

Dr. NINA AVDONINA

University Alaska Fairbanks,
Department of Mathematics and Statistics
Fairbanks, AK 99775-6660

Telephones: (404) 405-8057
(907) 474-7094/ 455-7655
navdonina@alaska.edu

Scientific Titles:

Ph.D. in Theoretical Physics and Mathematics, issued by Supreme Attestation Committee of the USSR (Certificate # 007470), 1979.

Associate Professor (Docent), issued by Supreme Attestation Committee of the USSR (Certificate # 091524), 1986.

Professional Positions

- 2006- present Department of Mathematics and Statistics, University of Alaska, Fairbanks, AK
Adjunct Professor of Mathematics.
- 2000-2012 Department of Physics and Astronomy, University of Pittsburgh, Pittsburgh, PA
Research Professor.
- 2003-2004 Department of Electrical Engineering, University of Alaska Fairbanks, Fairbanks AK
Research Professor.
- 2000-2001 Department of Physics and Astronomy, University of Tennessee, Knoxville, TN
Visiting Professor.
- 1999-2000 Department of Physics and Astronomy, University of Tennessee, Knoxville, TN
Research Associate.
- 1995-2000 Centre for Theoretical Studies of Physical Systems, Clark Atlanta University, GA
Research Consultant.
- 1994-1997 Department of Physics, Duquesne University, Pittsburgh, PA
Adjunct Professor of Physics.
- 1991- 2000 Department of Physics and Astronomy, University of Pittsburgh, Pittsburgh, PA
Research Associate.
- 1976-1991 Department of Mathematics, Institute of Refrigerating Industry, St. Petersburg, Russia,
Associate Professor (1986-1991), Assistant Professor (1976-1986).
- 1975-1976 A. F. Ioffe Physico-Technical Institute, Academy of Sciences, St. Petersburg, Russia.
Postdoctoral Fellow,

Visiting Positions

- 2002, 2004 University of Baya Blanka Argentina (3 month grant awarded by NSF).
- 1999 The Flinders University of South Australia, Adelaide, Australia (2 months visiting grant awarded by the Flinders University of SA).
- 1997 Pierre and Marie Curie Institute, Paris, France (6 month grant awarded by the French Ministry of Education).
- 1996 The Flinders University of South Australia, Adelaide, Australia (3 month visiting grant awarded by the Flinders University of SA).
- 1994 Institute for Theoretical Atomic and Molecular Physics at the Harvard-Smithsonian Centre for Astrophysics, Cambridge, MA (4 weeks, Visiting Scholars appointment)
- 1993 Daresbury Laboratory, UK (2 weeks, Visiting appointment).

Teaching Experience

- 2006-present *Adjunct Professor*, Department of Mathematics and Statistics, University of Alaska, Fairbanks, AK. "Calculus for Business", "Calculus I, Calculus II, Calculus III", "Differential Equations", Linear Algebra, "Intermediate Algebra", "Concepts and Applications of Mathematics".
- 2000- 2001 *Visiting Professor*, Department of Physics, University of Tennessee, Knoxville, TN. "Foundation of Astronomy" for non-science undergraduate majors.
- 1994- 1997 *Adjunct Professor*, Department of Physics, Duquesne University, Pittsburgh, PA. "Quantum Mechanics", "Modern Physics", "Atomic Physics" for science undergraduate majors.
- 1994- 1996 *Teaching Associate*, Department of Physics, University of Pittsburgh, Pittsburgh, PA. "Mathematical Methods in Physics" for graduate students and "Non-Calculus Physics" for undergraduate students.
- 1992 *Teaching Instructor*, Department of Physics, University of Pittsburgh, Pittsburgh, PA. "Introduction to Experimental Physics".
- 1976-1991 *Associate Professor (1986-1991), Assistant Professor (1976-1986)*. Department of Mathematics, Institute of Refrigerating Industry, St.Petersburg, Russia. Taught full range of graduate and undergraduate courses in mathematics for engineers

Education

- 1972-1975 Graduate fellow at A.F.Ioffe Physico-Technical Institute Academy of Sciences, USSR. Ph.D. in Theoretical Physics and Mathematics, awarded by Leningrad State University. Title of thesis: "Specific Features of Electron Scattering on the Atoms and Ions" Advisors: professors M. Ya. Amusia, Hebrew University of Jerusalem, Israel, Yu. Demkov, Leningrad State University, Russian Federation.
- 1966-1972 *Leningrad State University, Department of Physics* (MS in Theoretical physics and Mathematics).

