

Personal Data

PAVEL A. MAKAROV
Web: <https://makarovpa.ru>
Email: mkrvpa@gmail.com,
makarovpa@ipm.komisc.ru
Phone: +7 904 239 07 63
Date of birth: 17 July 1986
Place of birth: Lutsik, USSR
Citizenship: Russia
Marital status: Married, 1 kid

Mailing address:

Institute of Physics and
Mathematics
Komi Science Center
Ural Division of the RAS.
Oplesnina str., 4,
Syktyvkar, Russian Federation
167982

**Academic Background**

1. University degree in Radiophysics and electronics, Syktyvkar State University, Russia (2003 – 2008);
2. PhD-student at the Syktyvkar State University (2008 – 2011);
3. PhD, Chelyabinsk State University (2012);
4. Engineer at Syktyvkar State University (2008 – 2011);
5. Lecturer at College of Economics, Law and Informatics at the Syktyvkar State University (2008 – 2014);
6. Lecturer assistant at Syktyvkar State University (2009 – 2012);
7. Senior lecturer at Syktyvkar State University (2012 – 2015);
8. Assistant professor at Syktyvkar State University (2015 – present);
9. Master degree in Physics, Syktyvkar State University, Russia (2017 – 2019);
10. Senior researcher at Institute of Physics and Mathematics Komi Science Center Ural Division of the RAS, Russia (2021 – present);

Specialization and academic interests

Microwave electric and magnetic properties of thin multilayer and composite films. Oscillations and waves in magnetic structures. Spin waves dynamics. Nanostructured materials. Condensed matter physics. Nonlinear mechanics. Quantum mechanics and quantum field theory. High-energy physics. X-ray and synchrotron radiation. Quantum informatics. Analytical, qualitative and numerical methods.

Research experience

- Research for project supported by Russian Foundation for Basic Research # 13-02-01401 “Research of radio-physical properties and critical phenomena in thin films with different micro- and nanostructure” (2013 – 2015);
- Research for project supported by Russian Foundation for Basic Research # 17-02-01138_A “Electromagnetic, magnetoacoustic properties of films and multilayer structures” (2017 – 2019);
- Research for project supported by Russian Foundation for Basic Research # 17-57-150001 “Acousto-magneto-plasmonics” (2017 – 2019);
- Research for project supported by Russian Foundation for Basic Research # 21-72-20048 “Microwave magnetoelectronics of composite films and planar structures” (2021 – present).

Teaching experience

- Supervision of 14 undergraduate (2015 – 2021) and four master (2018, 2020) students at Syktyvkar State University;

Lecture courses:

- “PC architecture” (2008 – 2014, College of Economics, Law and Informatics at the Syktyvkar State University);
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- “Computer organization and design” (2008–2011, College of Economics, Law and Informatics at the Syktyvkar State University);
- “Physics” (2009–2010, Syktyvkar State University);
- “Computer networks” (2010–2013, Syktyvkar State University).
- “Mechanics” (2012–2016, 2018, Syktyvkar State University);
- “Atomic physics” (2012, 2017–2019, Syktyvkar State University);
- “Quantum radiophysics” (2012–2021, Syktyvkar State University);
- “Nuclear physics” (2013, 2018–2020, Syktyvkar State University);
- “Atomic and nuclear physics” (2013–2017, 2020, 2021, Syktyvkar State University)
- “Physical electronics” (2013–2020, Syktyvkar State University);
- “Programming in C” (2013–2018, Syktyvkar State University);
- “Theoretical mechanics” (2014–2021, Syktyvkar State University);
- “Electrical engineering” (2015, Syktyvkar State University);
- “Automatization of scientific research systems” (2015, Syktyvkar State University);
- “Quantum mechanics” (2015–2016, 2019–2021, Syktyvkar State University);
- “Oscillations and waves, optics” (2016, Syktyvkar State University);
- “Elements of quantum theory” (2016–2022, Syktyvkar State University);
- “Programming technology” (2016–2018, 2021, 2022 Syktyvkar State University);
- “Quantum field theory” (2018, 2020, Syktyvkar State University);
- “Biophysics” (2019–2021, Syktyvkar State University);
- “Physics of biomedical systems and technologies” (2019–2021, Syktyvkar State University);
- “Quantum theory” (2019–2021, Syktyvkar State University);
- “Numerical methods for solving of wave equations” (2019–2021, Syktyvkar State University);
- “The architecture of modern computing devices” (2021, Syktyvkar State University);
- “Object-oriented programming” (2022, Syktyvkar State University);

