KEVIN E. MARTUS Department of Mathematical Sciences William Paterson University martusk@wpunj.edu

EDUCATION

- Ph.D. Physics, Lehigh University (1985-1991)
- B.A. Applied Mathematics, Kean College of New Jersey (1980-1985)

PROFESSIONAL AFFILIATIONS

American Physical Society ~ Division of Atomic, Molecular, Optical and Plasma Physics American Association of Physics Teachers Council on Undergraduate Research - Institutional Liaison American Chemical Society Institute of Electrical and Electronics Engineers

EMPLOYMENT EXPERIENCE

 William Paterson University of New Jersey, Wayne, NJ. Appointed 1993
<u>Assistant Professor (93-2000) - Associate Professor (2000-05) - Professor (2005 - present)</u>: Academic duties include instructing courses in College Physics I & II, General Physics I, II, & III, Statics, Dynamics, General Astronomy, Acoustics & Sound, and Electronics. Research interests include the analysis of optical emissions from plasma discharges and plasma surface interactions.

<u>Director of Pre-Engineering Program 1999 to 2014</u>: Duties included advising students enrolled in the pre-engineering program at William Paterson University and course development for the program.

Jet Propulsion Laboratory, Pasadena, CA 1990 to 1993

<u>Postdoctoral Research</u>: Experimental work in the field of atomic and molecular physics. Duties involved the design, construction and testing of an instrument that analyzed the velocities and masses of atomic and molecular species found in planetary atmospheres. The instrument was developed to analyze the atmosphere of Saturn using a time-of-fight tube coupled to a hemispherical mass analyzer. Investigated surface interactions between atomic oxygen and materials used on the shuttle and on satellites used in low earth orbit.

City College of New York and Lehigh University 1985 to 1990

<u>Graduate Research Assistant</u>: Worked on experiments involving electron impact phenomena entailing design and fabrication of experimental apparatus, computer programming and interfacing, optical intensity and polarization measurements from vacuum ultra violet to nearinfrared, and extensive work on electron spectrometers. Thesis title: *Electron-Polarized Photon Coincidence Study on the Heavy Noble Gases*.

Awards

- WPUNJ Award for Excellence in Scholarship, May 18, 2004
- WPUNJ Faculty Recognition Award for Exemplary Service, May 19, 2017

