

Roland E. Allen

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Education: B.S., Physics, Rice University, 1963
Ph.D., Physics, University of Texas at Austin, 1968

Research: Theoretical Physics

Positions:

Research Associate, University of Texas at Austin, 1969 - 1970
Resident Associate, Argonne National Laboratory, summers of 1967 - 69
Assistant Professor of Physics, Texas A&M University, 1970 - 1976
Associate Professor of Physics, Texas A&M University, 1976 - 1983
Sabbatical Scientist, Solar Energy Research Institute, 1979 - 1980
Visiting Associate Professor of Physics, University of Illinois, 1980 - 1981
Professor of Physics, Texas A&M University, 1983 – Present

Honors and Research Activities

Honors Program Teacher/Scholar Award, 2005
University Teaching Award, 2004
College of Science Teaching Award, 2003
Deputy Editor, *Physica Scripta* (published for Royal Swedish Academy of Sciences), 2013-2016
Service on NSF, DOE, and university program evaluation panels, 1988-present
Co-organizer of Richard Arnowitt Symposium (September 19-20, 2014)
Organizer of Second Mitchell Symposium on Astronomy, Cosmology, and Fundamental Physics
(April 10-14, 2006)
Organizing Committee, Fifth Conference on Dark Matter in Astroparticle Physics (October 3-9, 2004)
Organizer of Mitchell Symposium on Observational Cosmology (April 11-16, 2004)
Organizer of Institute for Quantum Studies Research for Undergraduates Program (Summer, 2003)
Organizer of Richard Arnowitt Fest (April 5-8, 1998)
Co-organizer: 1984 Workshop on Theory and Modeling for Materials Design
1989 International Workshop on Surface Dynamics
1995 Conference on Physics and Chemistry of Semiconductor Interfaces
Editorial Board, *Superlattices and Microstructures*, 1994-2003
Fellow of the American Vacuum Society
Executive Committee, Texas Section of the American Physical Society (2004-2007)
Chair-Elect to Chair, Texas Section of the American Physical Society, April 2019 – March 2023

Representative Talks at Conferences

[Talks by students and research associates are omitted.]

“Sub-TeV superpartners may be observable, with reduced cross-sections and modified experimental signatures”, 30th International Conference on Supersymmetry and Unification of Fundamental Interactions (SUSY 2023), University of Southampton – in person, July 17-21, 2023.

“A new picture for scalar boson superpartners, with only second-order gauge couplings and reduced cross-sections”, 2023 Phenomenology Symposium, University of Pittsburgh – in person, May 8 – 10, 2023.

“Potential for definitive discovery of a 70 GeV dark matter WIMP with only second-order gauge couplings”, UCLA Dark Matter Conference 2023, Los Angeles – in person, March 29 - April 1, 2023.

“Potential for definitive discovery of a 70 GeV dark matter WIMP with only second-order gauge couplings”, APS April Meeting 2023, Minneapolis – in person, April 15–18, 2023.

“A dark matter WIMP that can be detected and definitively identified with currently planned experiments”, 4th World Summit on Exploring the Dark Side of the Universe (EDSU2022), Réunion Island – in person, November 7-11, 2022.

“Experimental signatures of a new dark matter WIMP”, International Conference on Neutrinos and Dark Matter (NuDM-2022), Sharm El Sheik, Egypt – in person, September 25-28, 2022.

“A new perspective on some current mysteries, including dark matter, dark energy, and black hole entropy”, Workshop in Astro-particles and Gravity”, Cairo University, Egypt – in person, September 20-22, 2022.

“From the origin of spacetime coordinates and quantum fields to quantitative predictions for near-term experiments”, invited (in-person) talk at Frontiers of Quantum and Mesoscopic Thermodynamics, Prague, Czech Republic – in person, July 31-August 6, 2022.

“A Dark Matter WIMP That Can Be Detected and Definitively Identified with Currently Planned Experiments”, XXIX International Conference on Supersymmetry and Unification of Fundamental Interactions (SUSY 2022), University of Ioannina, Greece – in person, June 27-July 2, 2022.

“Experimental signatures of a new dark matter WIMP”, XV International Conference on Interconnections between Particle Physics and Cosmology, Washington University in St. Louis, – in person, June 6-10, 2022.

“A Dark Matter WIMP That Can Be Detected and Definitively Identified with Currently Planned Experiments”, Phenomenology 2022 Symposium, University of Pittsburgh – in person, May 9-11, 2022.

