

Department of: Physics

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1. Refereed publications and book chapters

Dr. Basista

Mathews, S., Cornell, K., Basista, B. (2006) "Where is the Moon Tonight?"
Mathematics Teaching in the Middle School 11 (9), 467-475 (R)

Dr. Hunt

Hunt, A. G., 2006, Comment on "Fractal approach to hydraulic properties in unsaturated porous media," by Y.F. Xu and Ping Dong, *Chaos, Solitons, and Fractals*, 19 327-337 (2004), *Chaos, Solitons, and Fractals*, 28, 278-281.

Hunt, A. G., 2006, Scale-dependent dimensionality cross-over; implications for scale-dependent hydraulic conductivity in anisotropic porous media, *Hydrogeology Journal*, DOI: 10.1007/s10040-005-0453-6, 14: 499-507.

Hunt, A. G., G. E. Grant, and V. K. Gupta, 2006, Spatio-Temporal Scaling of Braided Streams, *Journal of Hydrology*, doi:10.1016/j.jhydrol.2005.02.034, 322: 192-198.

Hunt, A. G., S. Logsdon, and D. Laird, 2006, Percolation Treatment of Charge Transfer in Humidified Smectite Clays, *Soil Science Society of America Journal* 70: 14-23.

Hunt, A. G., and R. P. Ewing, 2006, Dependence of the electrical conductivity on saturation in real porous media, *Vadose Zone Journal*, 5: 731-741.

Hunt, A. G., L. A. Blank, and T. E. Skinner, 2006, Distributions of the Hydraulic Conductivity for Single-Scale Anisotropy, *Philosophical Magazine*, 86: 2407-2428.

Dr. Kozlowski

Kleismit R.A., Kazimierczuk M.K., Kozlowski G., "Sensitivity and resolution of evanescent microwave microscope", *IEEE Trans. on Microwave Theory and Techniques* 54, 639 (2006).

Dr. Lew Yan Voon

A. Zhang, L. C. Lew Yan Voon, and M. Willatzen, Dynamics of a nanowire superlattice in an ac electric field. *Phys. Rev. B* 73, 045316 (2006).

H. Ramirez, A. Camacho, and L. C. Lew Yan Voon, Electron dynamics in coupled quantum dots. *Nanotechnology* 17, 1286-1291 (2006).

- G. Guzman-Verri, L. C. Lew Yan Voon, M. Willatzen, and J. Gravesen, Electronic structure of helically coiled carbon nanotubes. *Mat. Res. Soc. Sym. Proc.* 901E (2006).
- M. Willatzen, B. Lassen, L. C. Lew Yan Voon, and R. Melnik, Dynamic coupling of piezoelectric effects, spontaneous polarization, and strain in lattice-mismatched semiconductor quantum-well heterostructures. *J. Appl. Phys.* 100, 024302 (2006).
- N. Radulovic, M. Willatzen, R. Melnik, and L. C. Lew Yan Voon, 2D modeling of carrier transport through semiconductor heterostructure nanowires. *J. Comput. Theor. Nano.* 3 (4), 551–559 (2006).
- B. Lassen, M. Willatzen, R. Melnik and L. C. Lew Yan Voon, Spurious solutions and boundary conditions in k.p theory. *Proceedings, 28th International Conference on the Physics of Semiconductors (Vienna, Jul 2006).*
- H. Y. Ramirez, A. Camacho, and L. C. Lew Yan Voon, Coupling relaxation and coherent emission in semiconductor double quantum dots. *Proceedings, 28th International Conference on the Physics of Semiconductors (Vienna, Jul 2006).*
- L. C. Lew Yan Voon, M. Willatzen, B. Lassen and R. Melnik, Physics-based models of dynamic response of piezoceramics. *Proceedings International Symposium on Advanced Dielectric Materials and Electronic Devices (MS & T '06, Cincinnati, Oct 2006).* Invited Paper.
- H. Ramirez, A. Camacho, and L. C. Lew Yan Voon, DC electric field effects on the electron dynamics in double rectangular quantum dots. *Brazilian J. Physics* 36, 869 (2006).
- B. Lassen, M. Willatzen, R. Melnik, and L. C. Lew Yan Voon, Electronic properties of free-standing InP and InAs nanowires. *J. Mat. Res.* 21, 2927 (2006).
- M. Willatzen and L. C. Lew Yan Voon, Flow-acoustic properties of elliptic-cylinder waveguides and enclosures, *J. Phys.* 52, 1 (2006).
- M. Willatzen, B. Lassen, and L. C. Lew Yan Voon, Nonlinearities and piezoelectric fields in AlN/GaN wurtzite heterostructures. *J. Appl. Phys.* 100, 124309 (2006).