Publications

Journal Publications

- N. Masoud, K. Martus, and D. Murnick, "Carbon Nanotube Generated Electron Beam Produced Plasmas", Plasma Sources Sci. Technol. 28, <u>https://doi.org/10.1088/1361-6595/ab123e</u> (2019).
- M.V. Holganza, A. Rivie, K. Martus, J. Menon, "Modulation of Metamorphic and Regenerative Events by Cold Atmospheric Pressure Plasma Exposure in Tadpoles, *Xenopus laevis*", Applied Sciences, 9 (4) <u>https://www.mdpi.com/2076-3417/9/14/2860</u> (2019).
- A. Rivie, J. Menon, and K. Martus, "Atmospheric pressure plasma accelerates tail regeneration in tadpoles *Xenopus laevis*", European Physical Journal Special Topics <u>http://dx.doi.org/10.1140/epjst/e2016-60243-3</u> (2017).
- K. Martus, N. Masoud, and K. Becker, "Collisional and Radiative Processes in High-Pressure Ne/N₂ Mixture Discharges", Plasma Sources Sci. Technol. **15**, S84-S90 (2006).
- K. Becker, N. Masoud, K. Martus, and K. Schoenbach, "Electron-Driven Processes in High-Pressure Plasmas", Eur. Phys. J. D **35**, 279–297 (2005).
- N. Masoud, K. Martus, and K. Becker, "VUV Emissions from a Cylindrical Dielectric Barrier Discharge (C-DBD) in Ar and in Ar/N₂ and Ar/Air Mixtures", J. Phys. D: Appl. Phys. **38**, 1674-1683 (2005).
- N. Masoud, K. Martus, M. Figus, and K. Becker, "Rotational and Vibrational Temperature Measurements in a High-Pressure Cylindrical Dielectric Barrier Discharge (C-DBD)", Contrib. Plasma Phys. **45**, 32-39 (2005).
- N. Masoud, K. Martus, and K. Becker, "Vacuum Ultraviolet Emissions from a Cylindrical Dielectric Barrier Discharge in Neon and Neon-Hydrogen Mixtures", Int. J. Mass Spectroscopy **233**, 19-24 (2004).
- H. Qiu, K. Martus, W.Y. Lee, and K. Becker, "Hydrogen Generation in a Microhollow Cathode Discharge in High-Pressure Ammonia-Argon Gas Mixtures", Int. J. Mass Spectroscopy **233**, 395-403 (2004).
- P. Kurunczi, K. Martus, and K. Becker, "Neon Excimer Emission from Pulsed High-Pressure Microhollow Cathode Discharge Plasma", Int. J. Mass Spectrometry **223-224**, 37-43 (2003).
- N. Abramzon, K. Martus, and K. Becker, "Absolute Cross Section for the Formation of Si(¹S) Atoms Following Electron Impact Dissociation of SiH₄", J. Chem. Phys. **113**, 2250-2254 (2000).
- V. Tarnovsky, H. Deutsch, K. Martus, and K. Becker, "Electron Impact Ionization of the SF₅ and SF₃ Free Radicals", J. Chem. Phys. **109**, 6596-6600 (1998).
- P. Kurunczi, K. Becker, and K. Martus, "Production of Vacuum Ultraviolet Resonance Radiation by Electron Impact on Silicon-Organic Molecules", Can. J. Phys. **76**, 153-162 (1998).
- P. Kurunczi, A. Koharian, K. Becker, and K. Martus, "Dissociative Excitation of Tetramethylsilane (TMS) and Hexamethyldisiloxane (HMDSO) by Controlled Electron Impact", Contrib. Plasma Phys. **36**, 726-735 (1996).
- K.E. Martus, O.J. Orient, and A. Chutjian, "Effect of Trapped Ions in a Gated Time-of-Flight Apparatus", Rev. Sci. Instr. **64**, 1754-57 (1993).

- O. Orient, A. Chutjian, K. Martus, and E. Murad, "Observation of CN A→X and B→X Emissions in Gas-Phase Collisions of Fast O(³P) Atoms with HCN", Phys. Rev. A 48, 427 (1993).
- K. Martus, O. Orient, R. Hodges, and A. Chutjian, "Theory and Operation of a Three-Gate Time-of-Flight Velocity Analyzer", Rev. Sci. Instr. **64**, 470 (1993).
- O.J. Orient, K. Martus, A. Chutjian, and E. Murad, "Optical Emission Generated by Collisions of 5eV O(³P) Atoms with Surface-Adsorbed Hydrazine", J. Chem. Phys. **97**, 4111-14 (1992).
- O.J. Orient, K. Martus, A. Chutjian, and E. Murad, "Recombination of 5eV O(³P) Atoms with Surface-Absorbed NO: Spectra and Their Dependence on Surface Material and Temperature", Phys. Rev. A **45**, 2998-3003 (1992).
- K. Martus, S. Zheng, and K. Becker, "Electron-photon Coincidence Study of Heavy Noble Gas Excitation at Small Scattering Angles", Phys. Rev. A 44, 1682-93 (1991).
- M. Roque, R. Siegel, K. Martus, V. Tarnovsky, and K. Becker, "Production of Fluorine ^{2,4}P → ²P° Resonance Radiation by Electron Impact on SF₆, CF₄, NF₃, and CCl₂F₂", J. Chem. Phys. **94**, 341-350 (1991).
- K.E. Martus and K. Becker, "Measurement of the P₁ Coherence Parameter in Forward Scattering for Excitation of Ne and Ar by Electron Impact", J. Phys. B **22**, L497-502 (1989).
- Z. Jabbour, K. Martus, and K. Becker, "Absolute Photoemission Cross Section of the BCl A → X System Produced by Dissociative Electron Impact on BCl₃", Z. Phys. D 9, 263-4 (1988).
- K.E. Martus, K. Becker, and D.H. Madison, "Effect of a Finite Angular Resolution on the Measurement of Polarization Correlation Parameters in Electron-Heavy Noble Gas Collisions", Phys. Rev. A **38**, 4876-80 (1988).
- Z.J. Jabbour, K.A. Blanks, K.E. Martus, and K. Becker, "Continuous Ultraviolet Emissions Produced by Electron Impact on SF₆ and NF₃", J. Chem. Phys. **88**, 4252-7 (1988).