“A Dark Matter WIMP That Can Be Detected and Definitively Identified with Currently Planned Experiments”, APS April Meeting 2022, New York – in person, April 9–12, 2022.

“Origin of quantum mechanics: from dits to quantum fields”, invited talk at 2022 Winter Colloquium on the Physics of Quantum Electronics, Snowbird, Utah – in person, Jan. 10-14, 2022.

“Experimental signatures of a new dark matter WIMP”, XXVIII International Conference on Supersymmetry and Unification of Fundamental Interactions (SUSY 2021), Shanghai – online, Aug 23-28, 2021.

“A Dark Matter WIMP That Can Be Detected and Definitively Identified with Currently Planned Experiments”, 24th International Conference on Particle Physics and Cosmology (COSMO’21), University of Illinois – online, August 2–6, 2021.

“Predictions of a fundamental statistical picture, including experimental signatures of a new dark matter WIMP”, Frontiers of Quantum and Mesoscopic Thermodynamics, Prague – online, July 18-24, 2021.

“Experimental signatures of a new dark matter WIMP”, 2021 Meeting of the Division of Particles and Fields of the American Physical Society (DPF21), Florida State University – online, July 12-14, 2021.

“A multicomponent dark matter scenario consistent with experiment”, Phenomenology 2021 Symposium (PHENO 2021), University of Pittsburgh – online, May 24 - 26, 2021.

“Experimental signatures of a new dark matter WIMP”, APS April Meeting 2021, virtual – online, April 9–12, 2021.

“A multicomponent dark matter scenario consistent with experiment”, Phenomenology 2020 Symposium, University of Pittsburgh - online, 5 May 2020. [online conference during pandemic]

“An ideal dark matter scenario and the experimental evidence supporting it” invited talk at 50th Winter Colloquium on the Physics of Quantum Electronics, Snowbird, Utah, 9 January 2020.

“An ideal multicomponent dark matter scenario and the space-based experimental evidence supporting it”, seminar at Southwest Research Institute (October 28, 2019, San Antonio).

“Virtual Higgs portal to new particles in a natural scenario with supersymmetric and non-supersymmetric WIMPs”, 2019 Meeting of the Division of Particles and Fields of the American Physical Society (July 29 – August 2, 2019, Boston).

“Black hole entropy, the black hole information paradox, and time travel paradoxes from a new perspective”, invited talk at conference on Frontiers of Quantum and Mesoscopic Thermodynamics (July 14-20, 2019, Prague, Czech Republic).

“Two natural scenarios for dark matter particles coexisting with supersymmetry”, 2019 Phenomenology Symposium (May 6-8, 2019, University of Pittsburgh).

“Time-dependent Ginzburg-Landau-McMillan models for light-induced ultrafast phase transitions in cuprates and other complex materials”, invited talk at conference on Ultrafast Bandgap Dynamics (April 15-17, 2019, Georgetown University, Washington D.C.).

“Two natural scenarios for dark matter particles coexisting with supersymmetry”, APS April Meeting (April, 2019, Denver).

“Consciousness as a superposition of collective neuronal excitations”, Suzy Lidström and Roland E. Allen, APS April Meeting (April, 2019, Denver).

“Time-dependent McMillan-Ginzburg-Landau models for light-induced ultrafast phase transitions in cuprates and other complex materials”, APS March Meeting (March, 2019, Boston).

“The meaning and importance of entropy in every branch of science”, seminar at Southwest Research Institute (November 5, 2018, San Antonio).

“Predictions of a fundamental statistical picture”, invited talk at Ninth International DICE Workshop on Spacetime, Matter, and Quantum Mechanics (Castello Pasquini/Castiglioncello, Tuscany, Italy, September 17-21, 2018).

“A global survey of the biggest questions”, Suzy Lidström and Roland E. Allen, invited talk at Ninth International DICE Workshop on Spacetime, Matter, and Quantum Mechanics (Castello Pasquini/Castiglione, Tuscany, Italy, September 17-21, 2018).

“Toward realistic dynamical simulations of advanced materials, including ultrafast phase transitions”, APS March Meeting (March, 2018, Los Angeles).

“Light, the universe, and everything – a global compilation of the most fundamental questions in science and technology”, Suzy Lidström and Roland E. Allen, invited talk at Physics of Quantum Electronics (January 8-12, 2018, Snowbird, Utah).