List of publications

Thesis

1. P.A. Makarov, “*Electrodynamic studies of multilayer thin-film structures*”, graduate thesis, Syktyvkar State University, 2008 (in Russian);
2. P.A. Makarov, “*The conducting and microwave-reflecting properties of the thin metal and metal-dielectric films with the inclusions*”, PhD dissertation, Chelyabinsk State University, 2012 (in Russian).
3. P.A. Makarov, “*CMS collaboration open data analysis*”, Master thesis, Syktyvkar State University, 2019 (in Russian).

Books, book chapters and review articles

4. V.M. Yurkin, N. V. Kokina, D. O. Kvochkin, P.A. Makarov, V.A. Ustyugov / “*Optics: Laboratory practical work*”, Syktyvkar State University, 2014 (in Russian);
 5. D. O. Kvochkin, P.A. Makarov, V.A. Ustyugov / “*Microcircuitry. Lecture notes. Part 1*”, Syktyvkar State University, 2016 (in Russian).
 6. D. O. Kvochkin, P.A. Makarov, V.A. Ustyugov / “*Microcircuitry. Lecture notes. Part 2*”, Syktyvkar State University, 2017 (in Russian).
 7. P.A. Makarov, V.M. Yurkin, V.S. Vlasov / “*Mechanics. Collection of problems*”, Syktyvkar State University, 2017 (in Russian).
 8. V.A. Ustyugov, P.A. Makarov / “*x86 Assembler Tutorial. Examples and problems*”, Syktyvkar State University,
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2021 (in Russian).

9. P.A. Makarov / “Quantum theory. Introductory course: demonstration materials”, Syktyvkar State University, 2021 (in Russian).