Invited Talks

- "Collisional and Radiative Processes in High-Pressure Non-thermal Plasmas", XXVII *International Conference on the Phenomena in Ionized Gases*, Eindhoven, The Netherlands, (July 2005), K. Martus, N. Masoud, and K. Becker.
- "Electron Driven Collisional and Radiative Processes in a Cylindrical Dielectric Barrier Discharge", *International Workshop on Microplasmas*, Hoboken, NJ, (October 2004), K. Martus, N. Masoud, and K. Becker.

Conference Proceedings

- "Carbon Nanotubes as Electron Emitters to Generate Plasma in Air and Air/Gas Mixtures", APS Division of Atomic Molecular and Optical Physics (DAMOP) Annual Meeting, Milwaukee, WI, (May 27-31, 2019), N. Masoud, K. Martus, and D. Murnick.
- "Adaptive Response to Plasma Exposure: Faster regeneration versus delayed metamorphosis in tadpoles, *Xenopus Laevis*," 10th Annual Garden State-Louis Stokes Alliance for Minority Participation (GS-LSAMP) Research Conference, Rutgers University, New Brunswick, NJ, (October 12, 2018), V. Holganza, K. Martus, and J. Menon.
- "Plasma Exposure and Tail Regeneration: Interplay of calcium with mitochondria and peroxisomes," 7th International Conference on Plasma Medicine, Drexel University and Nyheim Plasma Institute, Drexel University, Philadelphia, PA, United States. (June 19, 2018), V. Holganza, S. Nieves, J. Menon, and K. Martus.
- "Characterization of a Plasma Source used to Accelerate Wound Healing of the Tadpole *Xenopus Laevis*," Undergraduate Research Symposium, William Paterson University, Wayne, NJ, (April 14, 2018), S. Nieves, J. Menon, and K. Martus.
- "Plasma Exposure and Tail Regeneration: Interplay between Calcium, Mitochondria and Peroxisomes," Exploration Month, William Paterson University, Wayne, NJ, (April 10, 2018), V. Holganza, K. Martus, and J. Menon.
- "Plasma Exposure and Tail Regeneration: Interplay between Calcium, Mitochondria and Peroxisomes," Undergraduate Research Symposium, William Paterson University, Wayne, NJ, (April 14, 2018), V. Holganza, K. Martus, and J. Menon.
- "Characterization of a Plasma Source used Accelerate Wound Healing of the Tadpole *Xenopus Laevis*", Explorations, William Paterson University, Wayne, NJ, (April 10, 2018), S. Nieves, J. Menon, and K. Martus.
- "Plasma Induced by a Carbon Nanotube (CNT) Generated Electron Beam", International Conference on Plasma Science (ICOPS), Atlantic City, NJ, (May 2017), N. Masoud, Martus, and D. Murnick.
- "Characterization of a Plasma Source used to Accelerate Wound Healing of the Tadpole *Xenopus Laevis*", International Conference on Plasma Science (ICOPS), Atlantic City, NJ, (May 2017), K. Martus and J. Menon.
- "Modification of material surface property by plasma treatment: effect of cold plasma on silicone elastomer", Research and Scholarship Day, William Paterson University, Wayne, NJ, (2017), S. Nieves, J.W. Lee, and K. Martus.
- "Plasma and tail regeneration in tadpoles *Xenopus Laevis*. Do reactive oxygen species enhance the process?", Society for Integrative and Comparative Biology Annual Meeting, Portland, OR (January 2016), A. Rivie, J. Menon, and K. Martus.
- "Analysis of Optical Emissions from Nitrogen Discharge Plasmas", 53rd Annual Meeting of the New Jersey Academy of Science, Kean University, Union, NJ, (2008), V. Murphy and K. Martus.
- * "A Cylindrical Dielectric Barrier Discharge C-DBD as a Source of Vacuum Ultraviolet (VUV) Radiation", International Conference on Gas Discharges and their Applications, Toulouse, France (September 2004), N. Masoud, K. Martus, K. Becker, and M. Laroussi.

