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ACADEMICIAN OF NAS OF UKRAINE ANATOLY GLIBOVYCH ZAGORODNY (on the occasion of his 75th birthday)

In January 2026, Anatoly Glibovych Zagorodny, a renowned scientist in the field of statistical physics and the theory of plasma phenomena, and President of the National Academy of Sciences of Ukraine (NASU), celebrates his 75th birthday. In his activities, he combines fundamental research with scientific and managerial work in leadership positions at the NASU.

Anatoly Glibovych was born on January 29, 1951, in the village of Velyka Bagachka (in the Poltava region), in the family of a doctor. He received his higher education at the Faculty of Radiophysics: first at the Kharkiv Institute of Radio Electronics, and later at Kharkiv State University. After graduating from the university in 1972, he began working at the Institute for Theoretical Physics (ITP) in Kyiv as a trainee researcher. Since then, his fate has been inextricably linked with the ITP and the NASU. At the ITP, he combined research and scientific, organizational, and managerial activities while holding the positions of scientific secretary, department head, and deputy director for scientific work. In 2003–2024, he headed the ITP, and since 2024, he has been its honorary director. Simultaneously with his work at the ITP, Anatoly Glibovych served as Deputy Academician-Secretary of the Department of Physics and Astronomy (in 1998–2009), Chief Scientific Secretary (in 2009–2011), and Vice President of the NASU (in 2011–2020). In 2020, he was elected President of the NASU. In October 2025, the scientific community of the Academy re-elected him to this high position for a second term.

The scientific career of Anatoly Zagorodny began during a period when research in the field of plasma physics aimed at controlled thermonuclear fusion for the development of new powerful energy sources was actively advancing. Since his internship and postgraduate studies, Anatoly Glibovych followed fundamental approaches in theoretical research, which are characteristic of the scientific schools of Mykola Mykolayovych Bogolyubov and Oleksii Grygorovych Sitenko. In his works, Anatoly Glibovych developed and successfully applied a consistent statistical approach to the description of complex plasma systems.

His first studies concerning the influence of the boundaries of plasma systems on the spectra and lev-

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els of fluctuations were carried out by A.G. Zagorodny under the supervision of I.P. Yakymenko. Confinement and nonequilibrium are characteristic features of most plasma systems, which affect their fluctuation properties. The results obtained by A.G. Zagorodny were important for the improvement of plasma diagnostic methods, in particular, those based on the analysis of electromagnetic radiation scattered by fluctuations. These works formed the basis of A.G. Zagorodny's Candidate of Sciences dissertation, which was defended in 1978.

The subsequent stage of his scientific activity was associated with the study of plasma-molecular systems; interest in them increased after the observation of a giant resonance in such media. A.G. Zagorodny's works, co-authored with I.P. Yakymenko and Yu.L. Klimontovich, comprise a significant contribution to the development of the theory of such media. Kinetic equations with a Balescu–Lenard-type collision integral were obtained for free and bound charged particles, and the influence of the system boundary on the spatial distributions of electrons, ions, and molecules was analyzed. An important component of this cycle of works was the extension of the bremsstrahlung theory, taking into account the mutual scattering of plasma particles and molecules, ionization and recombination processes, and scattering on collective fluctuations. As a result, a number of new effects in plasma with a molecular component were predicted. The set of corresponding works, among which the monograph "Statistical Theory of Plasma-Molecular Systems" occupies a special place, became a basis for A.G. Zagorodny's Doctor of Sciences dissertation, which he defended in 1990. In 1997, A.G. Zagorodny was elected a Corresponding Member of the NASU; in 1998, he received the academic title of Professor; and in 2006, he became an Academician of the NASU.

For decades, Anatoly Glibovych taught special courses on plasma physics at the National University of Kyiv-Mohyla Academy and the Taras Shevchenko National University of Kyiv; he is the author or co-author of monographs and textbooks. A.G. Zagorodny pays substantial attention to the development of the Kyiv Academic University as an educational and research institution.

The Institute for Theoretical Physics was founded in 1966 as a center of fundamental research with extensive international links. The international conferences on plasma theory held in 1971 and 1974 made an important contribution to the formation of the scientific environment at the Institute. Anatoly Zagorodny deeply involved in this activity, and his first international contacts significantly affected the formation of topics for his further studies.

In the 1990s, his scientific attention was attracted by experimental measurements performed in one of the French laboratories. The scattering spectra of electromagnetic waves at fluctuations in plasma differed substantially from Gaussian distributions and did not agree with the classical theory of fluctuations. Together with O.G. Sitenko, A.G. Zagorodny developed the theory of turbulent plasma with fluid-like drift-diffusion motions, which explained the unusual scattering spectra. A further development of these ideas led to the studies of anomalous transport processes in plasma, which cannot be described in the framework of Markovian models.

The nonequilibrium character of plasma, which is inherent under both laboratory and space conditions, stimulates the excitation of intense eigenwaves and the emergence of transport mechanisms that dominate over classical diffusion caused by pair collisions. A.G. Zagorodny formulated kinetic equations for systems with non-Markovian relaxation processes and obtained their solutions, which explain the origin of super- and subdiffusive regimes in plasma.