Dr. Look

Edited Books, Chapters in Books

- D.C. Look, “Doping and defects in ZnO”, in *Zinc Oxide Bulk, Thin Films, and Nanostructures: Processing, Properties and Applications*, ed. by C. Jagadish and S.J. Pearton (Elsevier, Oxford, 2006) Chap. 2. Aug06.

J. Christen, B. Gil, A. Hoffmann, D.C. Look, and T. Yao, Editors, EMRS Symp. Proc. 181, "ZnO and Related Materials", Symp. G, EMRS, Strasbourg, May 31 – June 3, 2005 (Elsevier, Oxford, 2006). ~Feb06.

Refereed Journal Articles

F. Tuomisto, S. Hautakangas, I. Makkonen, V. Ranki, M. J. Puska, K. Saarinen, M. Bockowski, T. Suski, T. Paskova, B. Monemar, X. Xu, and D. C. Look, "Dissociation of VGaON complexes in HVPE GaN by high pressure and high temperature annealing", *phys. stat. sol. (b)* 243, 1436 (2006). June06

S. Hautakangas, I. Makkonen, V. Ranki, M. J. Puska, K. Saarinen, X. Xu, and D. C. Look, "Direct experimental evidence of impurity decoration of Ga vacancies in GaN", *Phys. Rev. B* 73, 193301 (2006). May06

S. Hautakangas, V. Ranki, I. Makkonen, M.J. Puska, K. Saarinen, L. Liskay, D. Seghier, H.P. Gislason, J. Freitas, R.L. Henry, X. Xu, and D.C. Look, "Gallium and nitrogen vacancies in GaN: impurity decoration effects", *Physica B* 376, 424 (2006) Apr06

W.C. Mitchel, W.D. Mitchell, S.R. Smith, A.O. Evwaraye, Z-Q. Fang, D.C. Look, and J.R. Sizelove, "Deep Level Near EC – 0.55 eV in Undoped 4H-SiC Substrates", *Materials Science Forum* 527-529, 505 (2006). ~Nov06.

Z-Q. Fang, B. Claflin, D.C. Look, L. Polenta, J. Chen, T. Anderson, and W.C. Mitchel, "Deep traps in high-purity semi-insulating 6H-SiC substrates: Thermally stimulated current spectroscopy", *Materials Science Forum* 527-529, 527 (2006). ~Nov06.

T. Aggerstam, S. Lourudoss, H.H. Radamson, M. Sjödin, P. Lorenzini, and D.C. Look, "Investigation of the interface properties of MOVPE grown AlGaIn/GaN high electron mobility (HEMT) structures on sapphire", *Thin Solid Films* 515, 705, (2006). Oct06

Y. Zhong, K.S. Wong, W. Zhang, and D.C. Look, "Radiative recombination and ultra-long exciton photoluminescence lifetime in GaN freestanding film via two-photon excitation", *Appl. Phys. Lett.* 89, 022108 (2006). July06

A. Krtshil, D.C. Look, Z-Q. Fang, A. Dadgar, A. Diez, and A. Krost, "Local p-type conductivity in n-GaN and n-ZnO layers due to inhomogeneous dopant incorporation", *Physica B* 376, 703 (2006). Apr06

S. Sun, G.S. Tompa, B. Hoerman, D.C. Look, B.B. Claflin, C.E. Rice, and P. Masaun, "Metalorganic Chemical Vapor Deposition and Characterization of ZnO Materials", *J. Electronic. Mater.* 35, 766 (2006). Apr06

