

**Viktor Konstantinovich Voïtovetskii (Obituary)**

A. P. Aleksandrov, S. T. Belyaev, Yu. V. Gaponov, D. P. Grechukhin, I. I. Gurevich, Yu. M. Kagan, I. K. Kikoin, I. L. Korsunskii, Yu. F. Pazhin, and N. A. Chernoplekov

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On February 18, 1983 Viktor Konstantinovich Voïtovetskii died after a lengthy illness. He was a talented experimental physicist, a scientist of high culture and outstanding native ability, recipient of USSR State Prizes, professor, Doctor of Physico-Mathematical Sciences, head of a department at the I. V. Kurchatov Institute of Atomic Energy. His whole life until the very last day was devoted to science. He died at the height of his creative power, full of new scientific plans and ideas.

Viktor Konstantinovich was born on September 29, 1921 in the city of Khar'kov into the family of a civil engineer. His creative ability became apparent during his school years. In the physics club of the Khar'kov House of Pioneers he (with his own hands) constructed and put into operation a working model of a Van de Graaf accelerator which was later demonstrated at an international exhibition in Paris. In 1936 the talented pupil had the good fortune of meeting Frederic Joliot-Curie who was visiting Khar'kov scientists, and this memorable meeting determined Voïtovetskii's decision to devote himself to experimental nuclear physics.

In 1939 Viktor Konstantinovich enrolled in the Leningrad Polytechnical Institute, but war interrupted his studies: in his third year he volunteered to go to the front. He participated in battles in the Oranienbaum area near Leningrad, in the liberation of the Baltic states and was seriously wounded. Demonstrating his strong willpower and fortitude Viktor Konstantinovich returned to his beloved activity. In 1945 he returned to his work at the Institute of Atomic Energy directly from the hospital and simultaneously he entered the Moscow Engineering Physics Institute from which he graduated in 1948.

From then on the scientific activity and the whole life of Viktor Konstantinovich Voïtovetskii were associated with the Institute of Atomic Energy. At first working under the direct guidance of I. V. Kurchatov and G. N. Flerov, and later independently, he devoted himself wholeheartedly to the solution of important scientific problems. In the course of an almost forty year period of work Viktor Konstantinovich became a prominent scientist with a worldwide reputation, distinguished by a special sense of new directions and by the strictest demands imposed on himself and his work. As a result of this unusual demand on himself his experimental work is characterized by its exceptionally complete and finished quality.

Already in his first papers Voïtovetskii showed himself as a scientist characterized by the uniqueness of the formula-



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tion of a problem and the originality of approach to its solution. He developed methods of precision isotopic analysis of uranium and thorium, proposed an interesting method for separating the isotopes of heavy elements, carried out far-reaching investigations on observing fine structure in the spectra of fission gamma-rays. In developing new methods of detecting nuclear radiation Voïtovetskii was one of the first in our country to begin investigations on the applications of scintillation methodology in nuclear physics and by his work made a decisive contribution towards the establishment and development of this direction of experimental physics in the USSR. His pioneering research was highly esteemed by the Soviet government who awarded to him in 1953 a State Prize of the USSR. In the course of many years Viktor Konstantinovich with his goal-oriented energy continued to occupy himself with introducing into the methodology of scientific research promising methods of detecting nuclear radiation.

In the early sixties Viktor Konstantinovich began the investigation of such a subtle phenomenon as neutron-neutron scattering. In his original experiments he utilized for this purpose the  $D(n, p)2n$ -reaction and investigated this process with a high degree of accuracy and reliability. This enabled him to determine such fundamental parameters as the scattering length and the effective range of the neutron-neutron interaction. The results of this work entered the tables of nuclear constants and have not lost their significance until the present time. On the basis of the results of these investigations the Academic Council of the I. V. Kurchatov Institute of Atomic Energy in 1964 awarded to V. K. Voĭtovetskii the degree of Doctor of Physico-Mathematical Sciences when he was defending his dissertation for the degree of Candidate of Science.

From the mid-sixties Viktor Konstantinovich turned to a new path in experimental physics—the investigation of coherent interactions of nuclear radiation with matter. In close contact with theory he carried out a series of investigations on observing and studying the effect of suppression of a nuclear reaction in perfect crystals. In a series of brilliant experiments the authors of this group of papers succeeded to demonstrate for the first time that under certain conditions it is possible to alter and even to stop completely a nuclear reaction when electromagnetic radiation that interacts with nuclei in a resonant manner passes through a perfect crystal. The discovery of this phenomenon led to a significant development of concepts of the nature of the interaction of radiation with matter and emphasized the special role of collective effects in the processes of interaction of resonance radiation with nuclei of atoms in crystals. The theory of the phenomena of this class was developed at the I. V. Kurchatov Institute of Atomic Energy by Yu. M. Kagan. For this group of papers a USSR State Prize was awarded in 1976 to Voĭtovetskii among the group of authors of these papers.

Being conscious of the particular importance and the fundamental nature of the work at the borderline of nuclear physics and solid state physics Voĭtovetskii at the end of the seventies carried out research on coherent processes under the action of powerful high frequency fields on a system of Mössbauer nuclei. An ingenious solution of a number of methodological problems enabled him to demonstrate clearly and to investigate exhaustively using tantalum nuclei a

physical phenomenon new in principle: NMR-gamma resonance—a two-quantum process in which transitions between Zeeman nuclear sublevels stimulated by a resonance radio frequency field take place simultaneously with the emission and absorption of Mössbauer quanta and lead to a radical restructuring of the spectrum. In one of his last papers Viktor Konstantinovich gave an experimental analysis of the fundamental energy-time uncertainty relation  $\Delta E \Delta t \sim \hbar$  for a single photon that lies at the foundation of present day quantum concepts.

Voĭtovetskii's activity was not confined to pure science. He was a talented organizer of scientific investigations. Under his direction in the department which encompasses a number of major laboratories devoted to specific problems an interesting creative collaboration of theory and experiment was developed in formulating and investigating fundamental problems of nuclear physics and solid state physics. This was greatly aided by the scientific "Voĭtovetskii seminar" well known both within the IAE and outside it. Voĭtovetskii generously transmitted his wide experience and knowledge to the younger generation of physicists; his relationships to others were always distinguished by attention, sensitivity, and kindness.

Voĭtovetskii belonged to that most rare type of a scientist-experimenter for whom an elegant demonstration of a new physical phenomenon represents the essence of creativity and is a source of inspiration. His constant aim as a researcher was utmost simplicity and transparency of an experiment which was achieved by utilizing ingenious methodology based on the latest technical achievements. He was deeply interested in a direct experimental verification of fundamental quantum laws, he was always full of new ideas and scientific plans.

The achievements of Viktor Konstantinovich Voĭtovetskii were rewarded by many government awards: the Orders of the Red Banner of Labor, Red Star, two orders of "Badge of Honor", and many medals.

The shining memory of Viktor Konstantinovich Voĭtovetskii will forever remain in the hearts of his friends and comrades sharing his work.

Translated by G. Volkoff