Anatoliĭ Evgen'evich Levashev (Obituary)

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Anatoliĭ Evgen'evich Levashev, a worker in the field of higher education of very long standing, who devoted sixty years of his life to scientific pedagogical work, Doctor of Physicomathematical Sciences, and Professor in the Department of Theoretical Physics at the Lenin Belorussian State University, died on December 27, 1979, at the age of 81. Belorussian theoretical physics has suffered a great loss.

ANATOLIĬ EVGEN'EVICH LEVASHEV (1898-1979)

A. E. Levashev was born on July 27, 1898, in the town of Dzharkent in the Semirechensk Oblast' in the family of a military serviceman. In 1925, he graduated from the Physicomathematical department of the Central Asian State University. After a three-year appointment at the Physicotechnical Institute in Leningrad, where he worked under the direction of Ya. I. Frenkel', A. E. Levashev began to lecture in theoretical physics courses in the Department of Physics and Mathematics at the Central Asian State University.

Anatoliĭ Evgen'evich worked in many institutions of higher learning in this country (Leningrad State University, Central Asian State University, Kazan' State University, and from 1962 in the Belorussian State University), and for more than forty years he directed the Departments of General Physics and Theoretical Physics, including twelve years at the Belorussian State University. A talented teacher, he taught all courses in general and theoretical physics, as well as many specialized courses.

A. E. Levashev's scientific work began during the complicated period development of relativistic physics and quantum mechanics. His first work, completed under the direction of Ya. I. Frenkel', was the calculation of the association constants of a gas taking into account the dipole and quadrupole moments of molecules. The next subject, proposed by Frenkel' in 1926, generalization of Schrödinger's optical-mechanical analogy to a rotating electron, aroused an interest in A. E. Levashev in the fundamental problems in physics. He is indebted to V. K. Frederiks and V. R. Bursian, professors at the Leningrad University, for arousing in him a deep interest in the theory of relativity and its tensor techniques, questions that determined his primary scientific specialization. A. E. Levashev gave a systematic construction of coordinateless (direct) vector calculation, in which lamellar vectors are dealt with on the same basis as polar vectors (arrows, pairs of points), both axiomatically and graphically. On the basis of the principle of duality of projective geometry he reconstructed tensor analysis as a whole. As a result, it became possible, when desirable, to replace relations between tensors, as sets of components (numbers), by coordinateless relations between tensors, as direct representations of physical quantities. Their axiomatic definition and specification with the help of graphical constructions broaden the possibilities of physical interpretation. A simple, but clear illustration of the application of coordinateless constructions was given by A. E. Levashev in the field of dynamic meteorology in his Candidate's Dissertation on the subject "Application of Coordinateless Tensor Methods for Calculating Thermal Advection (1944). In this dissertation, he proposed a gauge for rapid determination of the gradient wind from baric topography maps and for calculation of thermal advection, operations with which are governed by a suitably extended Bjerknes algebra.

In the monograph entitled *Elementary Particles* (1950), A. E. Levashev, geometrizing the properties of elementary particles (charges of different types, helicity, and others) and viewing them as discrete collections of direct dissymmetrical representations, proposed an algebra of particles and analyzed the famous experiments of Wu on the basis of the composition of dissymmetries by P. Curie. A deeper exposition of these problems, as well as a variation of the tetradic formulation of the general theory of relativity was the subject of A. E. Levashev's doctoral disseration (1960). Including in it the principle of duality, he proposed a method for calculating physical effects in the general theory of relativity as displacements associated with a cycle in the sense of E. Cartan. Many of the problems enumerated, including also Cartan's cycles, were unified by A. E.

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Levashev in his small, but very concentrated work entitled "Lobachevskiĭ's geometry and development of his ideas in the theory of relativity," dedicated to the 150-th anniversary of Lobachevskii's geometry.

Together with his student V. I. Vorontsov, A. E. Levashev put microscopic UHF electrodynamics into a consistently Lorentz-covariant form, which unified relativity with the relations of duality, so characteristic for UHF electrodynamics with its Larmor-Pistol'kors principle and the magnetic charge. At the same time, a generalization of the Tamm and Mandel'shtam relations was obtained, containing the metric tensor, depending on the dielectric and magnetic permeabilities. Analysis of the effect of relativistic motion on the symmetry of electromagnetic phenomena using the symbolism of A. V. Shubnikov and Curie's principle of dissymmetry, as well as the coordinateless construction of tensor calculations, was the subject of a monograph by A. E. Levashev entitled Motion and Duality in Relativistic Electrodynamics (1979).

A. E. Levashev deserves credit in creating the Belorussian school of gravitational physicists, which now constitutes one of the important groups of specialists in this field of theoretical physics in our country. Anatolii Evgen'evich was a permanent member of the section on gravitation at the MVSSO SSSR from the day that it was founded.

Setting an example of hard work and dedication to science, A. E. Levashev educated many students, and he generously shared his wealth of scientific and pedagogical experience with young people. Exceptional modesty and honesty were an integral part of his character.

The bright image of Anatoliĭ Evgen'evich Levashev will always remain in the memories of those who associated and worked with him.

Translated by M. E. Alferieff