- D.C. Look, "Progress in ZnO Materials and Devices", J. Electronic. Mater. 35, 1299 (2006). June06
- Z-Q. Fang, D.C. Look, A. Krtshil, A. Krost, F.A. Khan, I. Adesida, "Giant traps on the surface of hydride vapor phase epitaxy-grown free-standing GaN". J. Electronic Mater. 35, 613 (2006). Apr06
- B. Claflin, D.C. Look, S.J. Park, G. Cantwell, "Persistent n-type photoconductivity in p-type ZnO", J. Crystal Growth 287, 16 (2006). Jan06
- A. Wyszomolek, R. Stępniewski, M. Potemski, B. Chwalisz-Pietka, K. Pakula, J.M. Baranowski, D.C. Look, S. S. Park, and K. Y. Lee, "Magnetopolaron effect on shallow donors in GaN", Phys. Rev. B 74, 195205 (2006). Nov06
- A. Osinsky, J. Dong, B. Hertog, A. Dabiran, P. Chow, W. Schoenfeld, S. Pearton, D.C. Look and A. Cartwright, "CdZnO/ZnO Heterostructures for UV-Visible Light Emitters", ECS Transactions 3, 323 (2006). Nov06.
- W. C. Mitchell, W. D. Mitchell, Z. Q. Fang, D. C. Look, S. R. Smith, H. E. Smith, Igor Khlebnikov, Y. I. Khlebnikov, C. Basceri, and C. Balkas, "Electrical properties of unintentionally doped semi-insulating and conducting 6H-SiC", J. Appl. Phys. 100, 043706 (2006).
- K.P. Korona, A. Wyszomolek, J. Kuhl, M. Kaminska, J.M. Baranowski, D.C. Look, and S.S. Park, "Coupling of phonons with excitons bound to different donors and acceptors in hexagonal GaN", phys. stat. sol. (c) 3, 1940 (2006). ~June06

Refereed Conference Proceedings

- A.V. Osinsky, J.W. Dong, J.Q. Xie, B. Hertog, A.M. Dabiran, P.P. Chow, S.J. Pearton, D.P. Norton, D.C. Look, W. Schoenfeld, O. Lopatiuk, L. Chernyak, M. Cheung, A.N. Cartwright, and M. Gerhold, Mater. Res. Soc. Symp. Proc. 891, 371 (2006). ~June06
- M. Gerhold, A. Osinsky, and D.C. Look, "Development of ZnMgCdO-based alloys and heterostructures for optical applications", Proc. SPIE 6127, 1B (2006).

Dr. Petkie

- B. J. Drouin, C. E. Miller, J. L. Fry, D. T. Petkie, P. Helminger, I. Medvedev, "Submillimeter measurements of isotopes of nitric acid," Journal of Molecular Spectroscopy, 236 (1), 29-34 (2006).
- E. L. Jacobs, S. Moyer, C. C. Franck, F. C. De Lucia, C. Casto, D. T. Petkie, S. R. Murrill, C. E. Halford, "Concealed weapon identification using terahertz imaging sensors," (Invited Paper)

Proceedings of SPIE: Terahertz for Military and Security Applications IV, 6212,
(Orlando, Florida USA, 27 Sept. 2006).

Dr. Skinner

Skinner, TE, Kobzar, K, Luy, B, Bendall, MR, Bermel, W, Khaneja, N, and Glaser, SJ,
"Optimal Control Design of Constant Amplitude Phase-Modulated Pulses:
Application to Calibration-Free Broad-band Excitation," J. Magn. Reson. 179,
241–249 (2006).

Hunt, AG, Blank, LA, and Skinner, TE, "Distributions of the Hydraulic Conductivity for
Single-Scale Anisotropy," Phil. Mag. 86(16), 2407–2428 (2006).

2. Presentations and invited talks

Dr. Basista

Basista, B., Krakowski, R. May, 2006. Mathematics Teacher Preparation and
Professional Development. Presented at Ohio Mathematics Association of Two
Year Colleges. Burr Oak State Park, OH. (I)

Look, David

D.C. Look, "On the Identification of Impurities and Point Defects in ZnO", SPIE –
Photonics West, San Jose, 22Jan06. (Invited, Keynote)

D.C. Look, "Progress in ZnO Materials and Devices", Seminar, University of Cincinnati,
Cincinnati, 10Mar06. (Invited)

D.C. Look, "ZnO Materials and Devices: Past, Present and Future", Seminar, University
of Genoa, Genoa, Italy, 25May06. (Invited)

D.C. Look, "Unusual Electrical Properties of Hydrothermally Grown ZnO", EMRS,
Nice, France, 30May06.