- "Hydrogen Generation in a Microhollow Cathode Discharge in an Atmospheric-Pressure Ammonia-Argon Mixture", 56th Annual Gaseous Electronics Conference, San Francisco, CA, (October 2003), H. Qui, K. Martus, W. Lee, and K. Becker.
- "VUV Emissions from a High-Pressure Cylindrical Dielectric Barrier Discharge", 56th Annual Gaseous Electronics Conference, San Francisco, CA, (October 2003), N. Masoud, K. Martus, and K. Becker.
- "Collisional Excitation and De-Excitation of N₂ and N₂⁺ in High-Pressure Cylindrical Dielectric Barrier Discharge Plasma", 56th Annual Gaseous Electronics Conference, San Francisco, CA, (October 2003), K. Martus, N. Masoud, and K. Becker.
- "VUV Emissions from a High-Pressure Cylindrical Dielectric Barrier Discharge", 2003 Annual Meeting of DAMOP, Boulder, CO, (May 2003), K. Martus, N. Masoud, K. Becker, and M. Laroussi.
- "Computer Automation and Data Analysis Applied to Experimental Apparatuses in the Physical Sciences", 48th Annual Meeting of the New Jersey Academy of Science, Fairleigh Dickinson University, Madison, NJ, (April 2003), I. Stromberg and K. Martus.
- "Generation of H and O Vacuum Ultraviolet Emissions in High-Pressure Dielectric Barrier Discharge and Microhollow Cathode Discharge Plasmas", 2002 Annual Meeting of DAMOP, Williamsburg, VA, (2002), J. Yan, A. El Dakroury, M. Laroussi, M. Gupta, K. Martus, P. Kurunczi, and K. Becker.
- "DBD-Based VUV Sources for Advanced Photolithography", in 29th IEEE International Conference on Plasma Science (ICOPS), Banff, Alberta, Canada, (May 2002), M. Laroussi, M. C. Gupta, A. El Dakroury, J. Yan, K. Becker, and K. Martus.
- "Electron-Driven Neutral Dissociation of Si-Containing Molecules", Proc. 13th International Symposium on Atomic, Molecular, Cluster, Ion, and Surface Physics, Editors: Paul Scheier and Tilmann Mark, Going/Kitzhuhel, Tirol, Austria, (February 2002), pg. 192-195, T. Raynor, N. Abramzon, K. Martus, and K. Becker.
- "Generation of Atomic H and O Vacuum Ultraviolet Emissions in High-Pressure Dielectric Barrier Discharge Plasmas and Microhollow Cathode Discharge Plasmas in Ne-H₂ and Ar-O₂ Gas Mixtures", Proc. 13th International Symposium on Atomic, Molecular, Cluster, Ion, and Surface Physics, Editors: Paul Scheier and Tilmann Mark, Going/Kitzhuhel, Tirol, Austria, (February 2002), pg. 281-284, El Dakroury, J. Yan, P. Kurunczi, K. Martus, M. Laroussi, M.C. Gupta, and K. Becker.
- "Absolute Cross Sections for the Formation of Si Atoms Following Neutral Dissociation of SiH₄ and SiF₄ by Electron Impact", 54th Annual Gaseous Electronics Conference, State College, PA, (2001), T. Raynor, K. Becker, K. Martus, and N. Abramzon.
- "Development of a High Current Electron Gun for the Study of Electron-Impact Induced Dissociation of Molecules", 46th Annual Meeting of the New Jersey Academy of Science, Kean University, Union, NJ, (2001), A. Smith and K. Martus.
- "Ethanol De-chlorophyll Procedure may Erase the Histochemical GUS Expression", New York Area Plant Molecular Biology Meeting, Cold Spring Harbor, NY, (2001), C-y Hu and K. Martus.
- "Formation of Ground-State Si Atoms Following Electron Impact Dissociation of SiH₄ and SiF₄", 53rd Annual Gaseous Electronics Conference, Houston, TX, (2000), N. Abramzon, T. Raynor, K. Becker, and K. Martus.