An important direction of A.G. Zagorodny's scientific activity was the study of plasma containing fine particles, the so-called dusty plasma. These particles are much more massive than ions or molecules, and their behavior is governed by microfields in the plasma medium. Anatoly Glibovych formulated microscopic equations for plasma with dust impurities, derived a chain of Bogolyubov equations for them, and found effective interaction potentials between the dust particles. After the first observations of periodic structures formed by dust particles in a plasma medium, dusty plasma was considered to be an exotic system, so A.G. Zagorodny's report at an international conference in 1996 was greeted with some skepticism. However, over time, a separate research direction has emerged, which was aimed at improving plasma technologies and reducing the harmful effects of impurities in controlled fusion devices. The results obtained by A.G. Zagorodny are of fundamental importance for modern plasma diagnostic methods as well.

In recent years, A.G. Zagorodny has paid considerable attention to the search for relations between the energy parameters of fluctuation fields in media with temporal and spatial dispersion beyond the transparency spectral interval; this is a classical problem for which there was no rigorous solution for a long time. During this period, he continued his active scientific work and, in co-authorship with his colleagues, published a number of monographs on theoretical physics, in particular, "Modeling of processes in gas-discharge dusty plasma", "Application of field theory methods in statistical physics of nonequilibrium systems", and "The reduced description method in the kinetic theory of complex systems", as well as works devoted to the statistical description of nonequilibrium many-particle systems, power-law distribution functions, thermodynamic relations for systems with inhomogeneous particle distribution, dynamics of charged particles in electromagnetic fields, new resonances in the wave–particle interactions, large-scale fluctuations in dusty plasma, and nonstationary equations for the single-particle wave function of the Bose–Einstein condensate. A considerable part of Anatoly Glibovych's scientific contribution remains beyond the scope of this brief review.

In 2005, A.G. Zagorodny was awarded the State Prize of Ukraine in Science and Technology, and in 2012, he was awarded the title of Honored Figure of Science and Technology of Ukraine. He is a laureate of the NASU awards named after K.D. Synelnykov, M.M. Bogolyubov, and O.S. Davydov, an Honorary Doctor of a number of scientific institutions in Ukraine and abroad, the chairman of many coordination councils, the head of targeted programs, a foreign member of several academies of sciences and institutions in various countries, a member of the organizing committees of many international conferences, and the Editor-in-Chief of the Ukrainian Journal of Physics and the Bulletin of the National Academy of Sciences of Ukraine.

Anatoly Glibovych Zagorodny was elected President of the NASU in October 2020. It was an exceptionally hard period in the state's history. The COVID-19 pandemic required the Academy's institutions to function under quarantine restrictions, but without losing the pace of research. With A.G. Zagorodny's participation, the continuous work of scientific councils and coordination bodies was provided, and a basis for further development of the open science infrastructure and remote scientific interaction was laid. At the same time, A.G. Zagorodny formulated a strategic vision of the Academy's development aimed at increasing the relevance of research, supporting interdisciplinary areas, updating management mechanisms, and democratizing the internal life of the NASU.

The full-scale military aggression of Russia against Ukraine in 2022 made the organization of scientific research even more complicated. Under the leadership of Anatoly Glibovych, the NASU has maintained its integrity, ensured the operation of institutions under emergency conditions, and organized the relocation of scientific units and their employees from the zones of active hostilities. Applied scientific studies were focused on the needs of the defense-industrial complex, national security, and the development of the strategic sectors of the economy. A.G. Zagorodny made significant efforts to complete the Targeted Scientific and Technical Program of Defense Research of the NASU for 2020–2024, implement its developments, and substantially increase the funding for 2025–2029.

Support for scientific youth, the future of the Academy, remained an important area of Anatoly Glibovych's activity during this period. With his assistance, competitive programs for young scientists were expanded, grants for youth laboratories were established, and a postdoctoral research program and a scholarship named after Academician of the NASU B.E. Paton were launched.

An important component of the new approach is the implementation of the Akadem.City project, which is aimed at uniting the scientific schools in the Academy. With Anatoly Glibovych's assistance, coordinating scientific councils on quantum materials and quantum technologies, as well as artificial intelligence, were created at the NASU.

One of A.G. Zagorodny's major contributions has been his efforts to uphold and strengthen Ukraine's international scientific reputation during the full-scale war. A well-known scientist and the head of the Academy, he represents Ukrainian science on the international arena in order to integrate it into the world scientific space. With his support, the participation of NASU institutions in the EU framework programs Horizon Europe and Euratom, in major international collaborations at CERN, and in other projects involving European research infrastructures was intensified. A crucial aspect of this work was

ensuring international support for Ukrainian science during the war – through grants, humanitarian and technical assistance, and access to modern equipment and research platforms.

The life path of Anatoly Glibovych Zagorodny is an example of a combination of high scientific culture, intellectual exactingness, and responsibility toward the institution and people. His activity as a scientist and the head of the Academy testifies to his full dedication to science, the development of scientific schools, and the formation of a new generation of researchers.

In recognition of his scientific and organizational contributions, A.G. Zagorodny received the Orders of Merit, Class III (2008), Class II (2016), and Class I (2021), the Honorary Certificate of the Verkhovna Rada of Ukraine (2004), and awards of the National Academy of Sciences of Ukraine.

Friends and colleagues sincerely congratulate Anatoly Glibovych on his anniversary, wish him the realization of his plans, support from the scientific community, new creative achievements, and good health!

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The Editorial Board and the Editorial Staff of the Ukrainian Journal of Physics join in congratulating Anatoly Glibovych, the Editor-in-Chief of our journal, and wish him good health and great success in all his endeavors!