“A fresh perspective on black hole entropy and information”, invited talk at Physics of Quantum Electronics (January 8-12, 2018, Snowbird, Utah).

“Dark matter: theory and experiments”, seminar at Southwest Research Institute (December 18, 2017, San Antonio).

“Ultrafast phase transitions in advanced materials, including light-induced superconductivity”, invited talk at 26th International Laser Physics Workshop (July 17-21, 2017, Kazan, Russia).

“Ultrafast Phase Transitions in Advanced Materials, including Light-Induced Superconductivity”, invited talk at Frontiers of Quantum and Mesoscopic Thermodynamics (July 9-15, 2017, Prague, Czech Republic).

“Ultrafast phase transitions in advanced materials: review of some experiments and a new theoretical approach”, APS March Meeting, New Orleans, March 13-17, 2017.

“Ultrafast phase transitions in advanced materials responding to fast intense laser pulses, including light-induced superconductivity”, invited talk at Frontiers in Theoretical and Applied Physics (February 22-25, 2017, Sharjah, United Arab Emirates).

“Dark matter candidate with well-defined mass and couplings”, APS ‘April’ Meeting, Washington D.C., January 28-31, 2017.

“Ultrafast phase transitions in advanced materials responding to fast intense laser pulses, including light-induced superconductivity”, invited talk at Physics of Quantum Electronics 2017 (January 8-13, Snowbird, Utah).

“Electronic and structural response of materials to fast intense laser pulses, including light-induced superconductivity”, invited talk at Central European Workshop on Quantum Optics (June 27 – July 1, 2016).

“Electronic and structural response of materials to fast intense laser pulses, including light-induced superconductivity”, keynote talk at SPIE conference on Ultrafast Bandgap Photonics (Baltimore, April 18-20, 2016).

“Phenomenology of fundamental spinons”, Meeting of the APS Division of Particles and Fields (August 4-8, 2015, Ann Arbor, Michigan).

“Three Higgs-related predictions, including $Z^0 \rightarrow$ new spin $\frac{1}{2}$ particles”, APS April Meeting, Baltimore, 2015.

“Photoisomerization dynamics of a rhodopsin-based molecule (potential molecular switch) with high quantum yields”, APS March Meeting, San Antonio, 2015.

“The Higgs bridge: a tutorial for students and teachers”, APS April Meeting, Savannah, 2014.

“Kadanoff-Baym-Keldysh-Ehrenfest dynamics of correlated materials responding to ultrafast laser pulses”, APS March Meeting, Denver, 2014. [given by Lazar Kish]

“Predictions of a fundamental statistical picture”, 20-minute talk at the Meeting of the American Physical Society Division of Particles and Fields (Santa Cruz, August, 2013).

“Life in the Higgs condensate, where electrons have mass”, an invited talk at the Conference on Frontiers of Quantum and Mesoscopic Thermodynamics (Prague, July, 2013).

“Kadanoff-Baym-Keldysh-Ehrenfest dynamics of correlated materials responding to fast intense laser pulses”, April Meeting of the American Physical Society (Denver, 2013).

“Biochemical response and the effects of bariatric surgeries on type 2 diabetes”, March Meeting of the American Physical Society (Baltimore, 2013).

“Life in the Higgs condensate, where electrons have mass”, an invited talk at the 43rd Winter Colloquium on the Physics of Quantum Electronics (Snowbird, January, 2013).

“Theory and experiment in biomedical science”, an invited talk at Fall Meeting of the Texas Section of the American Physical Society (Lubbock, October, 2012).

“Response of molecules and materials to fast intense laser pulses”, an invited talk at Workshop on Breaking and Making Bonds with Light (Telluride, July, 2012).

“Mechanism for family replication in supersymmetric $SO(10)$ ”, April Meeting of the American Physical Society (Anaheim, 2011).

“Optimizing laser pulses for controlled excitation of materials and molecules”, APS 2011 March Meeting (Dallas).

“Response of materials and molecules to fast intense laser pulses”, an invited talk at Workshop on Large Scale Simulations in Materials Science and Biophysics (Arizona State University, January, 2011).

“Control of specific vibrational modes in carbon nanotubes and fullerenes responding to fast intense laser pulses”, APS 2010 March Meeting (Portland).