Invited Talks at the International Conferences

1. "Systems of vibrating strings with attached masses: control and inverse problems". Seventh International Conference on Dynamic Systems and Applications, Atlanta, Georgia, May 2015.
2. "Trajectories of Zeroes of the Matrix Elements for Bound-bound and Bound-free Transitions in Electron Scattering", International workshop, North Bengal University, India, March 2004.
3. "Review of Stripping Approximation in Total Bremsstrahlung Calculations.", XVIII IC Application of Accelerators in Research and Industry, Danton, Texas, November 2000.
4. "Small Angle Electron Scattering: General Properties and Specific Features", Europhysics Conference on Elementary Processes in Atomic Physics, CEPAS, Ukraine, 25-28 July 2000.
5. "Photoionization From Ions" International workshop "New Directions in the Study of the Interaction of Energetic Photons with Matter", North Bengal University Darjeeling, India, March 1996.
6. "Bremsstrahlung from ions", XIII IC Application of Accelerators in Research and Industry, Danton, Texas, November 1995.
7. "Outer-Shell Photoionization of Ions", International workshop "Atomic Physics at High Brilliance Synchrotron Sources", Argonne National Laboratory, April 1994.
8. "Photoionization Cross Sections of Excited States of Atoms and Ions", UK/USSR Seminar "Today and Tomorrow in Photoionization", Leningrad, 23-27 April 1990.

LIST OF THE MAIN PUBLICATIONS

1. N. B. Avdonina, S. Avdonin “Recursive Algorithms Solving Inverse Scattering Problems on Quantum Graphs”, Bulletin of the American Physical Society, 42d DAMOP, June 2011; Atlanta, GA; Volume 56, Number 5 (2011).
2. N. B. Avdonina “Influence of Correlations on the Trajectories of Zeroes of the Matrix Elements for Bound-bound and Bound-free Transitions in Electron Scattering Elements for Bound-bound and Bound-free Transitions in Electron Scattering”, RPC **75/12**, 2124-2128 (2007).
3. N. B. Avdonina, D. Fursa, A. Z. Msezane, R. H. Pratt, “Minima of generalized oscillator strengths of atomic transitions and the approach to the high energy limit”, Phys. Rev. A **71**, 062711 (2005).
4. N. B. Avdonina, S. Belov., Z. Felfli, M. Marletta, A. Z. Msezane, S. N. Naboko “Semiclassical approach to Regge poles trajectories calculations for nonsingular potentials: Thomas–Fermi type *J. Phys. A: Math. Gen.* **37**, 6943-6954 (2004).
5. E. G. Drukarev and N. B. Avdonina, “High energy photoionization beyond independent particle approximation” *J. Phys. B* **36**, 2033-2052 (2003).
6. J. H. Macek and N. B. Avdonina, “Lassetre's Theorem for excitation of ions by charged particle impact”, *J. Phys. B* **35**, 1775-1781 (2002).
7. N. B. Avdonina, S. Belov, Z. Felfli, A. Z. Msezane and S. N. Naboko, "New semiclassical approach for calculating Regge pole trajectories for singular potentials", *Phys. Rev A* **66**, 022713 (2002).
8. A. V. Korol, A. G. Lyalin, A. V. Solov'yov, N. B. Avdonina and R. H. Pratt, "On the stripping approximation in the bremsstrahlung process", *J. Phys. B* **35**, 1199-1210 (2002).
9. N. B. Avdonina, E. G. Drukarev, and R. H. Pratt, "Applicability of a non-relativistic asymptotic description of high energy photoionization", *Phys. Rev A* **65**, 052705 (2002).
10. Drukarev E. G., Avdonina N. B., and Pratt R. H., “Correlation Effects in the Energy Spectrum of Fast Outgoing Electrons from Double Photoionization of Helium”, *J. Phys.* **B 34**, 1-13 (2001).
11. Amusia M. Ya., Avdonina N. B., Drukarev E. G., Manson S.T, and Pratt R. H., “On the Qualitative Modification of the High Energy Atomic Photoionization Cross Section”, *Phys. Rev. Lett.* **85**, 4703 (2000).
12. Lamoureux M, Waller P., Charles P., and Avdonina N. B., “Results on Bremsstrahlung from Thick Targets, and New Diagnostic for Electron Energy Distribution”, *Phys. Rev.* **E62**, 4091-4095 (2000).
13. Avdonina N. B., Felfli Z., Fursa D. and Msezane A. Z., "Kinematics Representation for Elucidating Small-Angle Electron Scattering", *Phys. Rev.* **A62**, 14703 (2000).
14. Avdonina N. B., Pratt R. H., “Bremsstrahlung Spectra from Atoms and Ions at Low Relativistic Energies”, *J. Phys.* **B 32**, 4261-4276 (1999).
15. Avdonina N. B. Felfli Z., Msezane A. Z., "Normalization of Experimental Electron Impact Relative Cross Sections”, *J. Phys.* **B32**, 5179-5187 (1999).
16. Avdonina N. B., "Energy losses for Bremsstrahlung from Atomic Ions", *Physica Scripta* **T80**, 276-277 (1999).
17. Avdonina N. B., Felfli Z., Msezane A. Z., "Generalized Oscillator Strengths for Forward Electron Scattering", *J. Phys.* **B30**, 2591-2598 (1997).

