Sushko, Myroslav (Miroslav) Ya., Associate Professor, Department of Theoretical Physics and Astronomy

Born on December 15, 1960 (town of Stebnyk, Lviv region). In ONU since 1977: first as a student at the Physics School (1977–1982), then as a Ph.D. student at the Department of Theoretical Physics (1982–1985), an engineer (1983), and since 1984 until now – as a researcher or/and associate professor at the above Department and (since 2016) the Department of Theoretical Physics and Astronomy. In 1986, defended his Ph.D. thesis (in theoretical and mathematical physics). During different periods, was also temporally affiliated with Odessa Polytechnic Institute (now National Polytechnic University, Department of General Subjects), Long Island University, Brooklyn Campus (Academic Reinforcement Center and Physics Department, New York, USA), Odessa A. S. Popov National Telecommunications Academy (Department of Physics of Optical Communications), and National University "Odessa Maritime Academy" (Department of Theoretical Mechanics).

Has taught a variety of courses to the Physics School students, including:

- general courses Methods of Mathematical Physics, Classical Mechanics, Quantum Theory, Thermodynamics and Statistical Physics, Mechanics of Continuous Media, and separate chapters in Electrodynamics;
- specialized courses Quantum Field Theory, Theory of Elementary Particles, Mechanics of Continuous Media, Physics of Fluids, and Physical Kinetics (macroscopic approach);
- advanced problem-solving seminars Boundary-value Problems in Electrodynamics, Additional Chapters in Quantum Mechanics, Selected Problems in Quantum Mechanics, Electrodynamics and Hydrodynamics, Special Problems in Quantum Mechanics, Statistical Physics and Field Theory, and Special Problems in Theoretical Physics;
- courses Computer Methods for Physics Problem Solving and Computer Simulation of Nonequilibrium and Stochastic Processes;
- courses Business English and Foreign Language for Professional Purposes.
- master course Forms of Research Presentation;
- Ph.D. courses Theory of Elementary Particles and Microstructure and Macroscopic Properties of Random Heterogeneous Systems and Composite Materials.

Has also taught:

- courses Theoretical Mechanics (in English) and Theoretical and Applied Mechanics to marine students;
- General Physics courses (inclusing those in English) to the students of other universities.

Research activities focus on: the study of dynamic critical phenomena in fluids; spectroscopy of molecular light scattering near the critical point; dielectric and optical properties of heterogeneous systems. In co-authorship or on his own, has developed/studied: the method of frequency moments for analysis of the spectral characteristics of the order-parameter correlation functions for fluids, liquid crystals, and ferromagnetics; the structure of molecular light scattering spectra from fluids near their critical points; the nature of the narrowing of the depolarized Rayleigh-line wing in solutions; the higher-order thermodynamic fluctuations in fluids and the possibility of their partial experimental observation in the form of 1.5–molecular light scattering; the features and possible experimental manifestations of the 1.5–scattering effects in fluids; the possibility of experimental observation of three-point correlations in fluids; the way for experimental verification of the conformal invariance of critical fluctuations in fluids; asymmetry of the coexistence curve and the temperature dependence of its "diameter" in the asymptotic vicinity of the liquid–vapor critical point; the method of macroscopic compact groups for analysis of the effective electrophysical and optical parameters of finely dispersed and heterogeneous systems; many-particle models for the electrodynamic homogenization of heterogeneous systems with complex microstructure; many-particle contributions to the optical parameters of concentrated fine dispersions.

Has over 30 publications, including 6 textbooks in mathematical physics, calculus of variations, theoretical mechanics, and statistical physics and thermodynamics.

Major publications:

1. *N. P. Malomuzh, M. Ya. Sushko*. Many-particle polarizability effects in the spectra of molecular light scattering in simple liquids. Opt. Spectrosc. (USSR), 1984, **56**, No 6, 658–661. [Особенности проявления многочастичных поляризуемостей в спектрах молекулярного рассеяния света в простых жидкостях. Оптика и спектр., 1984, **56**, вып. 6, 1072–1077.]
2. *N. P. Malomuzh, M. Ya. Sushko*. A possible mechanism of narrowing of the Rayleigh-line wing in the vicinity of the critical point (in Russian). Ukr. Fiz. Zh., 1985, **30**, No 3, 363–369. [О возможном механизме сужения крыла линии Рэлея вблизи критической точки. Укр. физ. журн., 1985, **30**, № 3, 363–369.]
3. *N. P. Malomuzh, M. Ya. Sushko*. Spectroscopy of depolarized molecular scattering of light by liquids near the critical point. Sov. Phys. JETP, 1985, **62**, No 2, 246–254. [Особенности спектров деполяризованного молекулярного рассеяния света в жидкостях вблизи критической точки. ЖЭТФ, 1985, **89**, вып. 2 (8), 435–449.]

