

OBITUARY

VIKTOR MIKHAILOVICH GUSEV

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Viktor Mikhailovich Gusev, one of the leading workers of the I. V. Kurchatov Institute of Atomic Energy, an eminent specialist in atomic physics and solid-state physics, and head of the laboratory of the Plasma Physics Division, died on Oct. 6, 1978.

V. M. Gusev was born in 1919. In October 1941 he volunteered for the front while a third-year student in the physics department of Moscow State University. Before going into action, he joined the Communist Party of the Soviet Union. He was seriously wounded during fighting near Leningrad but after a long convalescence he returned to duty and fought until victory. He was decorated with the Order of the Great Patriotic War and many medals. When the war ended he returned to Moscow State University and graduated.

Over the more than 30 years of his scientific career, Viktor Mikhailovich Gusev made a significant contribution to a number of areas of physics. In the early years of his career he participated actively in the solution of the problems of creating atomic engineering in the country. He was awarded a State Prize for this work. A cycle of studies was done under his leadership in 1958-1960 on the implantation of deuterium ions in metals (by means of the $D(d, n)^3\text{He}$ reaction) as well as on measurement of the coefficients of metal sputtering by deuterium ions. These investigations served as the beginning of the study of the influence of wall material on the processes of obtaining and confining high-temperature plasma.

V. M. Gusev began working in the I. V. Kurchatov Institute of Atomic Energy in 1960. In 1961 he came out with the initiative for the creation of a new field of science and engineering, viz., ion implantation of semiconductors. Under his leadership and with his direct participation this field underwent an extensive development. He did a large complex of work, ranging from formulation of problems and elaboration of the physical foundations of the

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method of ion implantation to the practical realization of scientific and technological developments. His scheme and design were used to construct the small ILU high-current ion accelerator with mass separation of ions, making it possible to obtain currents of 300-keV doubly and triply charged ions of sufficient magnitude for practical use. Commercial production of ILU units was started in 1966. These accelerators have been set up in many scientific and industrial organizations of our country as well as in Hungary, the German Democratic Republic, and Bulgaria. Initially, this ensured the broad development of work on ion implantation, the introduction of a new progressive method into the fabrication of semiconductor devices based on silicon, especially photoelectric solar energy converters, p-i-n commutation diodes, diodes with various purposes, MOS and bipolar transistors, and integrated circuits. Along with his co-workers, V. M. Gusev was the first to obtain a p-n structure with ion beams in an ILU accelerator; this structure is characterized by high injection properties and a record-breaking intensity of radiation in the visible region of the spectrum.

V. M. Gusev made a great contribution to the development of the physical foundations of ion implantation: he studied the spatial distributions of implanted ions in amorphous and crystalline targets, the law of the generation and annealing of defects in implantation layers, the effect of ion channeling and radiation-stimulated diffusion on the spatial distributions of implanted ions as well as on the electrical properties of these layers.

Viktor Mikhailovich possessed exceptional generosity which was manifested in his sharing his experience with others. Workers of many leading institutes of our country as well as Hungary and the German Democratic Republic have trained in the laboratory he headed. The staff of the TsIFI Ion Implantation Laboratory, headed by I. Dyulai, regards V. M. Gusev as one of those scientists because of which work on ion implantation in semiconductors in Hungary was initiated and developed extensively.

V. M. Gusev used his experience on ion implantation to create radiation-resistant coatings on metals. Investigations, which V. M. Gusev first began, on chemical reactions during the interaction of hydrogen ion beams with various materials have taken on great importance.

In 1974 the scientific interests of Viktor Mikhailovich became linked with a new subject, i.e., working out materials science problems of thermonuclear fusion. He employed the ILU accelerator successfully to simulate the process of interaction of plasma with the first wall of a thermonuclear reactor.

Viktor Mikhailovich recently devoted particular attention to problems pertaining to the processes of synergism under the conditions of large-scale thermonuclear reactors. With his active participation work began on the creation of new devices with which it will be possible to simulate the concurrent action on the wall of various components of the corpuscular radiation of plasma and to imitate the effect of fast neutrons on the materials. Realizing that the conditions in large tokamaks are the closest to those in future reactors, he significantly facilitated the construction of a diagnostic complex for studying the processes of plasma interaction with the wall now being built in the T-10 tokamak.

The untimely death of V. M. Gusev is a great loss for Soviet physics. His bright image will remain in the minds of all who knew him.