“Origin of the Lorentzian metric, standard supersymmetry, and an effective Higgs field”, an invited talk at Conference on Beyond the Standard Models of Particle Physics, Cosmology, and Astrophysics (Cape Town, South Africa, February, 2010).

“Coupling of electrons to the electromagnetic field in a localized basis”, APS 2009 March Meeting (Pittsburgh).

“Toward molecular switches and biochemical detectors employing adaptive femtosecond-scale laser pulses”, APS 2008 March Meeting (New Orleans).

“Supersymmetric $SO(N)$ from a Planck-scale statistical theory”, an invited talk at Workshop on Standard Model and Beyond in the LHC Era (Valparaiso, Chile, January, 2008).

“Supersymmetric dark matter candidate (neutralino) from a fundamental statistical theory”, an invited talk at Sixth International Heidelberg Conference on Dark Matter in Astro and Particle Physics (Sydney, Australia, September, 2007).

“Toward molecular switches and biochemical detectors employing adaptive femtosecond-scale laser pulses”, an invited talk at Laser Physics 2007 conference (Leon, Mexico, August, 2007).

“Response of biological molecules to adaptive femtosecond-scale laser pulses”, an invited talk at the Summer School on Quantum Optics and Molecular Physics (Casper, Wyoming, July, 2007).

“Comparison of vibrational and electronic properties of dipicolinic acid with its parent ring molecule, pyridine”, an invited talk at Frontiers of Nonlinear Physics 2007 (on the Volga River, from Nizhny Novgorod to Saratov, Russia, July, 2007).

“Azobenzene isomerization and the prospects for optical molecular switches”, an invited talk at the Symposium on Quantum Mechanics, Informatics, and Control (Princeton University, April, 2007).

“Supersymmetry and Lorentz invariance as low-energy symmetries in a fundamental statistical theory”, Joint Meeting of Pacific Region Particle Physics Communities (Waikiki, Hawaii, October 20 – November 3, 2006).

“Supersymmetry and Lorentz invariance as low-energy symmetries in a fundamental statistical theory”, 2006 international symposium on Particles, Strings and Cosmology (PASCOS06), Ohio State University, Columbus, Ohio, September 10-15, 2006.

“Response of Dipicolinic Acid to Ultrafast Laser Pulses”, an invited talk at the International Conference on Coherent Control of Fundamental Processes in Optics and X-ray Optics (on the Volga River, from Nizhny Novgorod to Kazan, Russia, June 29 - July 3, 2006).

“Supersymmetry from a Fundamental Statistical Theory: Further Implications”, April Meeting of the American Physical Society (Dallas, April 22–25, 2006)

“Vibrational modes of dipicolinic acid, and their role in the response to femtosecond-scale laser pulses”, an invited talk at the 36th Winter Colloquium on The Physics of Quantum Electronics (Snowbird, January, 2006).

“Response of Biomolecules to Ultrafast Laser Pulses”, 2005 March Meeting of the American Physical Society (Los Angeles).

“Response of benzene and dipicolinic acid to ultrafast laser pulses”, an invited talk at the 35th Winter Colloquium on The Physics of Quantum Electronics (Snowbird, January, 2005).

“Predictions of Lorentz-Violating Supergravity”, 10th international symposium on Particles, Strings and Cosmology (PASCOS'04), Northeastern University, Boston, August 16-22, 2004.

"Lorentz-Violating Supergravity and Its Experimental Signatures", 3rd Meeting on CPT and Lorentz Symmetry, August 4-7, 2004, Indiana University, Bloomington.

"Response of Matter to Ultrafast Laser Pulses", an invited talk at the 2nd International Conference on Frontiers of Nonlinear Physics (on the Volga River, from Nizhny Novgorod to St. Petersburg, Russia, July 5-12, 2004).

"The intricate dance of electrons and nuclei during a photochemical reaction", an invited talk at the 34th Winter Colloquium on The Physics of Quantum Electronics (Snowbird, January, 2004).

"Searching for Lorentz Violation", an invited talk at the Second International Conference on Particle and Fundamental Physics in Space (Washington, D.C., December, 2003).

"Chemical systems and femtosecond-scale laser pulses", an invited talk at the 2003 Workshop on Quantum Optics (Grand Targhee Resort, near Jackson Hole, Wyoming, July, 2003).

"Dark Matter, Quantum Gravity, Vacuum Energy, and Lorentz Invariance", Fourth Conference on Physics Beyond the Standard Model (Castle Ringberg, Tegernsee, Germany, June, 2003).

