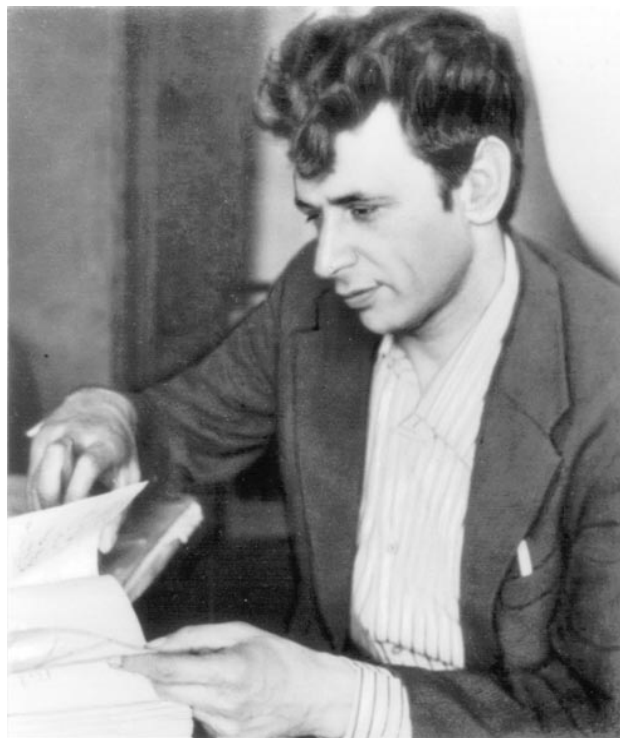


In memory of Lev Mikhaïlovich Erukhimov

A severe illness cut short the life of Lev Mikhaïlovich Erukhimov. He died on December 19, 1997 at the peak of his creative powers, and was unable to complete much of what he thought up and planned to implement. Professor Erukhimov, a well-known scientist, D. Phys.-Math. Sc., was a person of multifaceted talent, of rare inner beauty, gifted with inexhaustible energy and optimism.

L M Erukhimov was born on December 31, 1936 in Khabarovsk in the family of an Army doctor. After graduating in 1959 from the Radiophysics Faculty of the Gorky State University (now the Nizhniï Novgorod State University), he worked all his life at the Radiophysics Research Institute (NIRFI at Nizhniï Novgorod) where during the last years of his life he chaired the division of Solar-Terrestrial Physics and Wave Processes. A student of G G Getmantsev, he was a brilliant representative of the Nizhniï Novgorod school of radiophysics; always being a centre of attraction for his colleagues and students, he created a scientific school of very high regard both in Russia and in the West. Nineteen of his students obtained Can. Sc. degrees and three gained D.Sc. status. Lev Mikhaïlovich authored about 300 scientific publications, among them three books, more than 150 papers, research reports and invention certificates.

On arrival at NIRFI, Erukhimov impressed his colleagues with his vigorous research effort. During his first year at NIRFI, he evaluated the potentials and prospects of using satellite launches for ionospheric studies, and developed and implemented the method of determining the altitude of inhomogeneities in ionospheric plasma from the characteristics of reception of satellite radio signals using a long-base system of receivers. He organized and took part in numerous expeditions that set up observations from Murmansk (in the North) to Ashkhabad (in the South) and provided pioneering data on the altitude distribution of ionospheric inhomogeneities at high, middle and low latitudes. These measurements detected unexpectedly high plasma transfer velocities during periods of auroral perturbations; many years later these observations became the subject of detailed studies and discussions. Erukhimov developed a method of calculating the parameters of plasma inhomogeneities in the upper ionosphere from the data of multifrequency reception of signals from cosmic radio sources; the results made it possible to discover a wide power-law spectrum for their sizes. The accumulated experience was applied to studying the inhomogeneous structure of the near-solar and interstellar



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media. This work started extended full-scale studies of ionospheric processes directly connected with problems in astrophysics, solar corona physics and plasma physics. The research in these fields became one of the basic directions of Erukhimov's work in subsequent years.

