

Oleksandr Dolbyn (Alexander Dolbin)

Professor, Doctor of physical and mathematical sciences,

Scopus Author ID: 6603895851

<https://www.scopus.com/authid/detail.uri?authorId=6603895851>

<https://scholar.google.com.ua/citations?user=UMVUI-oAAAAJ&hl=ru>



Main place of work:

Acting Director – B. Verkin Institute for Low Temperature Physics and Engineering of the National Academy of Sciences of Ukraine, Kharkiv, Prospect Nauki, 47, Kharkiv, 61103, Ukraine ([ILTPE - B. Verkin Institute for Low Temperature Physics and Engineering](#)).

Professor of chair of Engineering Electrophysics – National Technical University "Kharkiv Polytechnic Institute".

Education, places of work and positions:

2024 to the present: Acting Director of ILTPE (B. Verkin Institute for Low Temperature Physics and Engineering of the National Academy of Sciences of Ukraine)

2021 – 2024 deputy director of ILTPE;

2018-2021 – Head of the Department of Thermal Properties and Structure of Solids and Nanosystems of the ILTPE;

2016-2018 – leading researcher of the Department of Thermal Properties of molecular crystals of the ILTPE;

2004-2016 senior researcher, head of the dilatometric research group of the ILTPE;

2000-2004 researcher of the Department of Thermal Properties of Molecular Crystals of the ILTPE;

1996-2000 leading specialist of the Institute of Monocrystals of the National Academy of Sciences of Ukraine;

1993-1996 full-time postgraduate studies at the National Technical University (KhPI);

1985-1993 student of the physics and engineering faculty of the Kharkiv Polytechnic Institute.

Fields of knowledge:

1. Physics and astronomy, 2018, professor.
2. Physics of low temperatures (2007 – senior researcher; 2012 – doctor of physical and mathematical sciences).
3. Techniques of strong electric and magnetic fields (1996, candidate of technical sciences).
4. Engineering electrophysics (1993, engineering diploma with honors).

Research Activities and Interests:

- Creation and investigation of physical properties of nanocomposite materials.
- Low-temperature dilatometric studies of low-temperature thermal expansion of Solids and Nanosystems:
 - low-temperature thermal expansion of silica aerogel;
 - features of thermal expansion and phase transformations of quasi-two-dimensional organic superconductors (α -(BEDT-TTF)₂ NH₄Hg(SCN)₄ and others);
 - radial thermal expansion of bundles of single-walled carbon nanotubes (pure and doped with gases);
 - quantum effects in thermal expansion of pure and gas-doped fullerite C₆₀;
 - thermal expansion of cryocrystals.
- Study of quantum and dimensional effects in the kinetics of gas sorption by mesoporous nanostructures (carbon nanotubes, MSM-41, graphene oxide, quartz aerogels).

- Study of low-temperature sorption by nanostructures of atomic and molecular impurities using temperature-programmed desorption (TPD) and temperature desorption spectroscopy (TDS).
- Study of the influence of the reduction temperature on the structure and sorption properties of graphene oxide materials.
- Computer modeling of physical processes in strong electric and magnetic fields.

Awards:

- State prize in the field of science and technology in 2011 for the series of works "Quantum effects and structural self-organization in new multifunctional nanomaterials".
- 2022 Award of the National Academy of Sciences of Ukraine "For Professional Achievements"

International research projects:

2005–2007 – STCU Project UZ-116 “Complex Studies of Magnetoresponse, Magnetic, Magneto-optic and Thermal Properties of Fullerite Doped with Gases”.

2008–2009 – STCU Project 4266 “Formation of one-, two-, three-dimensional carbon nanosystems and investigations of their low temperature dynamics”.

2007–2009 – STCU Project 4359 “Development of a new material based on pressure-oriented carbon nanotubes and investigation of its properties”.

2010–2012 – STCU Project 5212 “Development and investigation of new radiation-modified carbon nanotube materials for molecular nanoelectronics”.

2016 - "Investigations of the linear thermal expansion of silica aerogel", funding party "Active Aerogels", Lda, Coimbra, Portugal/Portugal) - Project manager.

