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**ACADEMICIAN OF THE NATIONAL  
ACADEMY OF SCIENCES OF UKRAINE  
VADYM MYKHAILOVYCH LOKTEV  
(to his 80th birthday)**

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On May 3, 2025, the outstanding Ukrainian theoretical physicist, Academician of the National Academy of Sciences of Ukraine (NASU), Professor Vadym Mykhailovych Loktev, turned 80. This is a good opportunity to recall, at least briefly, his life path and main achievements.

Vadym Mykhailovych received his professional education in Kyiv, where, in 1968, he graduated from the Physics Faculty of the T.G. Shevchenko State University of Kyiv (now Taras Shevchenko National University of Kyiv). Vadym Mykhailovych's life after graduating the University is tightly connected with the M.M. Bogolyubov Institute for Theoretical Physics

(ITP) of the NASU. In 1971, in the second year of his post-graduate studies at the M.M. Bogolyubov Institute for Theoretical Physics (ITP) of the NASU, he defended his Ph.D. thesis under the supervision of Oleksandr Serhiyovych Davydov and Elmar Grygorovych Petrov, and in 1983 his doctoral dissertation. In 1997, V.M. Loktev received the title of professor. The same year, he was elected a corresponding member and, in 2003, an academician of the NASU.

Besides obtaining substantial scientific results, Vadym Mykhailovych also has demonstrated significant organizational skills. In 1987–1993, he headed the laboratory of electronic processes in ordered systems at the ITP and, in 1993–2016, the department of nonlinear physics of condensed matter. For almost 15 years, he taught physics to students at the physics and radiophysics faculties of the Taras Shevchenko National University, and for several years, since 1998, he was the part-time head of the department of general and theoretical physics at the Igor Sikorsky Kyiv Polytechnic Institute. Since 2004 till now, Vadym Mykhailovych holds the position of Academician-Secretary of the Department of Physics and Astronomy of the NASU.

V.M. Loktev is the author of over 300 scientific papers in leading international journals, several monographs, and textbooks. Under his leadership, more than 20 Ph.D. and doctoral theses were defended.

Vadym Mykhailovych's scientific interests cover a wide range of issues in theoretical physics, including the theory of cryocrystals, magnetic phenomena, disordered systems, superconductivity, and superfluidity. He made several predictions, a significant part of which were confirmed experimentally. In particular, he predicted the magnetic structure of one of the low-

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temperature phases of solid oxygen; together with Yu.B. Gaididei and E.G. Petrov, he predicted the phenomenon of biexciton splitting of spectral lines in the range of two-particle light absorption by antiferromagnetic crystals and, with Yu.B. Gaididei, also the polarization of these lines; together with V.S. Ostrovsky, he predicted a new field-linear magneto-optical effect. Among other important results, it is worth mentioning the theory of anomalous enhancement of infrared absorption in disordered antiferromagnets (together with M.O. Ivanov and Yu.G. Pogorelov), the non-phonon mechanism of charge carrier pairing in high-temperature superconductors as an alternative to the Bardeen–Cooper–Schrieffer phonon mechanism (together with Yu.B. Gaididei), the generalization of the Bardeen–Cooper–Schrieffer theory to metals with an arbitrary charge carrier density (together with V.P. Gusynin and S.G. Sharapov), the study of the step motion at helical dislocations, and the explanation of the threshold excitation of acoustoluminescence (together with Yu.M. Khalak).

V.M. Loktev constructed a quantum theory of linear and nonlinear magnetic properties of magnets with a strong contribution of spin-orbit interaction, which supplemented the Landau–Lifshitz theory. Together with V.G. Bar'yakhtar and S.M. Ryabchenko, he developed the theory of magnetoelastic excitations of a new type, magnetoflexion waves. Together with A.A. Eremko, he showed the presence of spintronic properties in nonmagnetic systems with helical symmetry. Together with E.A. Pashitsky, he proposed a pairing mechanism in superconducting fullerenes based on the Jahn–Teller effect. Together with A.I. Bugrij, he found conditions for the occurrence of spatially inhomogeneous high-temperature Bose condensation of magnons and also constructed its theory. Together with O.V. Gomonai, he developed the theory of domain formation in antiferromagnets. Together with L.S. Brizhik and A.A. Eremko, he found a new spin invariant that complements the Dirac and Johnson–Lippmann invariants, and constructed a general solution of the Dirac equation with the Coulomb potential. He obtained a number of significant results while studying the spectrum of graphene ribbons with “zigzag” and “armchair” edges. In particular, together with Yu.V. Skrypnyk, criteria for the appearance of Dirac modes in the spectrum of elementary excitations were found, the dependences of their properties on the concentration, type, and loca-

tion of impurity centers in the ribbons were studied, and, using the Ioffe–Regel criterion, the damping of these modes was estimated, and the mobility thresholds in the presence of impurity centers of various nature were calculated.

Among Vadym Mykhailovych's recent scientific achievements, it is worth mentioning the theory of inhomogeneous non-equilibrium superconductivity in two-dimensional systems and the theory of nematic superconductivity in one-dimensional systems with massless fermions, which were developed by him and V.V. Turkovsky, the theory of orbital susceptibility of T-graphene, which he developed together with D.O. Orekhov and V.P. Gusynin, and the theory of electronic spectra, topological states, and impurity effects in graphene nanoribbons, which was developed together with Yu.G. Pogorelov and V.V. Turkovsky.

We cannot help also mentioning Vadym Mykhailovych's journalistic activity aimed at popularizing the achievements of the NASU among the Ukrainian society and strengthening the role of NASU in the enhancement of Ukraine's defense capabilities under the conditions of full-scale Russian aggression against Ukraine. V.M. Loktev is the editor-in-chief of the Great Ukrainian Encyclopedia, a member of the editorial boards of several journals, and a member of a number of scientific councils of the NASU institutions.

For his significant scientific achievements, V.M. Loktev was awarded the Orders of Prince Yaroslav the Wise of the V, IV, and III degrees; the Certificate of Honor of the Verkhovna Rada of Ukraine; the Honorary Title of Honored Worker of Science and Technology of Ukraine; and the V.I. Vernadsky Gold Medal of the NASU. He is a laureate of two State Prizes of Ukraine, the K.D. Synelnikov and M.M. Bogolyubov Prizes of the NASU, and the Davydov Prize of the ITP. In 2001, he was elected a full member of the European Academy (Paris).

Today Vadym Mykhailovych Loktev continues to work actively, being full of new creative plans.

The scientific community, colleagues, students, and friends sincerely congratulate Vadym Mykhailovych on his anniversary and wish him good health and new creative successes.

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