18. Lamoureux M., Avdonina N. B. "Bremsstrahlung in Hot Plasmas with Partially Ionized Atoms", Phys. Rev. E55, 912-926 (1997).
19. Avdonina N. B., Pratt R. H. "Parametrization of the Coulombic Bremsstrahlung Spectrum", Indian J. Phys. 71B, 208-222 (1997).
20. Felfli Z., Fomunung I. W, Msezane A. Z., Avdonina N. B., "Electron Impact Excitation of Optical Allowed Transitions at Small Angles", Nucl. Instr. Methods B 119, 337-244 (1996).
21. Avdonina N. B., Pratt R. H. "Bremsstrahlung from ions" Nucl. Instr. Methods B 99, 166-169 (1995).
22. Pratt R. H., C. David Shaffer, Avdonina N. B., Xiao-Min Tong, Viorica Florescu "New Developments in the theory of bremsstrahlung" Nucl. Instr. Methods B 99, 156-159 (1995).
23. Avdonina N. B., Lamoureux M., Pratt R. H. " Energy Losses and Spectra from Electron Bremsstrahlung in a Screened Atomic Potential" Appl. Radiat. Isot. 46, 445-446 (1995).
24. Amusia M. Ya., Avdonina N. B., Pratt R. H. "Coherent Correlation Enhancement of Outer Shell Photoionization Cross Sections of Alkali-like Ions," J. Phys. B27, 5211-5219 (1994).
25. Avdonina N. B., Pratt R. H. "Effect of Screening on the Radiative Tail of Elastic Scattering of Electrons from Ions", J. Phys. B 27, 4263-4270 (1994).
26. Avdonina N. B., Pratt R. H. "Bremsstrahlung Spectrum from Ions in a Model Potential Approximation", JQSRT 50, 349-358 (1993).
27. Avdonina N. B., Amusia M. Ya., "Role of Intershell Correlations in the Photoionization of Excited Atoms and Ions", Sov. Phys. Tech. Phys., 35(3), 312-16 (1990).
28. Amusia M. Ya., Avdonina N. B., "Photoionization of Excited States of Cesium Isoelectronic Series", Opt. and Spectr. 66, 578-83 (1989).
29. Avdonina N. B., Amusia M. Ya., "Intershell Interaction in Excited Atoms and Ion Photoionization", Z. Phys. D14, 191-4 (1989).
30. Avdonina N. B., Telnov D. A., "Low-Frequency Bremsstrahlung of Electrons in Collisions with Positive Ions", Sov. Phys. Tech. Phys. 33(1), 33-7 (1988).
31. Amusia M. Ya., Avdonina N. B., Kuchiev M. Yu., Chernysheva L. V., "The Effect of the Structure of an Atom on the Angular Distribution and Polarization of Braking Radiation", Acad. Sci. USSR, Bulletin (Phys) 50, 13-8 (1986).
32. Avdonina N. B., Amusia M. Ya., Kuchiev M. Yu., Chernysheva L. V., "Bremsstrahlung of Fast Electrons on Atoms", Sov. Phys. Tech. Phys. 31(2), 150-4 (1986).
33. Amusia M. Ya., Avdonina N. B., Chernysheva L. V., Kuchiev M. Yu., "Stripping" of the Atom in Bremsstrahlung", J. Phys. B18, L791-792 (1985).
34. Avdonina N. B., Amusia M. Ya., "Characteristic Features in Photoionization of Excited Atomic States", J. Phys. B16, L543-544 (1983).
35. Avdonina N. B., Amusia M. Ya., "Excitation of the 1P and 3P Levels of Magnesium Atom by Electron Impact", Sov. Phys. Tech. Phys. 28, 209-13 (1983).

