Lev Petrovich Pitaevskii (in celebration of his sixtieth birthday)

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Lev Petrovich Pitaevskiĭ, an outstanding theoretical physicist and Academician of the Russian Academy of Sciences, celebrated his sixtieth birthday on January 18, 1993.

Lev Petrovich Pitaevskiĭ is one of the talented representatives of L. D. Landau's world-renowned school. Since 1960 his research work has been associated with the P. L. Kapitsa Institute of Physics Problems. From 1988 to 1992 he directed the Theoretical Division, founded by L. D. Landau, of the Institute of Physics Problems of the Russian Academy of Sciences. In 1976 he was elected Corresponding Member and in 1990 he became a Full Member of the Russian Academy of Sciences.

Lev Petrovich Pitaevskiĭ has made fundamental contributions to almost every area of modern theoretical physics. His research in the theory of superfluidity is classic. In



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1959 he derived, together with V. L. Ginzburg, equations which describe the behavior of superfluid He⁴ near the λ -point, using the complex order parameter as the dynamical variable. In that same year he showed that at sufficiently low temperatures He³ must become superfluid as a result of pairing with nonzero angular momentum. This work initiated a new research direction in low-temperature physics.

In 1961 Lev Petrovich derived the well known Gross-Pitaevskiĭ equation for the wave function of a nonideal Bose gas and he investigated the structure of vortex filaments in a weakly nonideal Bose gas. At approximately the same time he also performed a classic series of works on the quasiparticle spectrum near the decomposition thresholds.

In the 1970s Lev Petrovich published a series of very profound and interesting works on multiphonon processes, the physics of crystals, and the general theory of relativity. In the 1980s he once again returned to the Bose-liquid theory, calculating the strict lower limit for the condensate density and proving that condensation does not occur in one-dimensional Bose systems.

Lev Petrovich constructed together with I. E. Dzyaloshinskiĭ and E. M. Lifshitz the theory of van der Waals forces (1959–1971). Together with the construction of the general concept of molecular interaction forces between condensed bodies, in this theory it is possible to derive many interesting specific results that can be directly checked experimentally. During this same period Lev Petrovich proved the important theorem that dispersion does not change the form of the stress tensor of the electromagnetic field in a transparent medium, and he predicted a new effect, known as the inverse Faraday effect.

Another important research direction, arising as a result of the pioneering work of Lev Petrovich, performed together with A. V. Gurevich, is ionospheric aerodynamics. Their first works in this field were devoted to the problem of flow of rarefield ionospheric plasma around bodies (in particular, satellites orbiting the earth). Next, new exact and approximate solutions were obtained for the nonlinear, nonstationary, collisionless kinetic equation describing rarefaction and shock waves. Finally, a theory taking into account dissipation effects was constructed in the 1980s. An effective method, developed by Lev Petrovich together with A. V. Gurevich, for constructing multisoliton solutions, which is proposed by Witham for averaging equations, is very important in such studies. This method was employed to obtain solutions describing a collisionless shock wave and to investigate the structure of edge solitons. These works of Lev Petrovich were later substantially elaborated in a series of papers of a mathematical character.

Among Lev Petrovich's work in plasma physics we must mention his analysis of the collision integral in a magnetic field and his study of nonlinear effects at plasma resonance. The well-known solution of the problem of ion recombination deserves special mention.

Lev Petrovich Pitaevskiĭ and A. V. Gurevich were awarded in 1980 the L. D. Landau Prize of the Russian Academy of Sciences for outstanding research in plasma physics.

Lev Petrovich's work together with E. M. Lifshitz on the completion of the famous Landau and Lifshitz course in theoretical physics is a very important contribution to the development of theoretical physics. They wrote three new volumes: "Quantum Electrodynamics" (together with V. B. Berestetskii), "Statistical Physics, part II" and "Physical Kinetics." Lev Petrovich continues to work on the theoretical physics course.

Even a cursory list of results obtained by Lev Petrovich in different fields of theoretical physics shows his fundamental contribution to the development of this science. Lev Petrovich's works appeared in textbooks a long time ago. His talent as a researcher and teacher (he has taught at the Moscow Physicotechnical Institute since 1962) is well known to a wide circle of physicists throughout the world. But, to Lev Petrovich's friends and colleagues, it is more important that he is always accessible and friendly and is able to understand his opponent, so that discussions of any problems with Lev Petrovich are always pleasant and instructive.

We wish Lev Petrovich health and the greatest creative achievements.

Translated by M. E. Alferieff