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ALEKSANDR SERGEEVICH DAVIDOV

(On His Sixtieth Birthday)

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PROFESSOR Aleksandr Sergeevich Davydov, the noted Soviet theoretical physicist, a distinguished specialist in the fields of nuclear and solid-state physics, winner of the Lenin Prize and the Ukrainian SSR State Prize, Academician of the Ukrainian Academy of Sciences, and Doctor of Physicomathematical Sciences observes his sixtieth birthday on December 26, 1972. Davydov has devoted almost 30 years of his life to scientific and teaching activity. He is the author of superlative works on various problems in theoretical physics, among which his papers on the theory of molecular excitons and the theory of collective excitations of nonspherical nuclei must be acknowledged as the most significant. His textbook "Quantum Mechanics" is now recognized in many of the world's universities as the best among those available on this discipline for physics students.

Davydov was born into the family of a worker at Evpatoriya in the Crimea. In 1930, after completing his second-degree intermediate schooling, he moved to Moscow and worked as a grinding-machine operator at an auto plant and later studied in the Workers' Faculty. In 1933, Davydov was admitted to the University of Moscow Physics Faculty. Five years later, having received his university diploma, he began graduate studies under the prominent Soviet theoretical physicist I. E. Tamm, of whose school he was subsequently to be recognized, and rightfully, as one of the brightest representatives.

The Second World War interrupted Davydov's scientific career after an auspicious beginning. He did not defend his candidate's thesis on the theory of beta decay and internal conversion until 1943, several years after it had been completed, and only later, when scientific communications with America had been restored, did he realize that the relativistic equations that he had derived in the thesis for particles with spin 3/2 had also been obtained in a paper of Schwinger.

In 1945, Davydov went to work in the Ukrainian Academy of Sciences Physics Institute at Kiev, where he was the first to formulate the basic premises of molecular-exciton theory and, in particular, to predict the splitting of nondegenerate molecular terms in crystals containing several molecules in the unit cell. In time, this effect came to be known as "Davydov splitting." During his years at the Ukrainian Academy of Sciences Physics Institute, Davydov constructed a theory of the absorption and luminescence spectra and the scattering and dispersion of light in molecular crystals that provided the stimulus for many theoretical and experimental studies, both in the USSR and abroad. The Davydov theory guides experimenters in their research and serves as a basis for interpretation of numerous studies in the spectroscopy of molecular crystals and complex molecules. It is widely used in research on the energy structure of solids, in quantum chemistry, and in biophysics in connection with the study of energy migration. Davydov was awarded the Lenin Prize in 1966 for his work on molecular excitons.

From 1958 to 1964, Davydov occupied the Chair of Quantum Mechanics at Moscow University. During this period, he turned his attention to the structure of atomic nuclei and, with his colleagues, developed a phenomenological theory of collective excitations, which received currency in the world literature as the theory of nonaxial nuclei. He proposed a model of the rigid nonaxial rotator that made it possible to understand the nature of the levels of anomalous rotational bands in a new light and to calculate the intensity ratios of electromagnetic transitions between states of different bands. He then developed a method (not involving perturbation theory) of allowing for the relation between the rotation of the nucleus and the oscillations of its surface and developed the notion of deformability of the nucleus on transition to an excited state. Later, Davydov constructed a theory of electromagnetic transitions in atomic nuclei with consideration of the

longitudinal and transverse deformabilities of their surfaces.

Returning to Kiev in 1964, Davydov headed up the Theoretical Section of the Physics Institute and the Section on the Theory of Multiparticle Systems of the Ukrainian Academy of Sciences Institute of Theoretical Physics. He continued his work on the theories of the nucleus and the solid state. His monograph "Excited States of Atomic Nuclei" appeared in 1966, and the "Theory of Molecular Excitons" in 1968. In 1969, Davydov was awarded the Ukrainian State Prize for his work on nuclear theory.

His attention has recently shifted to quantum biophysics, where he has proposed an interesting model of muscle contraction.

Davydov has given a great deal of time and energy to teaching activity. His brilliant lectures at the Kiev University, like the earlier ones at the University at Moscow, invariably attract large audiences, which are composed not only of the students and graduates to whom they are directly addressed, but also experienced university instructors, probationers, and staff members of the scientific research institutes. His profound insight into the essentials of his subject enable him to preserve simplicity and lucidity of exposition even in lectures on the most difficult subdivisions of modern theoretical physics. Striking simplicity and clarity of style also typify his monographs on "The Theory of the Atomic Nucleus" and "Quantum Mechanics," which have been translated and published in the USA, Great Britain, France, Italy, Japan, Poland, Yugoslavia, and other countries.

His sixtieth birthday finds A. S. Davydov still with all his strength and energy and creative plans for the future. His yeoman service to science, his warmth and benevolence in his relations to others, and his uncompromising firmness in the solution of fundamental problems have earned him the high esteem of physicists. And it is on their behalf and on that of his many students and colleagues that we should like to wish Aleksandr Sergeevich good health, good luck, and continued success in his scientific activity.

Translated by R. W. Bowers