"Simulations of the cis-trans photoisomerization of butadiene," 2003 March Meeting of the American Physical Society (Austin).

"Molecular Transformations following Femtosecond-scale Laser Pulses" an invited talk at the 33rd Winter Colloquium on The Physics of Quantum Electronics (Snowbird, January, 2003).

"Higgs Bosons and Dark Matter in Supersymmetric Scenarios with R-Parity Violation and Possible Violations of Lorentz Invariance", Third Conference on Physics Beyond the Standard Model (Oulu, Finland, June, 2002).

"Lorentz Invariance and Higgs Decays", 2002 Meeting of the APS Division of Particles and Fields (College of William and Mary, Williamsburg, May, 2002).

"Semiempirical Electron-Photon-Ion Dynamics of Chemical and Biological Systems", 2002 March Meeting of the American Physical Society (Indianapolis).

"Dark Matter and Lorentz Invariance", Second Meeting on CPT and Lorentz Symmetry (Indiana University, August, 2001,).

"Dark Matter Equation of Motion and Density Profiles", PASCOS 2001 International Symposium on Particles, Strings and Cosmology (University of North Carolina, April, 2001).

"Electronic and Structural Response of Materials to Fast Intense Laser Pulses", an invited talk at the SPIE Conference on Ultrafast Phenomena in Semiconductors (San Jose, January, 2001).

"Mechanisms for Laser Control of Chemical Reactions", an invited talk at the 31st Winter Colloquium on The Physics of Quantum Electronics (Snowbird, January, 2001).

"Response of Materials to Fast Intense Laser Pulses", Seminar at Lawrence Livermore National Laboratory (September, 2000, in conjunction with Livermore workshop on this general topic).

"Mechanism for a Small but Nonzero Cosmological Constant", NORDITA conference on Problems with Vacuum Energy (Copenhagen, August, 2000).

"The Higgs as a Supersymmetric Partner, with a New Interpretation of Yukawa Couplings", DPF2000 Meeting of APS Division of Particles and Fields (Ohio State University, August, 2000).

"Spin-Zero SUSY WIMPs", Phenomenology 2000 Symposium (Madison, Wisconsin, April, 2000).

"Response of Molecules and Materials to Fast Intense Laser Pulses", 30th Winter Colloquium on The Physics of Quantum Electronics (Snowbird, Utah, January, 2000).

"Equation of Motion of the Higgs Boson", Seventh International Symposium on Particles, Strings and Cosmology (Lake Tahoe, California, December, 1999).

"Interaction of Light with Biological Molecules", Symposium on New Advances in Materials Prediction, at the Fall Meeting of the Materials Research Society (Boston, November, 1999).

"Response of Semiconductors and Fullerenes to Ultrashort and Ultra-intense Laser Pulses", Symposium on Computational Approaches to Predicting the Optical Properties of Materials, at the Fall Meeting of the Materials Research Society (Boston, November, 1999).

"Lorentz Invariance at LHC Energies", Second International Conference on Physics Beyond the Standard Model (Tegernsee, Germany, June, 1999).

"Simulations of the Response of Chlorophyll and Retinal to Light", Centennial Meeting of the American Physical Society (Atlanta, March, 1999).

"Failure of Lorentz Invariance at LHC Energies", CPT98 Meeting on CPT and Lorentz Invariance (Bloomington, Indiana, November, 1998).

"Geometry Versus Electronic Effects in Scanning Tunneling Microscopy: The Arsenic Vacancy on GaAs(110)", 24th International Conference on the Physics of Semiconductors (Jerusalem, August, 1998).

"Instanton Cosmology", April Meeting of the American Physical Society (Columbus, Ohio, 1998).

"Observational Tests of Instanton Cosmology", The Richard Arnowitt Fest (George Bush Library, April, 1998).

"Electronic and Structural Response to Ultrafast Laser Pulses", an invited talk at the 1998 March Meeting of the American Physical Society (Los Angeles).

"Tight-Binding Electron-Ion Dynamics: A Method for Treating Nonadiabatic Processes and Interactions with Electromagnetic Radiation", Fall Meeting of the Materials Research Society (Boston, December, 1997).

"Instanton Cosmology", Sixth International Symposium on Particles, Strings and Cosmology (Northeastern University, Boston, March, 1998).