D.C. Look, "ZnO Photonic Devices: Materials Issues", SPIE – Great Lakes Photonics
Devices, Dayton, 14June06. (Invited)

D.C. Look, M. Callahan, and L. Bouthillette, "Optical and Electrical Properties of
Hydrothermally Grown ZnO: Effects of Annealing in Forming Gas", Fourth
International Workshop on ZnO and Related Materials, Giessen, Germany,
4Oct06.

D.C. Look, B. Clafin, Z-Q. Fang, and G. Farlow, "ZnO Materials and Devices: Past,
Present and Future", Seminar, Miami University of Ohio, 18Oct06. (Invited)

D.C. Look, "Donors and Acceptors in Bulk ZnO Grown by the Hydrothermal, Melt, and Vapor-phase Processes", 2006 MRS Fall Meeting, Boston, 30Nov06.

Dr. Foy

Bobb RL, Foy BD. Biomolecular Network Simulation. Wright State NSF-REU poster session. August, 2006. (poster)

Dr. Hunt

Invited Plenary Talk, Understanding Complex Systems, 2006, University of Illinois, Urbana-Champaign

Invited Keynote Address at International Workshop Flow and Transport in Porous Media, Ascona Switzerland, April, 2006.

Two presentations at the annual meeting of AGU in San Francisco.

Dr. Koenig

Endorf, R. J., Braun, G., Koenig, K. M., & Slezak, C. (July, 2006). An Implementation and Evaluation of "Tutorials in Introductory Physics". American Association of Physics Teachers National Conference, Syracuse, NY.

Koenig, K. (June 2006). Girls in Science Program. American Association of University Women Regional Conference, Chicago, IL. (I)

Dr. Kozlowski

1. Biggers R.R., Kozlowski G., Maartense I., Campbell A., Jones J., Fore N., Wheeler R., Gallagher H., Peterson T. Control of YBCO thin film properties using an initial buffer layer and PLD process control. Proceedings of 2006 Applied Superconductivity Conference, Seattle, Washington, August 27 – September 1, 2006.

2. Kleismit R., Kozlowski G., Biggers R.R., Maartense I., Campbell A., Haugan T., Barnes P., Peterson T. Cryogenic characterization of superconducting YBCO films on strontium titanate bicrystals using evanescent microwave microscopy. Proceedings of 2006 Applied Superconductivity Conference, Seattle, Washington, August 27 – September 1, 2006.

Dr. Lew Yan Voon

Many-body effects in spectral-hole burning for quantum-well lasers. L. C. Lew Yan Voon, M. Willatzen, and B. Lassen. SLAFES (Mexico, Nov 2006).

Localization and coupling in cylindrical quantum dots chains. H. Y. Ramirez, A. Camacho, and L. C. Lew Yan Voon. SLAFES (Mexico, Nov 2006).

Acoplamiento en superredes de puntos cuanticos. H. Ramirez, A. Camacho, and L. C. Lew Yan Voon. Colombian school of Physics (2006).

Physics-based Models of Dynamic Response of Piezoceramics. L. C. Lew Yan Voon, M. Willatzen, B. Lassen and R. Melnik. Invited Talk, Symposium on Advanced Dielectric Materials and Electronic Devices (MS& T '06, Cincinnati, Oct 2006).

Electromechanical coupling effects in semiconductor heterostructures. Physics seminar (Case Western Reserve University, Oct 2, 2006).

Physics of Piezoelectric Nanomaterials. Physics seminar (WSU, Sep 29, 2006).

Effects of coupling on electron-phonon scattering in double quantum dots. H. Y. Ramirez, A. Camacho, and L. C. Lew Yan Voon. International Conference on Superlattices, Nano-Structures and Nano-Devices (Istanbul, Aug 2006).

Spurious solutions and boundary conditions in k.p theory. B. Lassen, M. Willatzen, R. Melnik and L. C. Lew Yan Voon. 28th International Conference on the Physics of Semiconductors (Vienna, Jul 2006).