Refereed publications

10. I. V. Antonets, L. N. Kotov, P.A. Makarov, Ye. A. Golubev / “Nanostructure, conductivity, and reflectivity of thin iron and $(Fe)_x(BaF_2)_y$ films” // Tech. Phys. **55**: Issue 9, 1367–1372, 2010 / doi:10.1134/S1063784210090215.
11. L. N. Kotov, I. V. Antonets, R. I. Korolev, P.A. Makarov / “Resistance and oxidation of iron films and the effect of the upper layer of dielectrics and metals” // Bulletin of Chelyabinsk State University. Physics. **39**: 57–62, 2011 (In Russian).
12. P.A. Makarov, V.G. Shavrov, V.I. Shcheglov / “Influence of dissipation on magnetostatic surface waves in tangent magnetized ferrite plate” // J. of radio electronics. Issue 7, 2014 [e-print] (In Russian).
13. Yu. I. Keller, P.A. Makarov / “Dispersion of magnetostatic surface of direct and inverse waves in mediums with absorption” // International research journal. Issue 2, 66–68, 2016 / doi:10.18454/IRJ.2016.44.021 (In Russian).
14. A. V. Lytkin, P.A. Makarov / “Influence of the temperature on the magnetostatic waves properties in ferrite plates” // Juvenis scientia. Issue 2, 19–21, 2016 [e-print] (In Russian).
15. Yu. I. Keller, P.A. Makarov, V.G. Shavrov, V.I. Shcheglov / “The magnetostatic surface waves in ferrite plate with dissipation. Part 1. Dispersion relations” // J. of radio electronics. Issue 2, 2016 [e-print] (In Russian).
16. Yu. I. Keller, P.A. Makarov, V.G. Shavrov, V.I. Shcheglov / “The magnetostatic surface waves in ferrite plate with dissipation. Part 2. Propagation of the wave perpendicularly to the field direction” // J. of radio electronics. Issue 3, 2016 [e-print] (In Russian).
17. Yu. I. Keller, P.A. Makarov, V.G. Shavrov, V.I. Shcheglov / “The magnetostatic surface waves in ferrite plate with dissipation. Part 3. Propagation of the wave in arbitrary direction relatively to field” // J. of radio electronics. Issue 3, 2016 [e-print] (In Russian).
18. P.A. Makarov / “The recursive method for determining the reflective properties of multilayer film coatings” // Bulletin of Syktyvkar University. Series 1: Mathematics. Mechanics. Informatics. No 1(21), 9–27, 2016 [e-print] (In Russian).
19. P.A. Makarov, V.I. Shcheglov / “Influence of dissipation on magnetostatic surface waves dispersion” // J. Sib. Fed. Univ. Math. Phys. **9**: Issue 4, 469–472, 2016 / doi:10.17516/1997-1397-2016-9-4-469-472.
20. P.A. Makarov / “On the variational principles of the mechanics of conservative and non-conservative systems” // Bulletin of Syktyvkar University. Series 1: Mathematics. Mechanics. Informatics, No 2(23), 46–59, 2017 [e-print] (In Russian).
21. L. A. Maltceva, P.A. Makarov / “Dispersion of the magnetostatic backward volume waves in the absorbing medium” // Juvenis scientia. Issue 6, 5–6, 2017 [e-print] (In Russian).
22. V. S. Vlasov, P.A. Makarov, V. G. Shavrov, V. I. Shcheglov / “The orientational characteristics of magnetoelastic waves excitation by femtosecond light pulses” // J. of radio electronics. Issue 6, 2017 [e-print] (In Russian).
23. L. A. Maltceva, P.A. Makarov / “Temperature influence on magnetostatic waves dispersion in yttrium iron garnet films” // International research journal. Issue 7, 112–117, 2017 / <https://doi.org/10.23670/IRJ.2017.61.078> (In Russian).
24. P.A. Makarov / “Methodical of the using struct type in C/C++ programs” // Bulletin of Syktyvkar University. Series 1: Mathematics. Mechanics. Informatics, No 4(25), 50–58, 2017 [e-print] (In Russian).
25. P.A. Makarov, V.I. Shcheglov / “On the application of the operators formalism to the solution of the electrodynamics problems for bigyrotropic media” // Bulletin of Syktyvkar University. Series 1: Mathematics. Mechanics. Informatics. No 1(26), 3–16, 2018 [e-print] (In Russian).
26. P.A. Makarov / “On the application of the vector graphics language Asymptote for illustrating educational, methodical and scientific works of physics and mathematics” // Bulletin of Syktyvkar University. Series 1: Mathematics. Mechanics. Informatics. No 3(28), 19–37, 2018 [e-print] (In Russian).
27. V. S. Vlasov, P.A. Makarov, V. G. Shavrov, V. I. Shcheglov / “Vibrations of magnetization under the shock influ-