- "Formation of Ground-State Si Atoms Following Electron Impact Dissociation of SiH₄, SiF₄, and TMS", 2000 Annual Meeting of DAMOP, Storrs, CT, (2000), N. Abramzon, T. Raynor, K. Becker, and K. Martus.
- "Electron Impact Dissociation of Silane and Methane Probed by Laser-Induced Fluorescence Techniques", 52nd Annual Gaseous Electronics Conference, Norfolk, VA, (1999), N. Abramzon, K. Becker, and K. Martus.
- "Analysis of Optical Emissions Following Electron Impact on C₂F₆", 52nd Annual Gaseous Electronics Conference, Norfolk, VA, (1999), K. Martus, P. Kurunczi, and K. Becker.
- "Hydrogen Balmer and Lyman Line Emissions Produced by Electron Impact on TMS, TEOS, and HMDSO", 50th Annual Gaseous Electronics Conference, Madison, WI, (1997), K.E. Martus, P. Kurunczi, and K. Becker.
- "VUV Emissions Produced by Electron Impact on Si-Organic Molecules", in Proc. XXIII International Conference on Phenomena in Ionized Gases, editors: M.C. Bordage and A. Gleizes, University of Toulouse Press, Toulouse, France, (1997) P. Kurunczi, K. Martus, and K. Becker.
- "Vacuum Ultraviolet Emission Produced by Controlled Electron Impact on Si-Organic Molecules", 49th Annual Gaseous Electronics Conference, Urbana-Champaign, IL, (1996), P. Kurunczi, K. Becker, and K. Martus.
- "Diamond An Alternative Microcarrier for Microprojectile Bombardment", Workshop on Transgenic Plants, Tuskegee, AL, (1996) Abstract of Contributed Papers, C-y Hu, Z-j Wang, and K. Martus.
- "Analysis of Mass Spectra and Optical Emissions Produced by Electron Impact on Tetramethylsilane (TMS)", Proc. 10th International Symposium on Atomic, Molecular, Cluster, Ion, and Surface Physics, editors: J. Maier and M. Quack, Engelberg/Obwalden, Switzerland, (1996), pg. 102-105, R. Foest, R. Basner, M. Schmidt, P. Kurunczi, K. Martus, and K. Becker.
- * "Analysis of Optical Emissions Produced by Controlled Electron Impact on Si-Organic Molecules", in XXII International Conference on Phenomena in Ionized Gases Vol. 2, edited by K. Becker, W. Carr, and E. Kunhardt (Stevens Institute of Technology, Hoboken, NJ, 1995), pg. 183, P. Kurunczi, J. Michel, N. Abramzon, K. Martus, and K. Becker.
- "Effect of Trapped Ions in a Gated Time-of-Flight Apparatus", Proc. XVIII. ICPEAC, Aarhus, Denmark, (1993), pg. 809, O.J. Orient, K.E. Martus, and A. Chutjian.
- "Observation of CN A → X and B → X Emissions in Gas-Phase Collision of Fast O(³P) Atoms with HCN", Proc. XVIII. ICPEAC, Aarhus, Denmark, (1993), pg. 700, O.J. Orient, A. Chutjian, K.E. Martus, and E. Murad.
- "Theory and Operation of a Three-Gate Time-of-Flight Velocity Analyzer", Proc. XVIII. ICPEAC, Aarhus, Denmark, (1993), pg. 810, O.J. Orient, K.E. Martus, R.R. Hodges and A. Chutjian.
- "Comparison Between Gas-Phase and Surface-Aided Reaction of Hyperthermal O Atoms with Hydrazine", Twelfth International Symposium on Gas Kinetics, Reading UK. (1992) Abstract of Contributed Papers, O.J. Orient, K.E. Martus, A. Chutjian, and E. Murad.
- "Optical Emission in Collisions of Fast O(³P) Atoms with Surface-Adsorbed Hydrazine", APS-DAMOP Meeting, Chicago, IL. (1992), Bull. APS **37**, 1136 (1992), O.J. Orient, K.E. Martus, A. Chutjian, and E. Murad.