Lev Mikhaïlovich Erukhimov made a significant contribution to the theory of propagation of radio waves in randomly inhomogeneous media. He pioneered a mathematical model of the medium of radio wave propagation as a set of random phase shields; he was the author of the derivation of the transfer equation for frequency correlation and generalized Stokes parameters for radio waves propagating in randomly inhomogeneous magnetized plasma. Erukhimov was the first to study the role of statistical focusing on the flickering of radio signals; together with N G Denisov, he wrote a seminal paper on the fluctuational characteristics of radio waves under conditions of total internal reflection from inhomogeneous plasma, in which a detailed analysis was given of the double passage of radio waves through the same inhomogeneities.

Of special significance is Erukhimov's series of application-oriented studies on fluctuation phenomena in the

ionospheric propagation of radio waves from different frequency ranges; the results of this work were used in the development and design of purposely diversified radio systems.

A new direction of research matured in NIRFI in the early 1970s: the effects of high-power radio waves on the ionosphere; Erukhimov and his colleagues carried out theoretical and experimental investigations of nonlinear phenomena in a modified ionosphere, and of the generation of artificially induced turbulence in it.

Measurements on the spectral and dynamic characteristics of induced turbulence over a wide range of scales from one meter to a ten of kilometres, a study on the properties of induced radio emission in the disturbed region of ionosphere, the extension of new diagnostic techniques to natural and induced plasma turbulence, and the analysis and prediction of functioning of various radio systems in disturbed ionosphere — this is an incomplete list of the fields in which the leading position of the group headed by Erukhimov was unquestionably recognized both at home and abroad. On his initiative and with his participation, a low-latitude unit was built near the town of Dushanbe (in Tadzhikistan) to irradiate the ionosphere with powerful radio waves; pioneering results were obtained here on controlling the properties of artificially induced ionospheric turbulence.

Never underestimating the importance of international cooperation, Erukhimov made important contributions to transforming one of the unique research instruments in Russia, the NIRFI ‘Sura’ unit, into a centre at which scientists from Russia, Ukraine, USA, Sweden and Germany carried out joint experimental projects on modifying the ionosphere with powerful radiowave radiation. This cooperation was largely responsible for the survival of the scientific team at the NIRFI division headed by Erukhimov, for expanding the material resources of the research and for the continuation of the active experiments in the ionosphere.

Erukhimov was very generous in giving his time to young students; he knew that ignoring young people undercuts the future of science. He continued lecturing to his students at the Nizhniĭ Novgorod State University until his last days and participated in scientific colloquia; he loved sharing his vast knowledge with schoolchildren. The International Volga Schools on Space Plasma Physics that he organized gained widespread popularity and were attended by lecturers and listeners from many countries.

Erukhimov’s work at the *Izvestiya Vysshikh Uchebnykh Zavedenii: Radiofizika* journal (where he had been deputy chief editor for the last 17 years) was a very special chapter of his life. His unlimited energy made it possible to reshape one of the leading scientific journals in Russia to its present end-of-the-century format. He also paid considerable attention to taking part in the work of the editorial boards of two international journals, *Electromagnetic Waves and Applications* and *Waves in Random Media*.

Erukhimov’s talents were many and wonderful. He loved chess and played well, he wrote poetry and fairy tales for children. Many colleagues were acquainted with his witty improvisations and lively, although invariably kind, epigrams. His sharp mind found another expression in writing songs, often created on the spur of the moment and leaving

people in awe of his immediacy of response and accuracy of satire of current events.

Those who knew Lev Mikhaĭlovich Erukhimov will always remember with gratitude this wonderful person, brilliant physicist and teacher of physics, well liked by people from different generations and walks of life.

*V A Alimov, A V Gaponov-Grekhov, V L Ginzburg,
V V Zheleznyakov, V A Zverev, N A Mityakov,
V O Rapoport, A V Rakhlin, V I Talanov,
V P Uryadov, V L Frolov, O A Sheĭner*