36. Avdonin S.A., Avdonina N.B., and Petrov S.V., Diffusion model of drying in drum-type apparatus, *Journal of Appl. Chem.*, vol. 55, no. 5, (1982), 1073--77 (Russian), ISSN: 0044-4618.
37. Berezina (Avdonina) N. B., Demkov Yu. N., "Low Energy Resonance Scattering of Electrons by Thomas-Fermi Atoms", *Sov. Phys. JETP* 41, 421-4, (1975).
38. Amusia M. Ya., Berezina (Avdonina) N. B., Chernysheva L. V., "Single Ionization of Xe by Fast Electrons in the Vicinity of the 4d Subshell Threshold", *Phys. Lett.* 51A, 101-2 (1975).
39. Drukarev G. F., Berezina (Avdonina) N. B., "Energy Dependence of the Cross Section of Elastic Scattering of Slow Electrons by Positive Ions", *Sov. Phys. JETP* 42, 423-4, (1975).
40. Demkov Yu. N., Berezina (Avdonina) N. B., "Energy Levels in a Thomas-Fermi Potential and their Relation to Atomic Spectra", *Opt. and Spectr.* 34, 485-7 (1973).
41. Demkov Yu. N., Ostrovsky V. N., Berezina (Avdonina) N. B., "Uniqueness of the Firsov Inversion Method and Focusing Potentials", *Sov. Phys. JETP* 33, 867-70, (1971).

Proceedings of the Conferences and Workshops

1. Avdonin S., Avdonina N. B., and Julian Edward "Boundary inverse problems for networks of vibrating strings with attached masses" *Proceedings of Dynamic Systems and Applications*, 7, 1–4 (2016)
2. Felfli Z. , Belov S., Avdonina N. B., Marletta M., Msezane A. Z., Naboko S. N., "Regge Poles Trajectories for Nonsingular Potentials: The Thomas–Fermi Potentials", *Contemporary Problems in Mathematical Physics, Proceedings of the Third International Workshop, Cotonou, Republic of Benin, 1–7 November 2003*
3. Naboko S.N., Felfli Z., Avdonina N.B., and Msezane A.Z., "Regge Poles Calculation for Singular Potentials: The Lennard-Jones Potential", in *Proc. Neural, Parallel and Scientific Computations*, Vol. 2, Eds. M.P. Bekakos, G.S. Ladde, N.G. Medhin and M. Sambandham (Dynamic Publishing, Inc. Atlanta, Georgia, 2002) p. 293.
4. Avdonina N. B., Pratt R. H., "Bremsstrahlung from Ions", *AIP Conference Proceedings* 392, *Application of Accelerators in Research and Industry, Proceedings of the 14th International Conference, American Institute of Physics, Woodbury, New York* 249-252 (1997).
5. Lamoureux M., Avdonina N. B., Pratt R. H. "Determination of Bremsstrahlung Emissivity Coefficients for Plasmas with Partially Ionized Atoms", in *Proceedings of the 12th International Workshop on ECR Ion Sources, Riken, Japan* 176-179 (1995).
6. Avdonina N. B. "Outer-Shell Photoionization of Ions" in "Atomic Physics at High Brilliance Synchrotron Sources" *Proceedings of a Workshop held at Argonne National Laboratory, ANL/APS/TM-14*, 73-79 (1994).
7. Avdonina N. B., Pratt R. H., Chernysheva L.V. "Photoionization of Excited Highly Charged Ions" *AIP Conference Proceeding* 274, American Institute of Physics, New-York 553-555 (1992).
8. Avdonina N. B. "Photoionization Cross Sections of Excited States of Atoms and Ions", in "Today and Tomorrow in Photoionization, Proceedings of the UK/USSR Seminar", edited by M. Ya. Amusia and J. B. West, *Darbury Laboratory Report Series DL/SCI/R29*, 149-154 (1991).
9. Avdonina N. B., Telnov D. A., " Low-Frequency Bremsstrahlung on Ions" in "Spectroscopy and Collisions of Few-Electron Ions", *Proceedings of the Study Conference SCOFEI'88*, edited by M. Ivascu *et al*, Bucharest, Romania, 100-106 (1988).