- "Surface Recombination of 5eV O(³P) Atoms: Spectra and their Dependence on Surface Material and Temperature", Surface Chemistry Contractors Conference, Irvine, CA (1991), Abstract of Contributed Papers, O.J. Orient, K.E. Martus, A. Chutjian, and E. Murad.
- "Fast Atomic Oxygen Collisions with Surfaces: Effects of Surface Temperature on the Chemiluminescent Glow", Proc. XVII. ICPEAC, Brisbane, Australia, (1991), pg. 604, O. Orient, K. Martus, A. Chutjian, and E. Murad.
- "Coherence in Electron-Heavy Noble Gas Collisions at Small Scattering Angles", APS-DAMOP Meeting, Washington, DC (1991), Bull. APS 36, 1281 (1991), K. Martus, S. Zheng, and K. Becker.
- "Electron-Polarized Photon Coincidence Study of the Heavy Noble Gases", 43rd GEC, Urbana-Champaign, IL (1990), Bull. Am. Phys. Soc. 36, 208 (1991), K. Martus, S. Zheng, and K. Becker.
- "Coincidence Study of Heavy Noble Gas Excitation by Electron Impact in the Regime of Large Impact Parameters", 12th ICAP, Ann Arbor, MI (1990), Abstract of Contributed Papers, K. Martus, S. Zheng, and K. Becker.
- "Electron-Photon Coincidence Study of Heavy Noble Gas Excitation in the Regime of Small Scattering Angles", APS-DAMOP Meeting, Monterey, CA (1990), Bull. Am. Phys. Soc. 35, 1172 (1990), K.E. Martus and K. Becker.
- "Measurement of Coherence Parameters in Electron-Heavy Noble Gas Collisions", 42nd GEC, Palo Alto, CA (1989), Bull. Am. Phys. Soc. **35**, 1821 (1990), K.E. Martus and K. Becker.
- "Emission of the Fluorine Resonance Lines Following Dissociative Electron Impact Excitation of CCl₂F₂, NF₃, CF₄ and SF₆", 42nd GEC, Palo Alto, CA (1989), Bull. Am. Phys. Soc. 35, 1821 (1990), M. Roque, R. Siegel, K.E. Martus, and K. Becker.
- "Dissociative Excitation of Processing Plasma Constituents by Controlled Electron Impact", Proc. XVI. ICPEAC, New York, USA (1989), pg. 351, M. Roque, R. Siegel, Z.J. Jabbour, F.M. Olchowski, K.E. Martus, and K. Becker.
- "Angular Resolution Effects in the Measurement of Coherence Parameters in Electron-Heavy Noble Gas Collisions", Proc. XVI. ICPEAC, New York, USA (1989), pg. 168, A. Shukla, K. Martus, and K. Becker.
- "Measurement of the P₁ Coherence Parameter for Heavy Noble Gas Excitation by Electrons Scattered in the Forward Direction", Proc. XVI. ICPEAC, New York, USA (1989), pg. 169, K.E. Martus and K. Becker.
- "Coincidence Study of Heavy Rare Gas Excitation", APS-DAMOP Meeting, Windsor, ON (1989), Bull. APS **34**, 1394 (1989), K. Martus and K. Becker.
- "Consequences of a Finite Angular Resolution on the Measurement of Polarization Correlation Parameters", APS-DAMOP Meeting, Baltimore, MD (1988), Bull. APS 33, 1010 (1988), K. Martus, K. Becker, and D. Madison.
- "Electron Collisions with CCl₂F₂ and BCl₃", APS-DAMOP Meeting, Baltimore, MD (1988), Bull. APS **33**, 941 (1988), Z.J. Jabbour, K.E. Martus, and K. Becker.
- "Polarization Correlation Study of Heavy Rare Gas Excitation by Electron Impact", Proc. XV. ICPEAC, Brighton, England (1987), pg. 169, K.E. Martus and K. Becker.
- "Coherence in Electron-Heavy Rare Gas Collisions", 40th GEC, Atlanta, GA (1987), Bull. APS 33, 139 (1988), K.E. Martus and K. Becker.