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PERSONALIA

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Gerasim Matveevich Eliashberg (on his 90th birthday)

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The remarkable theoretical physicist, academician Gerasim Matveevich Eliashberg, has turned 90.

G M Eliashberg was born on July 26, 1930 in Leningrad. In 1947, he entered the Physical Faculty of Leningrad University and graduated with honors in 1952. Five years later, he worked at the Leningrad plant Krasny Khimik (Red Chemist), where he had been assigned on graduating from university.

In 1959, G M Eliashberg entered the postgraduate course of the Physical-Technical Institute in Leningrad. That same year, he published a paper formulating the theory of the superconducting state occurring owing to electron–electron interaction through the crystal lattice oscillations. In this study, he wonderfully combined the J Bardeen, L Cooper, J Schrieffer theory of superconductivity that had appeared two years before, the field theoretical formulation of this theory developed at that time by Lev Gor'kov, and A B Migdal's theory of electron–phonon interaction in normal metals. Being the basis of the microscopic description of superconductivity, the Eliashberg theory became with time a well-developed part of modern condensed state physics. Different modifications of this theory are being actively examined in application to new classes of superconductors and other mechanisms of electron–electron attraction. The remarkable recent discovery of lithium hydride superconductivity at a temperature of 250 K and a pressure of several megabars is only one of the examples of such examinations.

In 1961, G M Eliashberg became a junior research worker at the Physical-Technical Institute. There, he carried out a number of studies of transport phenomena in Fermi liquid. He developed the technique of analytical continuation that allowed finding frequency dependences of kinetic quantities calculated using the temperature diagram technique. This approach is conventional and is invariably used in theoretical studies, sometimes even without mentioning the name of its author.

After defending his candidate thesis in 1963, G M Eliashberg left Leningrad for Chernogolovka, where he began working at the theoretical department of a branch of the Institute of Chemical Physics and then from 1965 at the newly founded Institute of Theoretical Physics (now Landau Institute for Theoretical Physics), where he has been working till the present day. In 1972, G M Eliashberg became Doctor of Physical and Mathematical Sciences, and in 1990 he was elected a corresponding member and in 2000 a full member of the Russian Academy of Sciences.

In Chernogolovka, G M Eliashberg taught at the Moscow Institute of Physics and Technology, first at the chair of theoretical physics in Dolgoprudnyi and then at the chair of problems of theoretical physics at the Landau Institute. The educational process is always closely related to the teacher's personality. The scientific style of Eliashberg is known for a skillful mastery of complicated analytical methods remarkably combined with a precision of the physical statement of the problem. Intercourse with G M Eliashberg gave students not only facts and knowledge, but also scientific culture, while inculcating good manners and teaching lucidity of mind. B Ivlev, L Levitov, Yu Nazarov, and others are among his disciples.

Gerasim Matveevich Eliashberg

When at Chernogolovka, G M Eliashberg carried out a number of studies that remained significant for many years after.

In 1965, he and L P Gor'kov formulated the theory of small metallic particles. Describing an ensemble of such particles with the Wigner–Dyson distribution, the authors arrived at a number of conclusions accessible for experimental verification and anticipating the results of mesoscopy — the contemporary theory of quantum properties of disordered metals.

In the late 1960s – early 1970s, G M Eliashberg together with L P Gor'kov developed a consistent theory of superconducting state kinetics and derived a nonstationary generalization of the Ginzburg–Landau equations. One of the most remarkable phenomena established by him here was the amplification of superconductivity by a high-frequency field. This work by G M Eliashberg made an impact on extensive

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experimental and theoretical studies of nonequilibrium superconductivity, including experiments on the realization of quantum computation algorithms.

In the early 1980s, G M Eliashberg together with Yu Bychkov and S Iordanskii analyzed the properties of a strongly interacting two-dimensional electron gas in a quantizing magnetic field. And in the mid-1980s, together with L Levitov and Yu Nazarov he investigated the transport properties of metals without the center of inversion in normal and superconducting states long before this became a subject of numerous theoretical and experimental studies.

G M Eliashberg's work received wide international recognition. Someone even calculated that the words 'Eliashberg theory' are mentioned in the titles of scientific papers alone fifteen hundred times. In 1994, G M Eliashberg and Antony Leggett received the International John Bardeen Prize for the development of the theory of superconductivity with strong interaction.

G M Eliashberg occupies a special position at the Landau Institute for Theoretical Physics and in Russian theoretical physics as a whole. He is a very gentle, deeply intelligent, and highly educated man; a man that seems to radiate culture. And at the same time, with respect to significant vital things, he consistently shows iron strength in both scientific and worldly affairs. Realizing and highly appreciating modern tendencies in research, G M Eliashberg fosters the concept of Science as an infinite dialog between the researcher and Nature, as a deep process that can be painstaking and at the same time bring the joy of creation, unlike winning a competition. Contacts with G M Eliashberg invariably bear the charm of his personality.

We wish Gerasim Matveevich good health and further creative achievements.

A F Andreev, V M Galitskii, B I Ivlev,
I V Kolokolov, L S Levitov, V P Mineev,
Yu V Nazarov, L P Pitaevskii, V L Pokrovskii,
V B Timofeev, I M Khalatnikov, R P Shibaeva