2020 - Guarantor of the "Physics" educational program for PhD students specialty 104 "Physics and Astronomy"

Selected publications:

1. N. A. Vinnikov, A. V. Dolbin, R. M. Basnukaeva, L. M. Buravtseva, E. M. Grytsyuk, Quantum effects in the kinetics of thermal expansion of C₆₀ fullerite doped with ⁴He, *Low Temperature Physics*, **51**(3), 332–338 (2025) <https://doi.org/10.1063/10.0035836>
2. M.S. Barabashko, M. Drozd, A.V.Dolbin, R.M. Basnukaeva, N.A. Vinnikov, Kinetics of the thermal decomposition of thermally reduced graphene oxide treated with a pulsed high-frequency discharge in hydrogen atmosphere, *Low Temperature Physics*, **50**(5), 368–371 (2024) <https://doi.org/10.1063/10.0025619>
3. S.V. Cherednychenko, G.V. Andrievsky, N.A. Vinnikov, A.V. Dolbin, M.V. Kosevich, V.S. Shelkovsky, et al., Raman, UV-Vis, MS, and IR characterization of molecular-colloidal solution of hydrated fullerenes C₆₀ obtained using vacuum-sublimation cryogenic deposition method. Is the C₆₀ molecule truly highly hydrophobic?, *Low Temperature Physics*, **50**, 248 (2024) <https://doi.org/10.1063/10.0024965>
4. D. E. Hurova; S. V. Cherednichenko; N. A. Aksenova; N. A. Vinnikov; A. V. Dolbin; N. N. Galtsov, Structural studies of epoxy resin with impurities of carbon nanostructures, *Low Temp. Phys.* **50**, 167 (2024) <https://doi.org/10.1063/10.0024329>
5. H. V. Rusakova, L. S. Fomenko, S. V. Lubenets, V. D. Natsik, A. V. Dolbin, N. A. Vinnikov, R. M. Basnukaeva, S. V. Cherednichenko, A. V. Blyznyuk; Low-temperature micromechanical properties of polyolephin/graphene oxide nanocomposites with low weight percent filler. *Low Temp. Phys.*; **49** 1213–1218 (2023) <https://doi.org/10.1063/10.0021363>
6. M. S. Barabashko, R. M. Basnukaeva, A. V. Dolbin, M. Drozd, O. Bezkrivnyi, M. V. Tkachenko; Influence of MWCNTs additives on the thermal conductivity of HA–