4. *M. Ya. Sushko*. Structure of the Rayleigh-line wing in the vicinity of the critical point (in Russian). Ukr. Fiz. Zh., 1986, **31**, No 5, 679–686. [О структуре крыла линии Рэлея в окрестности критической точки. Укр. физ. журн., 1986, **31**, № 5, 679–686.]
5. *N. P. Malomuzh, M. Ya. Sushko*. Character of spectral-line narrowing in the vicinity of the isotropic liquid–nematic phase transition. Opt. Spectrosc. (USSR), 1987, **62** No 2, 232–235. [О характере сужения спектральных линий в окрестности фазового перехода изотропная жидкость–нематик. Оптика и спектр., 1987, **62**, вып. 2, 386–391.]
6. *N. P. Malomuzh, M. Ya. Sushko*. Spectral features of the order-parameter correlators in the vicinity of the critical points (in Russian). In *Modern Problems in Statistical Physics*. Proc. of All-Union Conf. (Lvov, 2–5 Feb., 1987). In 2 volumes. – Kiev, Naukova Dumka, 1989, V. 2, 71–77. [Спектральные особенности корреляторов параметра порядка в окрестности критической точки. В сб. “Современные проблемы статистической физики”. Труды Всесоюз. конф. (Львов, 3–5 февр. 1987 г.): В 2 т. – К.: Наукова думка, 1989, Т. 2, 71–77.]
7. *M. Ya. Sushko*. Spectral halfwidth of polarized light scattering in mixtures near the critical point. Opt. Spectrosc., 1992, **73**, No 6, 700–702. [О полуширине спектра поляризованного рассеяния света в растворах вблизи критической точки. Оптика и спектр., 1992, **73**, вып. 6, 1175–1180.]
8. *V. M. Adamyan, M. Ya. Sushko*. Introduction to Mathematical Physics (in Ukrainian and English). Textbook for Physics and Mathematics Majors and Engineers (recommended by Ministry for Education and Science of Ukraine, letter 14/18.2-2032 of November 4, 2002). Odesa, Astroprint, 2003, 320 pages. ISBN 966–549–940–8.
9. *M. Ya. Sushko*. Non-Gaussian Contributions to Thermodynamic Fluctuations. Ukr. J. Phys., 2004, **49**, No 7, 710–715. [Негауссові внески в термодинамічні флуктуації. Укр. фіз. журн., 2004, **49**, № 7, 712–717.]
10. *M. Ya. Sushko*. Molecular Light Scattering of Multiplicity 1.5. JETP, 2004, **99**, No 6, 1183–1188. [О молекулярном рассеянии света кратности 1.5. ЖЭТФ, 2004, **126**, вып. 6, 1355–1361.]
11. *V. M. Adamyan, M. Ya. Sushko*. Calculus of Variations (in Ukrainian). Textbook for Physics Majors. Odesa, Astroprint, 2005, 128 pages. ISBN 966–318–340–3.
12. *M. Ya. Sushko.* 1.5-multiplicity molecular light scattering in fluids? Condens. Matter Phys., 2006, **9**, No 1 (45), 37–45.
13. *M. Ya. Sushko.* Sesquialteral Molecular Light Scattering by Fluids. Ukr. J. Phys., 2006, **51**, No 8, 758–762. [Полуторне молекулярне розсіяння світла в рідинах. Укр. фіз. журн., 2006, **51**, № 8, 758–762.]
14. *M. Ya. Sushko.* Dielectric Permittivity of Suspensions. JETP, 2007, **105**, No 2, 426–431. [О диэлектрической проницаемости суспензий. ЖЭТФ, 2007, **132**, вып. 2, 478–484.]
15. *M. Ya. Sushko*. Fine structure of critical opalescence spectra. Low Temp. Phys., 2007, **33**, № 9, 806–809. [Физ. низк. темп., 2007, **33**, № 9, 1055–1058.]
