

Vladimir Parfenyev

Researcher at Landau Institute for Theoretical Physics RAS



PERSONAL DATA:

- Born 03.02.1990, Russia. Married +0.
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RESEARCH INTERESTS:

Fluid mechanics, turbulence, statistical physics, stochastic processes, machine learning.

EDUCATION:

- **2013 – 2016:** PhD in Theoretical Physics, Landau Institute for Theoretical Physics RAS.
Activities: theoretical research in the field of plasmonics and quantum optics under supervision of prof. Vladimir V. Lebedev and Dr. Sergey S. Vergeles. Main directions: theory of a spaser-based nanolaser, including description of the intensity-dependent generation frequency shift and thermal effects.
- **2007 – 2013:** BSc (with honors) and MSc (with honors) in Applied Mathematics and Physics, Moscow Institute of Physics and Technology, Department of General and Applied Physics.

EMPLOYMENT:

- **2016 – present:** Landau Institute for Theoretical Physics RAS, Department of Physics of Non-Equilibrium Processes. **Positions:** Junior Researcher (2016-2020), Researcher (2020-present). **Activities:** theoretical research in the field of fluid mechanics and statistical physics. Main directions: generation of solenoidal currents by interacting surface waves and self-organization of coherent vortex structures in turbulent flows.
- **2017 – present:** National Research University Higher School of Economics, Department of Physics. **Position:** Associate Professor (part time). **Activities:** lectures on stochastic processes and modeling in physics and fundamentals of functional integration.
- **2012 – 2013:** Samsung Moscow Research Center. **Position:** Junior Engineer. **Activities:** Design and optimization of wireless power transmission devices (COMSOL) in the group of Dr. Mikhail N. Makurin.

AWARDS AND PERSONAL GRANTS:

- 2022-2025, Basis Foundation, PostDoc Research Grant # 22-1-3-24-1, “Formation and structure of coherent vortices in turbulent flows”.
- 2017-2020, Basis Foundation, Junior PostDoc Research Grant #17-14-471-1, “Vortex flows and their interaction with turbulent fluctuations in hydrodynamic problems”.
- 2015, Dynasty Foundation Scholarship for Ph.D. students.
- 2013, Dynasty Foundation Scholarship for master students.

PARTICIPATION IN GRANTS:

- 2023-2026, Russian Science Foundation, 23-72-30006, “Interaction of coherent structures and fluctuations in hydrodynamic systems”, lead researcher.
- 2022-2025, Russian Science Foundation, 22-72-10052, “Stochastic structure and dynamics in non-equilibrium processes of biopolymer physics”, researcher.
- 2020-2022, Russian Science Foundation, 20-12-00383, “Structure of three-dimensional coherent vortices in turbulent flow”, lead researcher.
- 2019-2023, Government of the Russian Federation, Megagrant 2019-220-07-6822, “Turbulence, coherent flows and viscous electronics”, researcher.
- 2014-2018, Russian Science Foundation, 14-22-00259, “Investigation of stochastic processes in thin fluid layers and interfaces”, researcher.

PUBLICATIONS:

2 patents and 22 papers in peer-reviewed journals, including Phys. Rev. Lett., J. Fluid Mech., Phys. Fluids, New J. Phys., Optics Express, Opt. Mater. Express, Phys. Rev. E, J. Chem. Phys., Phys. Rev. Fluids, Phys. Rev. A., Physica D, JETP Letters.

PROFESSIONAL EXPERTISE:

I am a referee for Physics of Fluids, Soft Matter, Journal of Marine Science and Engineering, Journal of Experimental and Theoretical Physics, Optical Materials Express. Member of the Reviewer Board at the Journal of Marine Science and Engineering.

REFERENCES:

- Prof. Vladimir V. Lebedev – Landau Institute for Theoretical Physics RAS, head of the department of Physics of Non-Equilibrium Processes. Contacts: lwlebede@gmail.com (primary) or lebede@itp.ac.ru (official).
- Prof. Gregory Falkovich – Weizmann Institute of Science, Pollak Professorial Chair in Physics. Contact: gregory.falkovich@weizmann.ac.il
- Prof. Michael Chertkov – The University of Arizona, Department of Mathematics. Contact: chertkov@math.arizona.edu

LIST OF PUBLICATIONS:

1. I.V. Kolokolov, V.V. Lebedev, and V.M. Parfenyev, “Correlations in a weakly interacting two-dimensional random flow”, Phys. Rev. E 109, 035103 (2024).
2. S. Belan and V. Parfenyev, “Footprints of loop extrusion in statistics of intra-chromosomal distances: An analytically solvable model”, J. Chem. Phys. 160, 124901 (2024).
3. V. Parfenyev, “Statistical analysis of vortex condensate motion in two-dimensional turbulence”, Phys. Fluids 36, 015148 (2024).
4. V. Parfenyev, E. Mogilevskiy, and G. Falkovich, “Sum-of-squares bounds on correlation functions in a minimal model of turbulence”, Phys. Rev. E 107, 054114 (2023).
5. V. Parfenyev, “Profile of a two-dimensional vortex condensate beyond the universal limit”, Phys. Rev. E 106, 025102 (2022).
6. S.V. Filatov, A.V. Poplevin, A.A. Levchenko, V.M. Parfenyev, “Generation of stripe-like vortex flow by noncollinear waves on the water surface”, Physica D: Nonlinear Phenomena 434, 133218 (2022).
7. V.M. Parfenyev and S.S. Vergeles, “Influence of Ekman friction on the velocity profile of a coherent vortex in a three-dimensional rotating turbulent flow”, Phys. Fluids 33, 115128 (2021).
8. V.M. Parfenyev, I.A. Vointsev, A.O. Skoba, S.S. Vergeles, “Velocity profiles of cyclones and anticyclones in a rotating turbulent flow”, Phys. Fluids 33, 065117 (2021).
9. D. Starkov, V. Parfenyev, S. Belan, “Conformational statistics of non-equilibrium polymer loops in Rouse model with active loop extrusion”, J. Chem. Phys. 154, 164106 (2021).
10. V.M. Parfenyev and S.S. Vergeles, “Large-scale vertical vorticity generated by two crossing surface waves”, Phys. Rev. Fluids 5, 094702 (2020).
11. S.A. Belan and V.M. Parfenyev, “Optimality and universality in quantum Zeno dynamics”, New J. Phys. 22, 073065 (2020).
12. V. Parfenyev, S. Filatov, M. Brazhnikov, S. Vergeles, A. Levchenko, “Formation and decay of eddy currents generated by crossed surface waves”, Phys. Rev. Fluids 4, 114701 (2019).
13. V. Parfenyev, S. Belan, V. Lebedev, “Universality in statistics of Stokes flow over no-slip wall with random roughness”, J. Fluid Mech. 862, 1084-1104 (2019).
14. V.M. Parfenyev, S.S. Vergeles, “Influence of a thin compressible liquid film on the eddy currents generated by interacting surface waves”, Phys. Rev. Fluids 3, 064702 (2018).
15. S.V. Yablonskii, N.M. Kurbatov, V.M. Parfenyev, “Acoustic streaming in 2D freely suspended smectic liquid crystal film”, Phys. Rev. E 95, 012707 (2017).
16. V.M. Parfenyev, S.S. Vergeles, V.V. Lebedev, “Effects of thin film and Stokes drift on the generation of vorticity by surface waves”, Phys. Rev. E 94, 052801 (2016).
17. V.M. Parfenyev, S.S. Vergeles, V.V. Lebedev, “Nonlinear generation of vorticity in thin smectic films”, JETP Letters, 103 (3), 201 – 205 (2016); 104(4), 287 (2016).

18. S. Filatov, V. Parfenyev, S. Vergeles, M. Brazhnikov, A. Levchenko, V. Lebedev, "Nonlinear generation of vorticity by surface waves", *Phys. Rev. Lett.* 116, 054501 (2016).
19. S. Belan, V. Parfenyev, S. Vergeles, "Negative-angle refraction and reflection of visible light with a planar array of silver dimers", *Opt. Mater. Express*, 5 (12), 2843-2848 (2015).
20. I.A. Fyodorov, V.M. Parfenyev, G.T. Tartakovsky, S.S. Vergeles, A.K. Sarychev, "Allowable number of plasmons in nanoparticle", *JETP Letters*, 100 (8), 530-534 (2014).
21. V.M. Parfenyev, S.S. Vergeles, "Quantum theory of a spaser-based nanolaser", *Optics Express*, 22(11), 13671-13679 (2014).
22. V.M. Parfenyev, S.S. Vergeles, "Intensity-dependent frequency shift in surface plasmon amplification by stimulated emission of radiation", *Phys. Rev. A* 86, 043824 (2012).

PATENTS:

1. M.N. Makurin, N.N. Olyunin, V.M. Parfenyev, Ki Young Kim, Keum Su Song, "Planar spiral induction coil having increased quality (q)-factor and method for designing planar spiral induction coil", U.S. Patent No. 9712209 (2017).
2. M.N. Makurin, N.N. Olyunin, V.M. Parfenyev, Ki Young Kim, Keum Su Song, "Flat inductor and methods of manufacturing and using the same", Patent RF №2523932, US 20140225705 A1 (2014).