Dynamics of a nanowire superlattice in an AC electric field. L. C. Lew Yan Voon, A. Zhang, and M. Willatzen. 28th International Conference on the Physics of Semiconductors (Vienna, Jul 2006).

Coupling relaxation and coherent emission in semiconductor double quantum dots. H. Y. Ramirez, A. Camacho, and L. C. Lew Yan Voon. 28th International Conference on the Physics of Semiconductors (Vienna, Jul 2006).

Coupled Modeling Of Strained AlN/GaN Heterojunctions, Melnik, Mahapatra, Willatzen, Lew Yan Voon and Lassen. Australian Institute of Physics 17th National Congress 2006.

From Acoustic to Nano Cavities. Physics Colloquium, Ohio Northern University (May 3, 2006).

Dr. Petkie

D. T. Petkie, M. Kipling#, A. Jones#, P. Helminger, I. Medvedev, A. Maeda, B. J. Drouin, C. E. Miller, "The Rotational Spectrum of H₁₅NO₃: All States Below 1000 cm⁻¹," 61st Ohio State University International Symposium on Molecular Spectroscopy, June 19-23, 2006, Columbus, Ohio. # Undergraduate Students.

D. T. Petkie, P. A. Helminger, I. Medvedev, A. Maeda and F. C. De Lucia, "The Millimeter and Submillimeter-Wave Rotational Spectrum of the 8191, 6171, and 21 Vibrational States of Nitric Acid," 61st Ohio State University International Symposium on Molecular Spectroscopy, June 19-23, 2006, Columbus, Ohio.

R. Medvedev, B.P. Winnewisser, M. Winnewisser, M. Behnke, F. C. De Lucia, D. T. Petkie, R. P. A. Bettens, Z. Kisiel, "Fast Scan Submillimeter Spectroscopy Technique (FASSST)," 61st Ohio State University International Symposium on Molecular Spectroscopy, June 19-23, 2006, Columbus, Ohio.

(Invited Talk) D. T. Petkie, I. R. Medvedev, F. C. De Luica, "Spectroscopy and sensing in the submillimeter/THz," SPIE Great Lakes Photonics Symposium, Quantum Optics, Advanced Spectroscopy, and Terahertz Technology (Dayton, Ohio USA June 13 2006).

C. L. Casto, D. T. Petkie, F. C. De Luica, "Imaging: the World at 650 GHz," SPIE Great Lakes Photonics Symposium, Quantum Optics, Advanced Spectroscopy, and Terahertz Technology (Dayton, Ohio USA June 13 2006).

D. T. Petkie, "Terahertz Physics and Applications," Department of Physics Colloquium, University of Dayton, October 20, 2006.

Dr. Skinner

Gershenson, NI, Skinner, TE, Glaser, SJ, and Khaneja, N, "Optimal Control Design of Excitation Pulses for NMR to Accomodate Relaxation," 47th Experimental NMR Conference (ENC), April, 2006, Asilomar, California.

Luy, B, Kobzar, K, Skinner, TE, Khaneja, N, and Glaser, SJ, "A Simple Construction Scheme for Universal Rotations out of Point-to-Point Transformation Pulses," 47th Experimental NMR Conference (ENC), April, 2006, Asilomar, California.

Blank, LA, Skinner, TE, and Hunt, AG, "Saturation-dependent Anisotropy in the Hanford Subsurface Hydraulic Conductivity," American Geophysical Union Fall Meeting, December, 2006, San Francisco, California.

Dr. Tebbens

Tebbens, S.F., S.M. Burroughs, A.B. Murray, and J. Smigelski, 2006, Coasts in Motion Preliminary Results of a Summer 2006 LIDAR survey of the Outer Banks, North Carolina, Eos Trans. AGU, 87, Fall Meet. Suppl., Abstract G53C-0912.

Burroughs, S.M., and S.F. Tebbens, 2006, Self-Similar Criticality: A Link Between Fractal Geometry and Geophysical Observations, Eos Trans. AGU, 87, Fall Meet. Suppl., Abstract NG43B-1156.

Tebbens, S.F., and S.M. Burroughs, 2006, Dune retreat and shoreline change on the outer banks of North Carolina, Aegean Conferences, Twenty Years of Nonlinear Dynamics in Geosciences.

