

Immanuil Lazarevich Fabelinskiĭ (on his ninetieth birthday)

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January 27, 2001 was the 90th birthday of Immanuil Lazarevich Fabelinskiĭ, outstanding experimental physicist, corresponding member of the Russian Academy of Sciences, an expert on molecular scattering of light and physical acoustics.

Immanuil Lazarevich was born into a physician's family. His father tried hard to make his son take up the family trade but failed, and Immanuil Lazarevich, against his father's wishes, became a student of the Physics Department of Moscow State University. In 1936, he graduated from the university and was given the job of assistant at the Optical Laboratory of its Physics Department. The Optical Laboratory was at that time headed by G S Landsberg, full member of the Academy. From 1943, Immanuil Lazarevich worked at the Optical Laboratory, also headed by G S Landsberg, at the P N Lebedev Physics Institute (FIAN), where he continues to work up to this day.

In his early work, I L Fabelinskiĭ proved that the spectroscopy of scattered light (and in particular the Mandel'shtam–Brillouin effect) can be used for studying the acoustic and kinetic properties of gases, liquids, solutions and solids, and other physical phenomena. He was the first to discover the dispersion of the sound speed in liquids, to measure the absorption of hyper-sound in liquids and to measure the anisotropy relaxation time. His great experience and rare intuition enabled I L Fabelinskiĭ both to discover and to explain a new phenomenon: the fine structure of the wing of the Rayleigh line. This discovery stimulated a flurry of experimental and theoretical research in other countries. A new theory was developed that explained the new phenomenon.

Immanuil Lazarevich Fabelinskiĭ was the first to observe Mandel'shtam–Brillouin components in highly viscous liquids, which made it possible to measure the speed of hypersonic waves in these liquids. It must be pointed out that prior to I L Fabelinskiĭ's discovery, many laboratories world-wide were trying hard to find Mandel'shtam–Brillouin components in glass or highly viscous liquids but invariably failed.

This and many other studies were made using low-power lasers so that the light scattering was determined by heat fluctuations in the medium. When powerful light beams are used, the radiation is so intense that the non-linear properties of the medium begin to play a significant role, leading to stimulated scattering of light.

Starting with these results, Immanuil Lazarevich Fabelinskiĭ made a series of studies that led him to the discovery of entirely novel phenomena. Together with his colleagues, I L Fabelinskiĭ thus discovered stimulated thermal (entropy) light scattering in liquids, the stimulated scattering of the Rayleigh line wing. The discovery of the effect of stimulated light scattering in compressed gases attracted especial inter-



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est. Not only had previous research in India failed to discover Mandel'shtam–Brillouin components in compressed gases, but such a discovery was declared impossible in principle.

I L Fabelinskiĭ also detected stimulated scattering on transverse waves in a quartz single crystal and observed stimulated Mandel'shtam–Brillouin scattering in silicate glass.

Immanuil Lazarevich and his colleagues discovered the generation of picosecond pulses due to stimulated light scattering in media placed in a resonator, and published a large number of other investigations of condensed media that were regarded first-class world-wide and paved the way to further research.

An important dimension of the research that is now being conducted by Immanuil Lazarevich Fabelinskiĭ and his team is the study of the nature of critical phenomena using a special type of solution with a stratification region, i.e. the solution is heterogeneous inside the region and homogeneous outside. In such solutions, there are two critical points, a higher and a lower one. A whole range of new phenomena were discovered

by studying the propagation of hyper-sound and sound with a frequency of $\sim 10^6$ Hz in such solutions.

Immanuel Lazarevich Fabelinskiĭ has published over 150 papers. In 1965, he published a volume entitled *Molecular Scattering of Light*; in 1968, an enlarged edition was published in English.

I L Fabelinskiĭ has been the scientific advisor of 17 holders of PhD degrees and four of D.Sc. He created science schools in Moscow, Samarkand and Kemerovo.

Immanuel Lazarevich Fabelinskiĭ won the M V Lomonosov Award in 1966, the L I Mandel'shtam Award in 1991, and the A R Biruni State Award of Uzbekistan in 1983. In the year 2000, I L Fabelinskiĭ was awarded the S I Vavilov Gold Medal.

On his ninetieth birthday, we wish Immanuel Lazarevich Fabelinskiĭ good health, an undying interest in science and the implementation of the new ideas with which he is always brimming.

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