- MWCNTs composite. *Low Temp. Phys.* **49** (6): 737–742 (2023). <https://doi.org/10.1063/10.0019431>
7. N. A. Vinnikov, A. V. Dolbin, R. M. Basnukaeva, V. G. Gavrilko, V. B. Eelson and L. M. Buravtseva, Quantum effects in the low-temperature thermal expansion of fullerite C₆₀ doped with a ⁴He impurity, *Low Temperature Physics* 48, 791 (2022); <https://doi.org/10.1063/10.0014>
 8. N. A. Vinnikov, S. V. Cherednichenko, A. V. Dolbin, V. B. Eelson, V. G. Gavrilko, R. M. Basnukaeva and A. M. Plokhotnichenko, The new approach for obtaining aqueous solutions of fullerene C₆₀@{H₂O}_n by the cryogenic sublimation method, *Low Temperature Physics* 48, 336 (2022); <https://doi.org/10.1063/10.0009739>
 9. A.V. Dolbin, V.I. Dubinko, N.A. Vinnikov, V.M. Boychuk, P.I. Kolkovsky, Low-temperature sorption of hydrogen by porous carbon material containing palladium nanoclusters, *Low Temperature Physics*, 46(10), p. 1030–1038 (2020) <https://doi.org/10.1063/10.0001921>.
 10. V.V. Sumarokov, A.V. Dolbin, A. Jezowski, D. Szewczyk, N.A. Vinnikov, M.I. Bagatskii, The low-temperature specific heat of thermal reduced graphene oxide. *Low Temperature Physics*, 46(3), 301-305 (2020) <https://doi.org/10.1063/10.0000703>.
 11. A.V. Dolbin, N.A. Vinnikov, V.B. Esel'son, S.V. Cherednychenko, L. Kępiński, The impact of treating graphene oxide with a pulsed high-frequency discharge on the low-temperature sorption of hydrogen, *Low Temperature Physics*, 46(3), 293-300, (2020) <https://doi.org/10.1063/10.0000701>.
 12. H.V. Rusakova, L.S. Fomenko, S.V. Lubenets, A.V. Dolbin, M.V. Khlistyuck, A.V. Blyznyuk, Synthesis and micromechanical properties of graphene oxide-based polymer nanocomposites, *Fizika Nizkikh Temperatur*, 46(3), p. 336–345 (2020), *Low Temperature Physics* 46 (3), 276-284 (2020), <https://doi.org/10.1063/10.0000699>.
 13. J. Chigvinadze, S. Ashimov, A. Dolbin, G. Mamniashvili, Unusual magnetic phenomena in dynamic torsion studies of fullerene Rb₃C₆₀, *Fizika Nizkikh Temperatur*, 46(2), стр. 241–253 (2020), *Low Temperature Physics*, 46(2), 195-206 (2020) <https://doi.org/10.1063/10.0000541>.
 14. M. S. Barabashko, M. Drozd, D. Szewczyk, A. Jeżowski, M. I. Bagatskii, V. V. Sumarokov, A. V. Dolbin, Calorimetric, NEXAFS and XPS studies of MWCNTs with low defectiveness, *Fullerenes Nanotubes and Carbon Nanostructures*, (2020) <https://doi.org/10.1080/1536383X.2020.1819251>.
 15. J.G. Chigvinadze, S.M. Ashimov, A.V. Dolbin, Torsion studies of magnetic relaxation effects in fullerite C₆₀ in magnetic field, *Low Temperature Physics* 45 (5), 531-536 (2019), <https://doi.org/10.1063/1.5097363>.
 16. A.V. Dolbin, N.A. Vinnikov, V.B. Esel'son, V.G. Gavrilko, R.M. Basnukaeva The effect of graphene oxide reduction temperature on the kinetics of low-temperature sorption of hydrogen, *Low Temperature Physics* 45 (4), 422-426 (2019), <https://doi.org/10.1063/1.5093523>.
 17. A.V. Dolbin, M.V. Khlistuck, V.B. Eelson, V.G. Gavrilko, N.A. Vinnikov, Thermal expansion of organic superconductor α-(BEDT-TTF)₂ NH₄Hg(SCN)₄, *Low Temperature Physics* 45 (1), 128-131 (2019), <https://doi.org/10.1063/1.5082324>.
 18. A.V. Dolbin, M.V. Khlistuck, V.B. Eelson, V.G. Gavrilko, N.A. Vinnikov, R.M. Basnukaeva, V.A. Konstantinov, Y. Nakazawa, Thermal expansion of organic superconductor κ-(D4-BEDT-TTF)₂Cu{N(CN)₂}Br. Isotopic effect *Low Temp. Phys.* **43**, 1387 (2017), <https://doi.org/10.1063/1.5012790>
 19. A.V. Dolbin, N.A. Vinnikov, V.B. Esel'son, V.G. Gavrilko, R.M. Basnukaeva, M.V. Khlistyuck, A.I. Prokhvatilov, V.V. Meleshko, O.L. Rezinkin, and M.M. Rezinkina, Effect of cold plasma treatment on the hydrogen sorption by carbon nanostructures *Low Temp. Phys.* 44, 810 (2018); <https://doi.org/10.1063/1.5049163>.