- ence of elastic displacement*” // J. of radio electronics. Issue 4, 2018 [e-print] (In Russian).
28. Yu. I. Keller, P.A. Makarov, V. G. Shavrov, V. I. Shcheglov / “*Dispersion properties of electromagnetic waves on in-plane magnetized ferrite plate*” // J. of radio electronics. Issue 4, 2018 [e-print] (In Russian).
 29. P.A. Makarov, V. G. Shavrov, V. I. Shcheglov / “*Dispersion of a gyromagnetic wave in a ferrite plate with dissipation*” // J. of radio electronics. Issue 9, 2018 / doi:10.30898/1684-1719.2018.9.10 (In Russian).
 30. Yu. I. Keller, P.A. Makarov, V. G. Shavrov, V. I. Shcheglov / “*Dispersion properties of magnetostatic surface waves in a ferrite plate with dissipation*” // J. of Communications Technology and Electronics, **63**: Issue 6, 570–576, 2018 / doi:10.1134/S106422691806013X.
 31. Yu. I. Keller, P.A. Makarov, V. G. Shavrov, V. I. Shcheglov / “*Propagation of magnetostatic surface waves in a dissipative ferrite plate*” // J. of Communications Technology and Electronics, **63**: Issue 6, 1035–1041, 2018 / doi:10.1134/S1064226918090097.
 32. P.A. Makarov, M. A. Ulyasheva / “*On the theory of dispersion of gyromagnetic waves in a medium with dissipation*” // Bulletin of Syktyvkar University. Series 1: Mathematics. Mechanics. Informatics. No 4(33), 3–20, 2019 [e-print] (In Russian).
 33. I. A. Komarov, P.A. Makarov, V. A. Ustyugov / “*On the free mechanical vibrations in a dry-friction system*” // Bulletin of Syktyvkar University. Series 1: Mathematics. Mechanics. Informatics. No 3(36), 24–51, 2020 [e-print] (In Russian).
 34. I. A. Komarov, P.A. Makarov / “*Modelling spin chain dynamics on quantum computer*” // IT ARCTICA. No 4, 15–36, 2020 [e-print] (In Russian).
 35. D. Sivkov, S. Nekipelov, O. Petrova, A. Vinogradov, A. Mingaleva, S. Isaenko, P. Makarov, A. Ob'edkov, B. Kaverin, S. Gusev, I. Vilkov, A. Aborkin, V. Sivkov / “*Studies of Buried Layers and Interfaces of Tungsten Carbide Coatings on the MWCNT Surface by XPS and NEXAFS Spectroscopy*” // Applied Sciences, **10**: Issue 14, 4736, 2020 / doi:10.3390/app10144736.
 36. V.S. Vlasov, P.A. Makarov, V.G. Shavrov, V.I. Shcheglov / “*Shock excitation of the magnetization oscillations in a magnetoelastic medium by complex-shaped elastic pulses*” // Journal of Communications Technology and Electronics **66**: Issue 11, 1282–1288, 2021, doi:10.1134/S1064226921100156.
 37. P. Makarov, V. Ustyugov, L. Kotov, S. Nekipelov, V. Sivkov / “*Simulation of Electromagnetic Wave Propagation in Magnetic Randomly Inhomogeneous Magnetic Media*” // IEEE Magnetics Letters **13**, 2101305, 1–5, 2022, doi:10.1109/LMAG.2021.3132857.

Conference proceedings

38. P.A. Makarov / “*Investigation of the electromagnetic properties of composite media*” // Proceedings of First Russian Youth Conference “Youth and Science in the North” – Syktyvkar, Russia. **1**: 42–43, 2008 (In Russian);
 39. I. V. Antonets, P.A. Makarov / “*Conducting and reflecting properties of thin films of iron and $(Fe)_x(BaF_2)_y$* ” // Proceedings of IX International seminar “Magnetic phase transitions” – Makhachkala, Russia. 79–82, 2009 (In Russian);
 40. P.A. Makarov, L. N. Kotov, I. V. Antonets / “*Electrodynamic studies of reflective properties of multilayer thin-film structures*” // Proceedings of International conference “Phase transitions, critical and nonlinear phenomena in condensed media” – Makhachkala, Russia. 87–90, 2009 (In Russian);
 41. P.A. Makarov, V. G. Shavrov, V. I. Shcheglov / “*Magnetostatic surface waves in a ferrite plate with dissipation*” // Proceedings of XXII International Conference “Electromagnetic Field and Materials (Fundamental Physical Research)” – Moscow, Russia. 221–236, 2014 (In Russian).
 42. P.A. Makarov / “*On the teaching of C and C++ programming languages students of physical and mathematical specialties of universities*” // Proceedings of Conference “Regional basic higher educational institution within the framework of the program for the development of education: mission, functions and prospects”, – Syktyvkar, Russia. 83–87, 2017 (In Russian).
 43. P. Makarov, L. Maltceva, L. Kotov, V. Shcheglov / “*Magnetostatic waves in a medium with damping*” // EPJ Web of Conferences, **185**: 02012, 2018 / doi:10.1051/epjconf/201818502012.
 44. L. Maltceva, P. Makarov, L. Kotov, V. Shcheglov / “*Dispersion of the magnetostatic volume waves in a medium with damping*” // EPJ Web of Conferences, **185**: 02015, 2018 / doi:10.1051/epjconf/201818502015.
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Conference abstracts