"Response of Semiconductors to Fast Intense Laser Pulses," Workshop on Quantum Optics (Taos, August, 1997).

"Calculations of Transmission Resonances in the Bipolar Quantum Resonant Tunneling Transistor," March Meeting of the American Physical Society (Kansas City; March, 1997).

"Simulations of GaAs and H₂⁺ in Intense Laser Fields," an invited talk at the Texas Section Meeting of the American Physical Society (Lubbock; October, 1995).

"Simulating Nonadiabatic Processes in Quantum Chemistry and Materials Science," an invited talk at the Symposium on High-Performance Computing (Phoenix, April, 1995).

"Structure and Dynamics of Anion and Cation Vacancies at III-V(110) Surfaces," 22nd Conference on the Physics and Chemistry of Semiconductor Interfaces (Phoenix, January, 1995).

"Electron-Ion Dynamics: A New Technique for Simulating Both Electronic Transitions and Atomic Motion in Molecules and Materials," 41st Symposium of the American Vacuum Society (Denver, October, 1994).

"Characterization of the Ga Vacancy on GaAs(110)," an invited talk at the 22nd International Conference on the Physics of Semiconductors (Vancouver, Canada; August, 1994).

"Quantum Molecular Dynamics and Electron-Ion Dynamics: Versatile Techniques for Simulations of Defects and Growth on Semiconductor Surfaces," an invited talk at the Centre Europeen de Calcul Atomique et Moleculaire Workshop on Computer Simulation of the Growth of Semiconductor Materials (Lyon, France; June, 1994).

"Semiconductor Surface Defects Studied Through Scanning Tunneling Microscopy and Tight-Binding Molecular Dynamics," Workshop on Dynamical Phenomena at Crystal Surfaces (Irvine, California; June, 1994).

"Excited-State Molecular Dynamics and Constrained Molecular Dynamics for Simulations of Epitaxial Growth," 1994 March Meeting of the American Physical Society (Pittsburgh).

"(2x1) to c(4x2) Phase Transition at the Si(100) Surface," 20th International Conference on Low Temperature Physics (Eugene, Oregon; August, 1993).

"Computational Studies of Real Materials," Third Conference on Computational Materials Research (Morgantown, West Virginia; May, 1993).

"Tight-Binding Molecular Dynamics Simulations of GaAs Surface Vacancies," Gordon Conference on Scanning Tunneling Microscopy (Ventura, California; March, 1993).

"Computational Studies of Real Materials," Mardi Gras Conference on Concurrent Computing in the Physical Sciences (Baton Rouge, Louisiana; February, 1993).

"Atomic Forces in Scanning Tunneling Microscopy on Si(100): From Weak to Intense Fields," 21st International Conference on the Physics of Semiconductors (Beijing, China; August, 1992).

"Polarization of Electronic Charge and Distortion of Surface Geometry by an STM Tip," 38th National Symposium of the American Vacuum Society (Seattle, November, 1991).

"Energy Surface and Dynamics of Si(100)," 38th National Symposium of the American Vacuum Society (Seattle, November, 1991).

"Dimer Switching on Si(100)," International Conference on Scanning Tunneling Microscopy (Interlaken, Switzerland; August, 1991).

"Influence of STM Tip on Electronic Structure and Geometry: Si(100) Dimers," International Conference on Scanning Tunneling Microscopy (Interlaken, Switzerland; August, 1991).

"Computer Studies of Relaxation and Reconstruction of Semiconductor Surfaces," 37th National Symposium of the American Vacuum Society (Toronto, October, 1990).

"Simulations of Single and Double Step Growth on Si(100)," 37th National Symposium of the American Vacuum Society (Toronto, Canada; October, 1990).

"Equilibrium Chemisorption Geometries and Electronic Structures of Bi, Sb, Sn, Al, and Au Clusters on III-V Semiconductors," 5th International Conference on the Physics of Electro-Optic Microstructures and Microdevices (Heraklion, Crete; August, 1990).

"Surface Phonons in III-V Semiconductors," an invited talk at the International Workshop on Surface Dynamics (Austin, November, 1989).

"Novel Surface Phonon Branches in III-V Semiconductors," 36th National Symposium of the American Vacuum Society (Boston, November, 1989).

"Simulation of Chemical Reactions on Semiconductor Surfaces," an invited talk at the Workshop on Molecular Dynamics Simulations (Laguna Beach, California; March, 1989).