16. *M. Ya. Sushko, S. K. Kris'kiv*. Compact Group Method in the Theory of Permittivity of Heterogeneous Systems. Techn. Physics, 2009, **54**, No 3, 423–427. [Метод компактных групп в теории диэлектрической проницаемости гетерогенных систем. ЖТФ, 2009, **79**, вып. 3, 97–101.]
17. *M. Ya Sushko.* Effctive permittivity of mixtutes of anisotropic particles. J. Phys. D: Appl. Phys., 2009, **42**, 155410 (9pp).
18. *M. Ya. Sushko*. Compact group approach to the analysis of dielectric and optical characteristics of finely dispersed systems and liquids. J. Phys. Stud., 2009, **13**, № 4, 4708 (5 p.). [Журн. фіз. досліджень., 2009, **13**, № 4, 4708 (5 с.)]
19. *M. Ya. Sushko, O. M Babiy*. Asymmetry of the vapor–liquid coexistence curve: The asymptotic behavior of the "diameter". J. Mol. Liq., 2011, **158**, Issue 1, 68 – 74.
20. *M. Ya. Sushko*. Critical opalescence in fluids: 1.5-Scattering effects and the Landau–Placzek ratio. J. Mol. Liq., 2011, **163**, Issue 1, 33 – 35.
21. *M. Ya. Sushko*. Experimental observation of triple correlations in fluids. Condens. Matter Phys., 2013, **16**, No 1, 13003, 1–12.
22. *M. Ya. Sushko, A. K. Semenov*. Conductivity and permittivity of dispersed systems with penetrable particle-host interphase . Condens. Matter Phys., 2013, **16**, No 1, 13401, 1–10.
23. *O. V. Zatovskyi, M. Ya. Sushko*. Statistical Physics and Thermodynamics through Problems (in Ukrainian). Textbook for Physics and Engineering Majors. Odesa, ONU, 2014, 214 pages. ISBN 978–617–689–070–6.
24. *V. M. Adamyan, M. Ya. Sushko*. Introduction to Mathematical Physics. Calculus of Variations and Boundary-Value Problems (in Ukrainian). Textbook for Physics and Engineering Majors (recommended by Ministry for Education and Science of Ukraine, letter 1/11-4606 of March 31, 2014). Odesa, Astroptint, 2014, 380 pages. ISBN 978–966–190–912–9.
25. *M. Ya. Sushko, V. Ya. Gotsulskiy, M. V. Stiranets*. Finding the effective structure parameters for suspensions of nano-sized insulating particles from low-frequency impedance measurements. J. Mol. Liq., 2016, **222**, 1051 – 1060.
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27. *M. Ya. Sushko, A. K. Semenov*. A mesoscopic model for the effective electrical conductivity of composite polymeric electrolytes. J. Mol. Liq., 2019, 279, 677 – 686.
28. *M. Ya. Sushko, A. K. Semenov*. Rigorously solvable model for the electrical conductivity of dispersions of hard-core–penetrable-shell particles and its applications. Phys. Rev. E, 2019, **100**, 052601 (14pp).
29. *V. M. Adamyan, M. Ya. Sushko*. Basics of Quantum Statistical Physics (in Ukrainian). Lecture notes for Physics majors and Ph. D. students. Odesa, ONU, 2020, 74 pages. ISBN 978–617–689–372–1.
30. *S. V. Kozytskyi, M. Ya. Sushko*. Theoretical Mechanics. Essentials for Maritime Cadets. Textbook for Navigation and Ship Handling majors. Odesa, "Ecology", 2021, 172 pages. ISBN 978–617–7867–19–6; Odesa, NU "OMA", 2021, 170 pages.
31. *M. Ya. Sushko, S. D. Balika*. Effect of the electrical double layer on the electrical conductivity of suspensions. Physica Scripta, 2023, **98**, 015812 (12pp).