45. P.A. Makarov / *“Investigation of high-frequency reflecting properties of a thin two-layer structure”* // Abstracts of the X Russian Scientific Conference of Students in Radiophysics – Saint Petersburg, Russia. 57–59, 2006 (In Russian).
46. P.A. Makarov / *“Investigation of backward waves in thin isotropic layers”* // Abstracts of the XIII Russian Scientific Conference of Physics Students and Young Scientists – Yekaterinburg – Rostov-on-Don – Taganrog, Russia. 565–566, 2007 (In Russian).
47. P.A. Makarov / *“Electrodynamical investigations of thin multilayer structures”* // Abstracts of the XV Russian Scientific Conference of Physics Students and Young Scientists – Kemerovo – Tomsk, Russia. 136–137, 2009 (In Russian).
48. P.A. Makarov / *“Coefficients of reflection and transmission of electromagnetic microwave waves for multilayer thin-film structures”* // Abstracts of the XLIV Winter School of the Petersburg Institute of Nuclear Physics, RAS – Saint Petersburg, Russia. 66–68, 2010 (In Russian).
49. P.A. Makarov, V.I. Shcheglov / *“Dispersion of magnetostatic surface waves in a medium with attenuation”* // Abstracts of the L School of the Petersburg Institute of Nuclear Physics, RAS – Saint Petersburg, Russia. 184, 2016 (In Russian).
50. P.A. Makarov, V.I. Shcheglov / *“Dispersion of magnetostatic surface waves in a medium with damping”* // Abstracts of the VI Euro-Asian Symposium “Trends in MAGnetism” (EASTMAG-2016) – Krasnoyarsk, Russia. 260, 2016.
51. A. V. Lytkin, P.A. Makarov / *“Influence of the temperature on the magnetostatic waves properties”* // Abstracts of the VI Euro-Asian Symposium “Trends in MAGnetism” (EASTMAG-2016) – Krasnoyarsk, Russia. 363, 2016.
52. P.A. Makarov, V.I. Shcheglov / *“Dispersion characteristics of surface magnetostatic waves in thin nickel films”* // Abstracts of the LI School of the Petersburg Institute of Nuclear Physics, RAS – Saint Petersburg, Russia. 198, 2017 (In Russian);
53. L. A. Maltceva, P.A. Makarov, V.I. Shcheglov / *“Dispersion of the magnetostatic volume waves in a medium with damping”* // Abstracts of the Moscow International Symposium on Magnetism (MISM-2017) – Moscow, Russia. 137, 2017.
54. P.A. Makarov, V.I. Shcheglov, L. N. Kotov / *“Magnetostatic waves in a medium with damping”* // Abstracts of the Moscow International Symposium on Magnetism (MISM-2017) – Moscow, Russia. 169, 2017.
55. V. S. Vlasov, A. M. Lomonosov, P.A. Makarov, V.I. Shcheglov, L. N. Kotov / *“Nonlinear interactions of surface elastic waves with magnetization in metal films”* // Abstracts of the Moscow International Symposium on Magnetism (MISM-2017) – Moscow, Russia. 436, 2017.

Conference presentations

1. The 26th Conference of the Condensed Matter Division of the EPS “CMD26” (September 4–9, 2016, Groningen, Netherlands), *“Dispersion of magnetostatic surface waves in the thin ferromagnetic films”*.
2. An interdisciplinary workshop “Acousto-magneto-plasmonics meets quantum optics” (June 28–30, 2017, Versailles, France), *“Magnetostatic surface and volume waves”*.

Skills

- Programming, scripting and markup languages: x86 assembler, C, C++, Python (SciPy, QuTiP), Maxima, Asymptote, Gnuplot, Bash, \LaTeX , HTML, CSS.
- Operating systems: advanced experience with GNU/Linux: Debian, Mint and Manjaro.
- Intermediate experience with CERN and CMS Open Data, ROOT and CMSSW.
- Medium experience with vacuum engineering and microwave techniques.
- Basic level of IBM Quantum.
- Languages: Russian (native), English (intermediate).