20. A. V. Dolbin, M. V. Khlistyuck, V. B. Esel'son, V. G. Gavrillo, N. A. Vinnikov, R. M. Basnukaeva, V. E. Martsenuk, N. V. Veselova, I. A. Kaliuzhnyi, and A. V. Storozhko, Sorption of hydrogen by silica aerogel at low-temperatures *Low Temp. Phys.* **44**, 144 (2018) <https://doi.org/10.1063/1.5020910>
21. A. I. Prokhvatilov, A. V. Dolbin, N. A. Vinnikov, R. M. Basnukaeva, V. B. Esel'son, V. G. Gavrillo, M. V. Khlistyuck, I. V. Legchenkova, Yu. E. Stetsenko, V. V. Meleshko, and V. Yu. Koda, Thermocatalytic pyrolysis of CO molecules. Structure and sorption characteristics of the carbon nanomaterial *Low Temp. Phys.* **44**, 334 (2018) <https://doi.org/10.1063/1.5030457>
22. A.V. Dolbin, M.V. Khlistyuck, V.B. Esel'son, V.G. Gavrillo, N.A. Vinnikov, R.M. Basnukaeva, I. Maluenda, W.K. Maser and A.M. Benito. The effect of the thermal reduction temperature on the structure and sorption capacity of reduced graphene oxide materials *Applied Surface Science* **361**, 213 (2016) <http://dx.doi.org/10.1063/1.4874880> .
23. V. Eremenko, V. Sirenko, A. Dolbin, S. Feodosyev, I. Gospodarev, E. Syrkin, I. Bondar, K. Minakova, "The Phonon Mediated Anomalies of Thermal Expansion in Transition-Metal Compounds and Emergent Nanostructures", *Solid State Phenomena*, 257, pp. 81-85, 2017 DOI: 10.4028/www.scientific.net/SSP.257.81.
24. A.V. Dolbin, M.V. Khlistuck, V.B. Esel'son, V.G. Gavrillo, N.A. Vinnikov, R.M. Basnukaeva, A.I. Prokhvatilov, I.V. Legchenkova, and V.V. Meleshko, W.K. Maser and A.M. Benito. The effect of the thermal reduction on the kinetics of low-temperature ⁴He sorption and the structural characteristics of graphene oxide, *Low Temperature Physics* **43**, 383 (2017) <http://doi.org/10.1063/1.4979362>
25. A.V. Dolbin, M.V. Khlistyuck, V.B. Esel'son, V.G. Gavrillo, N.A. Vinnikov, R.M. Basnukaeva, I. Maluenda, W.K. Maser, and A.M. Benito. The effect of the temperature of graphene oxide reduction on low-temperature sorption of ⁴He *Low Temp. Phys.* **42**, 57 (2016) <http://doi.org/10.1063/1.4979362>
26. A.V. Dolbin, M.V. Khlistyuck, V.B. Esel'son, V.G. Gavrillo, N.A. Vinnikov, R.M. Basnukaeva, V.V. Danchuk, V.A. Konstantinov, Y. Nakazawa. Peculiarities of thermal expansion of quasi-two-dimensional organic conductor k-(BEDT-TTF)2Cu[N(CN)2]Cl *Fiz. Nizk. Temp.* **42**, 1007 (2016) [*Low Temp. Phys.* **42**, 788 (2016)] <http://doi.org/10.1063/1.4962750>.
27. B. A. Danilchenko, I. I. Yaskovets, I. Y. Uvarova, A. V. Dolbin, V. B. Esel'son, R. M. Basnukaeva and N. A. Vinnikov. Tunneling effects in the kinetics of helium and hydrogen isotopes desorption from single-walled carbon nanotube bundles *Appl. Phys. Lett.* **104**, 173109 (2014) <http://doi.org/10.1063/1.4874880>
28. A.V. Dolbin, V.B. Esel'son, V.G. Gavrillo, V.G. Manzhelii, N.A. Vinnikov, R.M. Basnukaeva, V.V. Danchuk, and N.S. Mysko, E.V. Bulakh, W.K. Maser and A.M. Benito. Sorption of ⁴He, H₂, Ne, N₂, CH₄, and Kr impurities in graphene oxide at low temperatures. Quantum effects *Low Temp. Phys.* **39**, 1090 (2013) <http://dx.doi.org/10.1063/1.4868528> .
29. A.V. Dolbin, M.V. Khlistyuck, V.B. Esel'son, V.G. Gavrillo, N.A. Vinnikov, R.M. Basnukaeva, and V.V. Danchuk. The quantum effects in the kinetics of ⁴He sorption by mesoporous materials *Low Temp. Phys.* **42**, 80 (2016) <http://dx.doi.org/10.1063/1.4941598>
30. A.V. Dolbin, M.V. Khlistyuck, V. B. Eselson, V. G. Gavrillo, N. A. Vinnikov, R. M. Basnukaeva, F. Conceição And M. Ochoa. Thermal expansion of silica aerogel at low temperatures, *Journal of Applied Physical Science International*, Vol 8 Issue 1, 2017.