Georgii Nikolaevich Flerov (Obituary)

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The outstanding Soviet physicist and world-renowned scientist, Academician Georgii Nikolaevich Flerov, Laureate of Lenin and State Prizes of the USSR, died unexpectedly on November 19, 1990.

The development of a new scientific field, heavy ion physics, is associated with G. N. Flerov's name. He was Director of the Nuclear Reactions Laboratory at the Joint Institute for Nuclear Research (Dubna), the founder and teacher of that scientific group.

Georgii Nikolaevich was born on March 2, 1913 in Rostov-on-Don. He finished the Leningrad Polytechnic Institute in 1938, however Georgiĭ Nikolaevich's activity as a scientist began already in 1937. His talent as an experimental physicist, exceptional perseverance and purposefulness in solving the most difficult problems of nuclear physics became apparent even in the first independent papers by Georgii Nikolaevich. When a nuclear chain reaction proved to be possible in principle, G. N. Flerov, together with L. I. Rusinov, conducted experiments to determine the key parameter for achieving a nuclear chain reaction-the number of secondary neutrons which arise during fission. On the agenda stood the question: with what probability are the natural isotopes of uranium $(U^{238}, U^{235}, and U^{234})$ split by the action of neutrons of different energies? To conduct this research, G. N. Flerov, together K. A. Petrzhak, developed a procedure of record-setting sensitivity, which enabled them in 1940 to observe for the first time a new physical phenomenon; the spontaneous fission of nuclei. This fundamental discovery served as the start of the development of the entire field of nuclear physics.

In the first days of the war, G. N. Flerov joined the Leningrad Peoples' Militia, and then completed courses at the Military Aviation Academy at Ĭoshkar-Ole. But even while serving in the army, he continued to follow the scientific literature, to consider problems connected with nuclear fission and with the possibility for achieving a nuclear chain reaction.

He presented a report to physicists in December 1941 in Kazan' and suggested a renewal of research on the uranium problem interrupted by the war. Possible ways for solving a number of fundamental problems were indicated in the report. Work on the development of atomic science and technology was started at the end of 1942 in the Soviet Union, and G. N. Flerov was among several physicists with whom I. V. Kurchatov started the analysis and development of a whole set of problems. Later on he took a very active part in research directly connected with strengthening the defense force and with building the foundations of nuclear energy in the Soviet Union.

In the post-war years, G. N. Flerov continued work in the field of the physics of nuclear fission and conducted a



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series of experiments to study the component of cosmic rays from fission.

From 1953 on, the scientific interests of G. N. Flerov were connected with the development of a new field in nuclear physics, with the investigation of the processes which arise upon the collision of complex nuclei and the fundamental problem of synthesizing new elements. At his suggestion, the Nuclear Reactions Laboratory was created at the Joint Institute for Nuclear Research in Dubna in 1957.

After taking the first steps on the 150 cm cyclotron at the Institute of Atomic Energy, the group that was headed by G. N. Flerov went through a long course of developing and perfecting the cyclotron acceleration method and made an outstanding contribution to the building of powerful heavy ion accelerators. The research carried out by G. N. Flerov and his students in the Nuclear Reactions Laboratory in the course of three decades led to the synthesis of new chemical elements with atomic numbers from 102 to 110, to obtaining a large number of new nuclei which are located on the boundary of stability, to the discovery of new forms of radioactivity and of new mechanisms for nuclear interactions. Ten discoveries made by G. N. Flerov and his colleagues are recorded in the State Register of the USSR. Part of the results obtained in his laboratory led to the opening up of new scientific fields, which are being intensively developed in large centers for heavy ion physics in a number of countries. The discovery of high stability of extremely heavy nuclei with atomic numbers greater than 104 with respect to spontaneous fission, which opened new prospects for the further development of work in this field of research, was one of the results having fundamental significance.

Along with solving key fundamental problems of nuclear physics, G. N. Flerov paid much attention to the practical use of the achievements of nuclear physics throughout his entire activity. Georgii Nikolaevich was one of the initiators of the development in the USSR of nuclear physics methods to solve problems of prospecting for oil and for the most rational development of oil sites. He developed an original pulse method for the neutron logging of oil reservoirs.

A number of problems of an applied nature, work on creating and using polynuclear membranes for the final purification of fluids and gaseous media, on studying the interaction of heavy ions with materials, on radiation materials science, and on obtaining short-lived radioactive nuclides for biological research and medical diagnosis, were solved in recent years in the Laboratory. Georgiĭ Nikolaevich founded and continuously directed for more than thirty years the large international group of the Nuclear Research in Dubna. During these years, the Laboratory became one of the largest centers in the world for heavy ion physics. Georgiĭ Nikolaevich always paid much attention to his colleagues at the Laboratory, to their scientific growth, and to the development and strengthening of scientific collaboration with other centers of heavy ion physics. He educated dozens of great scientists while they were working fruitfully at the Joint Institute for Nuclear Research, in the Soviet Union, and in other countries.

Georgiĭ Nikolaevich devoted much effort to scientific organizational work. He was for many years chairman of the Scientific Council of the Academy of Sciences of the USSR for the Application of the Methods of Nuclear Physics in Related Fields, and was a member of a number of councils of the Academy of Sciences of the USSR and of editorial boards of scientific journals.

Georgiĭ Nikolaevich's authority was very high both in the Soviet Union and abroad; his reports at the largest international conferences received invariable attention. He was elected an honorary member of a number of foreign academies and was awarded honorary doctorates by a number of foreign universities.

G. N. Flerov was cited many times for outstanding scientific attainments by high government awards; the title of Hero of Socialist Labor was conferred on him in 1949, and he was awarded orders and medals of the USSR and of other countries.

The bright memory of Georgii Nikolaevich Flerov will remain forever in the hearts of people who had the good fortune to become acquainted with and to work with him, and to be a student of his.

Translated by Frederick R. West