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In memory of Vladimir Vasil'evich Migulin

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Vladimir Vasil'evich Migulin, full member of the Academy of Sciences, world authority in radiophysics, teacher, professor in the Physics Department at M V Lomonosov Moscow State University, and one of the last of the first generation of pupils of L I Mandel'shtam and N D Papaleksi, died on September 22, 2002.

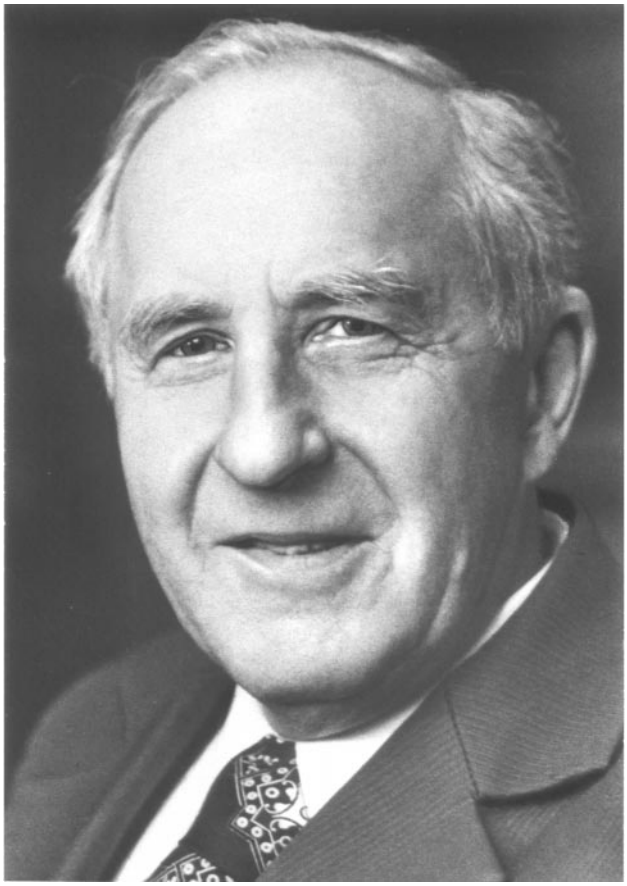
V V Migulin was born on July 10, 1911 in the town of Sereda (now Furmanov) of the Ivanov Region of Russia into the family of a textile industry engineer. In 1928, he enrolled in the Department of Physics and Mechanics of the Leningrad Polytechnical Institute. In 1932, he graduated from the Institute and began his research career in the laboratory of Professor N D Papaleksi at the Leningrad Electrophysics Institute.

After moving to Moscow in 1934, V V Migulin began working at the P N Lebedev Physics Institute (FIAN). Under the supervision of L I Mandel'shtam and N D Papaleksi, he actively joined in the work on parametric excitation of oscillations and radio interferometry.

The work on the parametric excitation of electric oscillations and parametric regeneration that V V Migulin carried out at that time formed the foundation of the theory and practical calculations of modern parametric amplifiers and converters. He discovered and investigated the phenomena of combination resonance and combination synchronization, and in 1937 presented and defended his PhD thesis on these subjects.

V V Migulin's next series of papers dealt with some problems of radio wave propagation, which were important both in their theoretical and in their applied aspects. In this field he conducted research in radio interferometry which allowed him to clarify the phase structure and velocity of propagation of radio waves along the Earth's surface. The results of this work served as a starting point for designing a number of systems for radio navigation and radio geodesy, and were also used for other practical applications of radiointerferometric techniques. He also developed the dispersion radiointerferometer which helped solve the problem of so-called 'coastline diffraction'. Since that time, the method of dispersion interferometry has been successfully used in many fields, including the study of the ionosphere using space probes and the method of ionospheric tomography, which has enjoyed immense progress in recent years.

In 1935 L I Mandel'shtam invited the talented young researcher to start teaching at the Chair of Oscillations at M V Lomonosov Moscow State University. From then until the end of his days, the tie between V V Migulin and the Physics Department of M V Lomonosov Moscow State University was virtually uninterrupted and V V Migulin grew in the process from assistant lecturer to head of chair. From 1945 he headed the Chair of Radiophysics of Pulse Phenomena, involved in radiolocation research, and from 1956 the chair of his venerable mentor; he remained its head until 2001.



Vladimir Vasil'evich Migulin
(10.07.1911 – 22.09.2002)

During the years of the Second World War, V V Migulin devoted all his energy to strengthening the defense potential of the country, developing at the Air Force Research Institute new radio navigation and radiolocation systems, and implementing them for the Air Force. In 1946 he received the State Prize but even before that was decorated with the Order of the Red Star and the medal "For Victory over Germany".

