Isaĭ Izrailevich Gurevich (on his seventieth birthday)

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Isaĭ Izrailevich Gurevich is a prominent physicist with a broad range of scientific interests and a deep understanding of the physical nature of the phenomena that he studies. He has equal mastery not only of the subtleties of the physical experiment, but also of its theoretical interpretation. Gurevich has authored over a hundred scientific papers, several of which have now become classics.

Gurevich was born in Riga on July 13, 1912. He graduated from Leningrad University in 1934. His first papers, which were devoted to neutron physics, date from the same year. Most interesting among the studies in this series is the investigation of the level structure of heavy nuclei, which culminated in a hypothesis of phase transitions in nuclear matter. This hypothesis has been fully confirmed in the contemporary superconducting model of nuclear matter. The discovery of the splitting of nuclei by cosmic particles was also made during this early phase of Gurevich's career. This was essentially the first study of strong interactions of ultrahigh-energy cosmic-ray particles.

Gurevich worked in the area of nuclear-reactor physics in 1941–1948. A qualitative theory of nuclear reactors was constructed in a joint effort with Ya. B. Zel'dovich, I. Ya. Pomeranchuk, and Yu. B. Khariton. Gurevich's work on the theory of exponential thermal-neutron experiments and the theory of resonant absorption in heterogeneous uranium/moderator systems, the latter developed jointly with Pomeranchuk, are of particularly great importance. It was this work that made it possible to build natural-uranium reactors. Gurevich took an active part in calculations of the critical dimensions of the first Soviet nuclear reactor, which was started up by I. V. Kurchatov in December of 1946.

The approximate method that Gurevich developed for solving the integral equations of neutron diffusion formed the basis for his doctorate dissertation, which he defended in 1944.

Since 1952, Gurevich has been occupied with nuclear and elementary-particle physics and the physics of high energies and weak interactions.

In 1956–1957, working with M. I. Pevzner, Gurevich showed for the first time in an analysis of experimental data on nuclear resonances that the nuclear levels are not randomly distributed about their mean values and that there is a "repulsion" of nuclear levels and a low probability of very closely similar states. This study was the point of departure for a whole series of later experimental and theoretical investigations.

In 1958–1967, following the discovery of nonconservation of parity in weak interactions, Gurevich and his co-workers undertook a major cycle of studies to test the $(V\text{-}A)$ variant of weak-interaction theory against the angular asymmetry of $\mu \to e$-decay electrons. These studies yielded the value $a = 0.325 \pm 0.005$ for the coefficient of asymmetry—the best in the world literature and one that agrees very closely with the $(V\text{-}A)$ variant of the theory.

In 1964, jointly with V. M. Galitskiĭ, Gurevich made a theoretical study of coherence effects in the bremsstrahlung of ultrarelativistic electrons, in which he discovered a new effect of bremsstrahlung suppression by the medium by absorption of photons in matter.

From 1968 to the present, Gurevich has devoted a great deal of attention to a procedure developed in his laboratory for the study of matter with the aid of positive muons. This procedure, which is based on measurement of the precession and relaxation of the spin of polarized muons, has already led Gurevich and his colleagues to the discovery of two-frequency precession of the hydrogen-like muonium atom (Certificate for Discovery) and the subbarrier quantum diffusion of the muon, and to measurement of internal magnetic fields in magnetic materials and superconductors. The muon technique for study of matter is now widely recognized worldwide, along with such classical methods of solid-state physics as neutron diffraction, the Mössbauer effect, and *NMR*. For his work on the development of the new muon technique for study of matter, Gurevich

ISAĬ IZRAILEVICH GUREVICH

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was awarded the I. V. Kurchatov Gold Medal of the USSR Academy of Sciences in 1980.

Progress in modern nuclear physics would be unthinkable without the construction of complex experimental installations and methodological development. Gurevich devotes a great deal of time to this aspect of his work. Among his methodological studies, special note should be taken of the design of an installation to produce strong pulsed magnetic fields with intensities up to 300 kOe in a one-liter volume with durations of several milliseconds. Pulsed magnetic fields of this kind are of great importance both for elementary-particle and for solid-state physics. Pulsed fields have been used, for example, in a series of experiments in search of the Dirac monopole and in a study of the properties of superconducting materials in high magnetic fields.

Gurevich was elected a Corresponding Member of the USSR Academy of Sciences in 1968. He does a great deal of work in the training of scientific manpower. His past students include a Corresponding Member of the USSR Academy of Sciences, four Doctors of Sciences, and a large number of candidates of Sciences. Gurevich has been a Professor in the Nuclear Physics Department of the Moscow Engineering Physics Institute (MIFI) since 1946. His lectures, which are profoundly pedagogical in form, invariably illuminate the highest-priority problems of modern nuclear physics. The monograph "The Physics of Low-Energy Neutrons" by Gurevich and L. V. Tarasov, which appeared in 1965 (and was soon thereafter translated into English), is of great scientific teaching value.

For his active and productive scientific-research work, Gurevich has been awarded two Orders of the Red Banner of Labor and two "Badges of Honor." He became a USSR State Prize Laureate in 1949.

On his seventieth birthday, his friends and colleagues wish Isaĭ Izrailevich Gurevich health, happiness, creative activity, and new scientific successes.

Translated by R. W. Bowers