1999, Princeton
66. University of Texas Chapter of the IEEE Lasers and Electro-Optics Society, May 24, 1999, Austin

67. Italy Chapter of the IEEE Lasers and Electro-Optics Society, June 7, 1999, Milan
68. Benelux Chapter of the IEEE Lasers and Electro-Optics Society, June 9, 1999, Amsterdam
69. IEEE Lasers and Electro-Optics Society Annual Meeting, November 12-15, 2001, San Diego
70. Conference on Optoelectronic and Microelectronic Materials and Devices (COMMAD), December 11-13, 2002, Sydney
71. Workshop on Selective, Patterned, and Self-Assembled Growth of Nanostructures, January 6-8, 2003, Hong Kong
72. SPIE Photonics West, January 2003, San Jose, CA
73. Materials Research Society Symposium Proceedings, April 21-25, 2003, San Francisco, CA
74. Department of Electrical Engineering Seminar Series, University of Wisconsin, April 26, 2004, Madison
75. Dallas-Fort Worth Chapter of the IEEE Lasers and Electro-Optics Society, Distinguished Lecturer, May 6, 2004, Dallas
76. Portland Development Center, Intel Corporation, July 15, 2004, Portland
77. 31st International Symposium on Compound Semiconductors (ISCS-2004), September 12-16, 2004, Seoul, Korea
78. SPIE Photonics West, 2005, Jan. 22-27, 2005, San Jose, CA
79. Department of Electronic and Electrical Engineering, University College London, February 28, 2005, London
80. MIT Lincoln Laboratory, July 19, 2005, Lexington, MA
81. IEEE Lasers and Electro-Optics Society Annual Meeting, October 24-28, 2005, Sydney
82. Indium Phosphide and Related Materials Conference (Short Course), May 7, 2006, Princeton
83. Conference on Lasers and Electro-Optics, Pacific Rim (Tutorial), August 26-31, 2007, Seoul
84. IEEE Lasers and Electro-Optics Society Annual Meeting (Short Course), October 2007, Orlando
85. Conference on Lasers and Electro-Optics (CLEO), (Invited) San Jose, May 2008
86. Integrated Photonics and Nanophotonics Research and Applications (IPNRA), (Invited) Boston, July 2008
87. Emerging Trends In Photonic and Electronic Device Research, (Invited), Urbana, Sept 2008
88. IEEE Lasers and Electro-Optics Society Annual Meeting (Short Course), November 2008, Newport Beach

Edited Volumes

- IEEE Journal of Quantum Electronics*, Guest Editor, Special issue on quantum well heterostructures and superlattices (Vol. 24, No. 8, 1988)
- Selected Papers on Semiconductor Diode Lasers*, SPIE Milestone Series, Volume MS 50, B J Thompson, General Ed. (SPIE Optical Engineering Press, Bellingham, WA, 1992)
- Journal of Crystal Growth*, Guest Editor (with G B Stringfellow), Proceedings of the Sixth International Conference on Metalorganic Vapor Phase Epitaxy (Vol. 124, Nos. 1-4, 1992)
- Journal of Electronic Materials*, Guest Editor (with P.D. Dapkus), Proceedings of the Sixth Biennial Workshop on Organometallic Vapor Phase Epitaxy (Vol. 23, No. 2, 1994)
- IEEE Journal of Quantum Electronics*, Guest Editor (with B I Miller), Special issue on strained-layer optoelectronic materials and devices (Vol. 30, No. 2, 1994)
- IEEE Journal of Selected Topics in Quantum Electronics*, Guest Editor (with W T Tsang, P D Dapkus, and L A Coldren) Special issue on optoelectronic materials and processing (Vol. 3, No. 3, 1997)
- IEEE Journal of Selected Topics in Quantum Electronics*, Guest Editor (with D G Deppe, D Bimberg and Y Arakawa) Special issue on nanostructures and quantum dots (Vol. 6, No. 3, 2000)
- IEEE Journal of Selected Topics in Quantum Electronics*, Guest Editor (with A C Bryce and C Jagadish) Special issue on optoelectronic materials and processing (in press 2008)

Patents

- Fabrication of gallium arsenide MOS devices, C C Chang, R P H Chang, J J Coleman and T T Sheng, *US Patent 4,144,634*
- Zinc diffused narrow stripe AlGaAs/GaAs double heterostructure laser, Y Z Liu, C S Hong, P D Dapkus and J J Coleman, *US Patent 4,517,674*
- Semiconductor device and method, K Hess, J J Coleman, T K Higman and M A Emanuel, *US Patent 4,994,882*
- Flared and tapered rib waveguide semiconductor laser and method for making same, J J Coleman and M S Zediker, *US Patent 6,317,445*
- Separate lateral confinement quantum-well laser, J.J. Coleman, R.B. Swint, and M.S. Zediker, *US Patent 6,649,940*
- Current biased dual DBR grating semiconductor laser, J J Coleman and S D Roh, *US Patent 6,728,290*
- Flared and tapered rib waveguide semiconductor laser and method for making same, J.J. Coleman and M.S. Zediker, *Canadian Patent 2,459,313*
- Current biased dual DBR grating semiconductor laser, J J Coleman and S D Roh, *US Patent 7,339,968*