"Simulations of Atomic Processes at Semiconductor Surfaces", an invited talk at the World Materials Congress (Chicago, September, 1988).

"Reaction of Atoms, Metallic Clusters, and Diatomic Molecules with III-V Semiconductor Surfaces", 19th International Conference on the Physics of Semiconductors (Warsaw, Poland; August, 1988).

"Simulations of Atomic Processes at Semiconductor Surfaces", an invited talk at the March Meeting of the American Physical Society (New Orleans, March, 1988).

Ph.D. Students Supervised (name, year Ph.D. received; first job)

Chenwei Jiang, 2010; 2 years research at Texas A&M for Ph.D. from Xi'an Jiaotong University.

Antonio Mondragon, 2007; instructor at Blinn College and Stephen F. Austin State University.

Seiichirou Yokoo, 2006; postdoctoral research scientist, Cognitive Brain Mapping Laboratory, Brain Science Institute, RIKEN Research Institute, Japan.

Ben Torralva, 2001; research associate, Lawrence Livermore National Laboratory (followed by staff physicist, Lawrence Livermore National Laboratory).

Traian Dumitrica, 2000; research associate, Rice University (followed by assistant professor, University of Minnesota).

Robert Hamilton, 1999; Dell Computer, Austin.

Qingsheng Gao, 1998; Rare Medium /Attension Inc., San Antonio.

Shahram Khosravi, 1997; computer science department at Texas A&M.

John S. Graves, 1997; Raytheon /E-Systems, Dallas.

Brent A. Richert, 1989; assistant professor, Air Force Academy, Colorado Springs. Received Distinguished Graduate Student Award; also graduate student awards from Texas chapter of the American Vacuum Society (Dallas, 1988) and national Materials Research Society (Boston, 1988).

Marcin Streszewski, 1988; instructor, Jagellonian University, Cracow, Poland.

Shangfen Ren, 1986; research associate, University of Illinois (followed by assistant, associate, and full professor at Illinois State University); now an APS Fellow.

Hunhwa Lim, 1984; assistant professor, Kyung-Hee University, South Korea (followed by associate professor and professor).

Richard P. Beres, 1982; Texas Instruments, Houston (followed by Texas Instruments, Dallas).

William R. Lawrence, 1976; assistant professor, University of Houston at Clear Lake (followed by associate professor and full professor).

Rodger W. Hardy, 1975; visiting assistant professor, University of Houston (followed by NCR, Colorado Springs; Solar Energy Research Institute, Denver; McDonnell-Douglas, St. Louis).

Vernon E. Kenner, 1973; Teledyne-Brown, Huntsville, Alabama (followed by LTV, Dallas). Received Distinguished Graduate Student Award.

M.S. Students Supervised

Andrea Burzo, 2001; continued on as a Ph.D. student in experimental quantum optics.

Yongjun Tang, 1999; left to seek a Ph.D. in Economics.

Antonio Mondragon, 1996; continued on as a Ph.D. student.

Yi Liu, 1995; employed by Vitesse Semiconductor Corporation, Dallas.

Pradip Das, 1994; employed as computer analyst by State Farm in Bloomfield, Illinois.

Jianfeng Shao, 1991 (CUSPEA student); entered Ph.D. program in materials research, University of Minnesota.

Jin Liu, 1991; entered Ph.D. program in electrical engineering, Southern Methodist University.

Waltrand Teresa Taferner, 1990; entered Ph.D. program in experimental physics, University of Houston.

Chomsik Lee, 1989; entered graduate program in electrical engineering, Texas A&M University.

Stephen Blount, 1985; employed by Mission Research Corporation, Santa Barbara, California.

Jack Denur, 1975; entered Ph.D. physics program at North Texas State University.

Research Associates and Visitors

Zhibin Lin, 2008-2009; research position at Renewable Energy Materials Research Science and Engineering Center, and Department of Physics, Colorado School of Mines

Xiang Zhou, 2008-2009; returned to faculty position at Wuhan University

Petra Sauer, 2004-2007; instructor at Bard High School Early College in New York City.

Robert Murawski, 2004-2005; afterward research associate with Marlan Scully group.

Yusheng Dou, 2001-2004; assistant professor, Nicholls State University.

Jan Gryko, 1989-1993; research position at Arizona State University (followed by assistant professor at College of Eastern Utah).

Zhi-Hong Huang, 1989-1990; research positions at University of Toledo and Penn State University.