Conference reports (since 2005):

1. Statistical Physics 2005: Modern Problems and New Applications. Annual Conference in Ukraine. 28–30 Aug., 2005, Lviv, Ukraine.
2. All-Ukrainian Convention *Physics in Ukraine*. 3–6 Oct., 2005, Odesa, Ukraine.
3. Disperse Systems. 12th Scientific Conference of CIS member-countries. 18–22 Sept. 2006, Odessa, Ukraine.
4. Statistical Physics 2006: Condensed Matter: Theory & Applications. International Conference in Ukraine. 12–15 Sept., 2006, Kharkiv, Ukraine.
5. 4th International Conference: Physics of Liquid Matter: Modern Problems. 23–26 May, 2008, Kyiv, Ukraine.
6. Disperse Systems. 13th Scientific Conference of CIS member-countries. 22–26 Sept. 2008, Odessa, Ukraine.
7. The 3-rd Conference Statistical Physics: Modern Trends and Applications. 23–25 June 2009, Lviv, Ukraine.
8. 5th International Conference: Physics of Liquid Matter: Modern Problems. 21–24 May, 2010, Kyiv, Ukraine.
9. The 4-th Conference Statistical Physics: Modern Trends and Applications. 3–6 July 2012, Lviv, Ukraine.
10. Disperse Systems. 25th International Scientific Conference. 17–21 Sept. 2012, Odessa, Ukraine.
11. Fifth International Symposium Methods and Applications of Computational Chemistry. 1–5 July 2013, Kharkiv, Ukraine.
12. 6th International Conference: Physics of Liquid Matter: Modern Problems. 23–27 May, 2014, Kyiv, Ukraine.
13. Disperse Systems. 26th International Scientific Conference. 22–26 Sept. 2014, Odessa, Ukraine.
14. 7th International Conference Physics of Liquid Matter: Modern Problems. May 27–30, 2016, Kyiv, Ukraine.
15. Electronics and Information Technologies. 8th Ukrainian-Polish Conference (ELIT-2016). August 27–30 2016, Lviv–Chynadiyevo, Ukraine.
16. Disperse Systems. 27th International Scientific Conference. 19–23 Sept. 2016, Odessa, Ukraine.
17. The Development of Innovation in Engineering, Physical and Mathematical Sciences. International Scientific-Practical Conference. 22–24 September 2016, Mykolayiv, Ukraine.
18. Actual Problems of Condensed Matter physics. International conference dedicated to the centennial of Professor A. Yu. Glauberman, November 13–16, 2017, Odesa, Ukraine.
19. 8th International Conference Physics of Liquid Matter: Modern Problems. May 18–22, 2018, Kyiv, Ukraine.
20. The Development of Innovation in Engineering, Physical and Mathematical Sciences. II International Scientific-Practical Conference. 13–15 September 2018, Mykolayiv, Ukraine.
21. Ukrainian Conference with International Participation "Chemistry, physics and technology of surface" and Workshop "Metal-based biocompatible nanoparticles: synthesis and applications". 15–17 May 2019, Kyiv, Ukraine.
22. The 5th Conference Statistical Physics: Modern Tends and Applications. 3–6 July 2019, Lviv, Ukraine.
23. The international research and practice conference "Nanothechnology and nanomaterials" (NANO–2019). 27–30 August, 2019, Lviv, Ukraine.
24. Disperse Systems. 28th International Scientific Conference. 16–20 Sept. 2019, Odessa, Ukraine.
25. Ukrainian Conference with International Participation "Chemistry, physics and technology of surface" dedicated to the 90th birthday of Academician Aleksey Chuiko. 21–22 October 2020, Kyiv, Ukraine.
26. Ukrainian Conference with International Participation "Chemistry, physics and technology of surface" devoted to the 35th anniversary of the Chuiko Institute of Surface Chemistry of NAS of Ukraine. 26–27 May 2021, Kyiv, Ukraine.
27. International research and practice conference "Nanothechnology and nanomaterials" (NANO–2021), 25–27 August, 2021, Lviv, Ukraine.
28. International research and practice conference "Nanothechnology and nanomaterials" (NANO–2022), 25–27 August, 2022, Lviv, Ukraine.
29. Ukrainian Conference with International Participation "Chemistry, physics and technology of surface" and Workshop "Microwaves and nanoparticles for real-time detection of human pathogens". 19–20 October 2022, Kyiv, Ukraine.

30. International research and practice conference “Nanothechnology and nanomaterials” (NANO–2023), 16–19 August, 2023, Bukovel, Ukraine.
31. 9th International conference “Physics of disordered systems”, 29-21 September 2023, Lviv, Ukraine.