

PERSONALIA

Nikolai Aleksandrovich Borisevich (On his Fiftieth Birthday)

V. V. Gruzinskii, B. I. Stepanov, V. A. Tolkachev, and F. I. Fedorov
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September 21, 1973 is the 50th birthday of Prof. Nikolai Aleksandrovich Borisevich, a prominent Soviet scientist, President of the Belorussian Academy of Sciences, Corresponding Member of the USSR Academy of Sciences, Academician of the Belorussian Academy of Sciences, and a Doctor of Physicomathematical Sciences.

Borisevich is widely known for his fundamental works on luminescence, spectroscopy, infrared techniques, and quantum electronics.

Borisevich was born to a peasant family in the village of Luchnoi Most in the Berezino province of Minsk Oblast'. His road to science was a difficult one. In his youth, he became a state ward, took part in the Komsomol secret revolutionary movement, fought with partisan detachments, and later in the ranks of the Soviet Army. For his gallantry in action, Borisevich was awarded a First Degree Order of the Patriotic War, two Orders of the Red Star, and many medals.

The war came to an end, and the ex-soldier finally realized his dream of studying physics: in December of 1945 he walked into the auditorium of the V. I. Lenin Belorussian State University. Less than 20 years after graduating from the university's physicomathematical department, Borisevich became President of the Belorussian Academy of Sciences (1969).

In 1951, the University had sent Borisevich as a graduate student to the S. I. Vavilov State Optical Institute. His scientific career begun in Academician Terenin's laboratory under the guidance of Prof. B. S. Neporent. He completed his thesis within a short time. In it he reported results on the vapor luminescence of complex molecules that were of fundamental importance and have been incorporated into scientific monographs. The young scientist had discovered a new phenomenon: the quenching of vapor fluorescence by foreign gases, which made it possible to obtain important information on the mechanism of energy transfer between the molecules and added to our conceptions of the properties of the excited states of complex molecules.

Borisevich returned to Minsk in 1954 and became one of the organizers of the Institute of Physics of the Belorussian Academy of Sciences. As deputy director of the Institute (1955-1969) and director of the Infrared Physics Laboratory that he had organized, he did a great deal of work on the organization of physical research, the screening and training of scientific cadre, formalization of subject matter, and the assembly of a staff for an attack on major scientific problems.

Borisevich is a scientist with a broad range of scientific interests. His activity as a scientist has been characterized by skilful selection of the most funda-



mental problems, original and profound approaches to their solution, and close reconciliation of fundamental research with the requirements of practice.

Borisevich's work in the field of molecular spectroscopy and luminescence laid the foundations for the development of a number of new trends in these areas. He devoted most of his attention to the physical properties of molecules in the gaseous phase, to study of their individual properties and the specific effects of their environment. He constructed a statistical theory of photophysical processes in molecules and developed subtle experimental methods for their investigation that made possible a review of the energetics and dynamics of intra- and intermolecular interactions. Borisevich introduced molecular spectroscopy to such fundamentally new concepts as selective energy, effective excitation energy, and others that give the most complete characterization of the energy state of an aggregate of molecules. He worked out optical methods for the determina-

tion of molecular temperatures and vibrational heat capacity, the frequency of electron transitions, inversion frequencies and other important molecular constants. His studies made a decisive contribution to clarification of the anti-Stokes-luminescence problem, which had been a matter of dispute for many years.

Borisevich completed a major cycle of studies whose intent was to clarify the role of triplet states in the transformation of absorbed luminous energy by molecules in the gaseous phase. Delayed thermally activated luminescence was discovered, as was a new kind of cooperative luminescence in vapor—sensitized anti-Stokes annihilation luminescence; study of these effects made it possible to establish a relation between the structure and configuration of the molecular energy levels and the deactivation probabilities of the excited states.

Borisevich's monograph "Excited States of Complex Molecules in the Gaseous Phase" (1967) was the culmination of his systematic research on the luminescence and spectroscopy of free molecules.

The research done by Borisevich on scattering of radiation by multicomponent systems is also of considerable scientific and practical importance. A new class of optical filters for a broad region of the spectrum in the infrared was created on the basis of these studies. The filters have unique properties and are widely used in various fields of science and engineering. In 1972, he published the monograph "Infrared Filters" (in collaboration with V. G. Vereshchagin and M. A. Validov).

Borisevich has done much to develop methods of spectral and luminescence analysis and put them into extensive use in the Belorussian economy.

Borisevich's extensive investigations in spectroscopy and luminescence bear a close relation to his research in the field of quantum electronics. In 1965, he based a theoretical analysis of the basic factors determining the lasing properties of complex molecules on conceptions of intra- and intermolecular excitation-energy conversion. Later research established the role of selective amplification spectra and induced losses in lasing ability, the lasing kinetics of the molecules, and the frequency stability of the radiation generated. He established a number of criteria for the selection of organic compounds that might be promising for use in lasers and prepared active media with various parameters that generate radiation efficiently in a broad range of the spectrum and have already been put to practical use.

A major cycle of original research on nonlinear and characteristics of gas lasers was carried out under Borisevich's direct supervision. New methods were devised for use of these lasers in untrahigh-resolution

spectroscopy. He developed gas lasers with nonlinear selective losses within the control loop and single-frequency helium-neon lasers with substantial output powers.

Borisevich has created a major school of scientists in Belorussia. He taught for many years at the Belorussian State University. A large contingent of his students is profitably employed in his laboratory. He is always surrounded by young scientists. At seminars, in the institution of research projects and the discussion of their results, and in his private conversations he gives generously of his wealth of scientific and personal experience. He is himself an exemplary communist scientist, an indefatigable toiler.

Borisevich has the ability to combine creative scientific and teaching activity with a heavy burden of scientific-administrative and social responsibilities. He carries an enormous and varied workload as President of the Belorussian Academy of Sciences. His many-faceted erudition and grasp of fundamentals have made Borisevich a high authority. His talents as an organizer have had a strong influence on the development of science and engineering in the Republic.

Borisevich is a deputy of the USSR Supreme Soviet and a member of the Central Committee of the Belorussian Communist Party. He is Chairman of the State Prize Committee of the Belorussian SSR in the field of science and engineering, a member of the USSR Committee on Lenin and State Prizes, a member of the Scientific Council of the USSR Academy of Sciences on the problem "luminescence" and of the Board of the Commission on Spectroscopy of the USSR Academy of Sciences, Editor-in-Chief of the "Doklady Akademii Nauk BSSR," and a member of the editorial panels of the All-Union "Zhurnal Prikladnoĭ Spektroskopii" and the international journal "Spectroscopy Letters." He has taken part in the work of nine General Conferences of the International Atomic Energy Agency as deputy chief or head of the BSSR's delegation. For meritorious service in the development of science and the implementation of its achievements in the national economy, Borisevich has been awarded high government honors: the Orders of Lenin and the Red Banner of Labor. The Polish Academy of Sciences has awarded him its Nicholas Copernicus Medal.

This birthday finds Borisevich with his great gifts in full flower, full of vigor, energy, and creative plans. His friends, colleagues, and students heartily congratulate him on his 50th birthday and wish him good health, great happiness, and new creative achievements.

Translated by R. W. Bowers