Sydney Davison, 1987-88; on sabbatical from University of Waterloo.

Kelin Wang, 1985; on leave from University of Science and Technology of China.

Czeslaw Jedrzejek, 1984-present; on sabbatical and frequent visits from Jagellonian University, Cracow.

Madhu Menon, 1984-90; research position at University of Kentucky.

Terry Humphreys, 1983-84; E-Systems, Dallas.

Anil Kumar, 1983-84; assistant professor of physics, Prairie View A&M (followed by associate professor and professor).

Some Substantial Undergraduate Research

Clarence Annett, 1973; entered graduate program in physics at Ohio State.

Shelley Shumway, 1986; received NSF fellowship, and Ph.D. in physics from Cornell University; research associate at Argonne National Laboratory and University of Washington.

Kent Wade, 1987; received M.S. in physics from University of Illinois, and entered Ph.D. program in materials research at University of Wisconsin.

Zorawar Wadiasingh, 2004-2006; received Ph.D. in physics at Rice University. (Received Goldwater Scholarship in 2005.)

For more recent undergraduate research, see papers 238, 248, 250, 256, 258, 259, 260, 262, 265, 266, 267.

In 2019-2022 undergraduate students in our group have given about 20 conference research talks, mainly at APS Texas Section meetings.

Courses Taught

Physics 689, Concepts of Modern Theoretical Physics

Physics 689, High-Temperature Superconductivity

Physics 689, Theory of Advanced Materials

Physics 689, Special Topics in Condensed Matter Physics

Physics 659 and 660, History of Physics

Physics 634, Quantum III b (relativistic quantum field theory)

Physics 633, Quantum III a (advanced quantum mechanics)

Physics 627, Elementary Particle Physics

Physics 624, Quantum II (second graduate course in quantum mechanics)

Physics 606, Quantum I (first graduate course in quantum mechanics)

Physics 617, Solid State Physics

Physics 607, Statistical Mechanics

Physics 603, Classical Electrodynamics

Physics 601, Classical Mechanics

Physics 489, Modern Astrophysics

Physics 489, Renaissance Astronomy (in Italy)

Lib. Arts 489. University Scholars Mentor Group

Physics 424, Solid State Physics

Physics 408, Thermodynamics and Statistical Mechanics

Physics 401, Computational Physics

Physics 314, Survey of Astronomy

Physics 306, Basic Astronomy

Physics 304, Advanced Electricity and Magnetism

Physics 302, Advanced Mechanics

Physics 222, Modern Physics for Engineers

Physics 221, Optics and Thermal Physics

Physics 208, Electricity, Magnetism, and Optics

Physics 206, Mechanics (new course introduced in 2019)

Physics 218, Mechanics

Physics 202, College Physics

Physics 201, College Physics

Physics 101, Topics in Contemporary Physics

Service on Some Committees

Elected to Chair line of Texas Section of American Physical Society (2019-2023)
Elected to Executive Committee, Texas Section of APS (2004-2007)
Departmental Awards Committee (Chair, 2015-present; and 3 years earlier)
Colloquium Committee (2018-present; and colloquium organizer for 18 years total in past))
Arnowitt Award Committee (Chair, 2017-present)
College of Science Tenure and Promotion Advisory Committee (2010-2012)
Promotions, Tenure, and Appointments Committee (Chair, 2008 & 2009)
Performance Evaluation Committee (Chair, 2008)
Hyer Award Committee, Texas Section of American Physical Society (Chair, 2008; created this award)
New Mitchell Physics Buildings Committee (appointed)
Executive Committee (elected)
College of Science Faculty Advisory Committee (Chair)
Astronomy Committee (Chair)
Distinguished Lecture Series and Colloquium Committee (Chair)
Department Brochure Committee (Chair)
Ph. D. Qualifying Exam Committee (Chair)
Search Committees in Astronomy, High Energy Experiment and Theory, Condensed Matter Experiment and Theory, Quantum Optics Experiment and Theory, Nuclear Experiment
TAMU Sigma Xi Awards Committee (Chair)
Faculty Senate Research Committee (elected)
College of Science alternate for Council of Principal Investigators (elected)
University Tenure Mediation Committee (elected)
University Faculty Development Leave Committee (elected)
University Professor Emeritus Committee (appointed)

Publications

[Journal articles are refereed; papers in conference proceedings and other books are not. Editorials are listed but not numbered.]

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