Barton, C.C., S. F. Tebbens, S.M. Burroughs, A.B. Murray, and A.D. Ashton, 2006, Analyzing, modeling, and forecasting shoreline dynamics, Twenty Years of Nonlinear Dynamics in Geosciences.

Smigelski, J., S. F. Tebbens, and C.C. Barton, 2006, Scaling analysis of water level records from the North American Great Lakes, Twenty Years of Nonlinear Dynamics in Geosciences.

Smigelski, J., C.C. Barton, and S. F. Tebbens, 2006, Scaling analysis of tide gauge data from the Atlantic, Gulf of Mexico, and Pacific Coasts of the Unites States, Twenty Years of Nonlinear Dynamics in Geosciences.

3. *Invitations to participate or chair symposia*

None

4. *Editorial board memberships*

None

5. *Granting Agency Study Section Memberships*

None

6. *Offices held in National professional organizations*

None

7. *Special events, symposia or colloquia*

Events

Honors Seminars of Metropolitan Dayton series, "Nanotechnology," Lok C. Lew Yan Voon. February 23, 2006.

Physics Department Annual Scholarship Presentation/Halloween Party.

Research Experience for Undergraduates (summer 2006). Funded by NSF and attended by 10 students.

Seminars

Characterization of two-dimensional Debye clusters using Brownian motion, Terry Sheridan (Ohio Northern Univ.).

Revealing our Galaxy's inner stellar disk, Margaret Hanson (Univ. Cincinnati).

Perspectives on computational physics, Foy, Lew Yan Voon, Skinner (Physics, WSU).

Understanding the physics of toys - It's not child's play, Beverly Taylor (Miami University).

The Physics of Time Travel: A New Twist in Space and Time
Public talk: A Brief History of Time Travel, Dr. Ronald Mallet (Univ. Connecticut)

The interface of biology and nanotechnology, Rajesh Naik (AFRL, WPAFB).

Single atom/molecule manipulation with STM, Saw-Wai Hla (OU).

Micro and nano technology at the Michigan Nanofabrication Facility, Fred Terry, Jr. (Univ. Michigan).

Physics of Piezoelectric Nanomaterials, L. Lew Yan Voon.

WSU/REU and AFIT Summer Internship Programs Presentations.

Senior project presentation: John Callahan, A Short Study of Copper-Indium-Gallium-Selenide Amorphous Polycrystalline Thin-Film Solar Cells $\text{CuIn}_{1-x}\text{Ga}_x\text{Se}_2$ (CIGS) through Photoluminescence Spectroscopy (Engineering Physics); David Fultz, Dual modulated photoreflectance spectroscopy with a broad spectrum pump beam (Engineering Physics); Stephen Pawel, Superconducting properties of $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ thin films deposited on SrTiO_3 bi-crystals by using PLD (Engineering Physics).

MS thesis defense

Bill Ford, Development of a fourier transform far infrared (FTFIR) spectrometer to characterize broadband transmission properties in the terahertz region.

Gian Guzman-Verri, Electronic Properties of Si-based nanomaterials.

L Blank, Models of Anisotropic Media and Predictions of Associated Hydraulic Conductivity.

8. Faculty who were awarded professional development leave

Beth Basista. Location: Ohio. Purpose: Carry out research plans.

9. Faculty, staff or students who were given awards locally, nationally or internationally

The Physics Department awarded scholarships for 2006-2007 to the following students:

Katherine Yeager (Kingston Memorial Scholarship),
Ajani Ross (Merrill Andrews Scholarship).

Graduate Student Excellence Award (SoGS): Gian Guzman-Verri

10. Outreach programs

Take Your Sons and Daughters to Work Day (April 27). Participants: 10. Staff: Will Wagner.

11. Student clubs and activities

6 students were inducted into the Sigma Pi Sigma Physics Honorary Society (Cetnar, Durham, Mitchell, Ross, Tabor, Yeager).

12. Undergraduate honors students

None

13. Off campus or special interest courses

None

14. Graduate students

Three students were awarded the MS degree in Physics: L. Blank, B. Ford, G. Guzman-Verri.