From 1946 to 1951 V V Migulin headed the section of the Thermotechnical Laboratory (now the Institute of Theoretical and Experimental Physics, ITEP) where he worked on some aspects of particle accelerator design, and in 1951 he became director of the Sukhumi Physico-Technical Institute, where the work on the atomic project was continued. The results of this work were rewarded in 1953 by his second State

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Prize. In 1957 – 1959 he worked as Deputy Director of the International Atomic Energy Agency (IAEA) in Vienna. All the while, Vladimir Vasil'evich continued his pedagogical activities at M V Lomonosov Moscow State University, supervised his postgraduates, and lectured to students.

From 1962 to 1969 V V Migulin was Head of Division at the Institute of Radioelectronics of the Russian Academy of Sciences; the division developed low-noise parametric amplifiers and worked on designing receivers in the millimeter and submillimeter wavelength ranges. These receivers won gold medals at the Leipzig Fair in 1966 and at the All-USSR Exhibition of the National Economy in 1967.

In 1969 V V Migulin became Director of the Institute of Terrestrial Magnetism and Radiowave Propagation of the Academy of Sciences of the USSR, which he led for 20 years, personally heading research in the physics of the Earth's ionosphere and magnetosphere. A new discipline in modern physics was born under his guidance: solar-terrestrial physics.

One of the more important space science projects carried out under his guidance was the creation of an integrated ionospheric space laboratory: the "Intercosmos-19" satellite launched in February 1979. The data collected by this satellite set in motion a number of pioneering efforts in the studies of the ionosphere and magnetosphere of the Earth; new phenomena connected with the interaction of electromagnetic radiation and charged particles were discovered.

V V Migulin also led work on investigating the effect of natural and artificial perturbations on the ionosphere, on the propagation of radio waves, and on the functioning of radio systems that make use of long-distance ionospheric propagation of shortwave radio signals.

Vladimir Vasil'evich always attentively monitored the birth of new scientific fields and supported them as much as he could. For instance, research into systems with Josephson junction contacts was started under his guidance and with his participation. The effect of single-frequency parametric regeneration was discovered in oscillatory systems with Josephson contacts; it was awarded a certificate of discovery.

In the 1960s scientists of the Chair of Oscillations of Moscow State University conducted a search for fractional elementary charges. The search gave a negative answer to the question of the possibility of the existence of free quarks; this fact was the basis for the emerging gluon model.

During the last decades V V Migulin actively stimulated progress in research into optoelectronic and laser physics at his chair; as a result, unique instruments were created for controlling laser emission and for processing optical signals. V V Migulin was the founding father and leader of the "Fundamentals of Optical Transmission and Data Processing" school, which is well known in this country and abroad.

The pedagogical activities of Vladimir Vasil'evich manifested clearly the pronounced imprint of the L I Mandel'shtam school. He was a brilliant lecturer; he strived to bring to the listener the main characteristics of various oscillating and wave phenomena in impressive and lucid form. These features are quite prominent in the textbook he wrote, *Fundamentals of Radiolocation*, and in the collective work he wrote together with his colleagues at the Chair of Oscillations: *Fundamentals of the Theory of Oscillations*. The latter textbook ran through two editions and was translated into both English and French.

Vladimir Vasil'evich Migulin earned profound respect among Russian and foreign scientists owing to his enormous erudition, his highest responsibility for the quality of work, his unyielding principles, his responsiveness, and his brilliant organizational skills.

In 1970 V V Migulin was elected a corresponding member of the Academy of Sciences of the USSR, and in 1992 a full member of the Russian Academy of Sciences.

The social and science management activities of V V Migulin are multifaceted. For more than 30 years he was deputy to the Secretary Academician of the Division of General Physics and Astronomy of the USSR Academy of Sciences (now Russian Academy of Sciences), he chaired the Scientific Council on Radio Wave Propagation, then the Council of Solar-Terrestrial Interconnections, and he headed the Russian National Committee of the International Radio Union and served as its vice-president.

V V Migulin was a member of a number of international science societies and academies, and Honorary member of the A S Popov Society. For his exceptional pedagogical activities he was made Honorary Professor of M V Lomonosov Moscow State University and received the M V Lomonosov Prize in 1999.

His untiring and fruitful work was rewarded with two State Prizes, two Orders of Lenin, the October Revolution Order, two Orders of Labour Red Banner, "Sign of Honor", "Red Star" and "For the Service to the Motherland" Orders, and numerous medals.

Vladimir Vasil'evich was a wise and kind person and will be remembered as such by all those who had the good fortune to work with him or to meet him.

A F Andreev, A A Boyarchuk, V B Braginskiĭ,
A V Gaponov-Grechov, Yu V Gulyaev, V V Zheleznyakov,
V A Kotel'nikov, O N Krokhin, A S Logginov,
V N Oraevskiĭ, V A Sadovnichiĭ, V I Trukhin