

Venedikt Petrovich Dzhelepov (on his seventieth birthday)

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Usp. Fiz. Nauk **139**, 741–742 (April 1983)

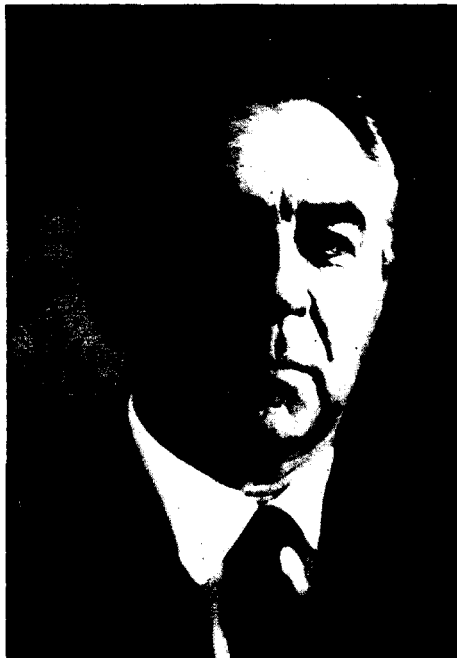
PACS numbers: 01.60. + q

Venedikt Petrovich Dzhelepov, corresponding member of the Academy of Sciences of the USSR, a prominent Soviet physicist well known for his investigations and for his scientific-organizational activity in the domain of the physics of the atomic nucleus and of elementary particles, and of physics and technology of powerful modern particle accelerators celebrated his seventieth birthday on April 12, 1983.

V. P. Dzhelepov was born in Moscow in the family of an office worker. Upon graduating in 1937 from the Leningrad Polytechnical Institute he carried out under the direction of A. I. Alikhanov his first scientific investigations connected with the experimental verification of the Dirac positron theory. In 1939 after having served in the Red Army, Dzhelepov worked in the Radium Institute of the USSR Academy of Sciences where under the direction of I. V. Kurchatov he participated in the commissioning and putting into operation of the first cyclotron in Europe. During the period from the fall of 1939 to March 1941 Dzhelepov was again called up to serve in the Red Army. In subsequent years he carried out research connected with the construction of a new more powerful (to an energy of 12 MeV) cyclotron in the Leningrad Physicotechnical Institute of the USSR Academy of Sciences and later he worked in Kazan' in the laboratory of Yu. B. Kobzarev.

In August 1943 Dzhelepov joined the small group of physicists who under the direction of I. V. Kurchatov created the new nuclear center—now known as the I. V. Kurchatov Institute of Atomic Energy. Here he carried out research on the process of fission of the different uranium isotopes.

In 1948 Dzhelepov was given by I. V. Kurchatov a responsible assignment which determined the direction of all his further scientific activity. As the Associate Director of the new laboratory (later the Institute for Nuclear Problems of the Academy of Sciences of the USSR) he participated in the construction in Dubna of the largest in the world proton accelerator—the five-meter synchrocyclotron at an energy of 500 MeV; he organized the preparation for research in the new field of science—high-energy physics. From this time onward he has entirely devoted himself to the creation in the USSR of a new experimental base for fundamental research and the study of processes of nuclear interactions of accelerated particles. It is specifically in this field of science that his outstanding talent of a scientist



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and organizer of large-scale modern experimental investigations manifested itself.

In 1956 using the Institute of Nuclear problems of the Academy of Sciences of the USSR and the High-Energy Laboratory of the Academy of Sciences of the USSR as a base, the first international nuclear center—the Joint Institute for Nuclear Research was created in Dubna. In this position he to an even greater degree manifested his talent as an organizer and director of large-scale scientific collaborating groups and an organizer of a wide-spread international scientific-technical collaboration. It is difficult to overestimate the contribution that Dzhelepov made to the organization and development of the Joint Institute of Nuclear Research. Characteristic of him as the director of the laboratory is his constant attention to the opinion of those surrounding him, the wide-ranging discussion in the group of his collaborators of all the principal problems of scientific and scientific-organizational activity. Dzhelepov boldly advanced talented young scientists into positions of leadership. Possessing boundless energy and an ability

to carry a large workload he had time to go into the details of all the work in his laboratory not forgetting a single scientific or technical subdivision. The members of the scientific collaboration group are well acquainted with the constant attention of the director to all their needs, his benevolent readiness to solve any technical problems or difficulties in daily life. The successful activity of the laboratory which has been headed by Dzhelepov for now over three decades is indubitably connected with this style of leadership.

Dzhelepov's own direct scientific activity is broad and multifaceted. The important scientific results obtained by him over many years occupy a prominent place in world science. At the beginning of the 1950's he carried out a series of investigations on the interaction of high energy neutrons with nucleons and nuclei. In this work such fundamental results were obtained as the proof of the symmetry of nuclear forces at high energies, the discovery of spin dependence of exchange forces in the neutron-proton system. In 1954 Dzhelepov was awarded the scientific degree of Doctor of Physico-Mathematical Sciences for this series of investigations.

Subsequently Dzhelepov participated in the study of the polarization phenomena in experiments on double and triple scattering of nucleons, he carried out an investigation of the production of pions in nucleon collisions confirming the charge independence of nuclear forces. Dzhelepov made a significant contribution to the experimental investigations of weak interactions in the capture of negative μ -mesons by protons and the confirmation of Fermi's universal theory of weak interactions; under his direction the discovery was made of the phenomenon of electron decay of negative pions.

Important results came from the wide-ranging investigations of the interaction of negative muons with molecules of hydrogen isotopes. He devoted much attention to these investigations infecting his young colleagues with enthusiasm and an investigator's zeal. For the first time the discovery was made of the resonance-dependence of the probability of formation of muon mesomolecules of the heavy isotopes of hydrogen—the phenomenon of catalysis by muons of the fusion reactions of deuterium and tritium nuclei was discovered. This fundamental result is of interest from the point of view of the possibility in principle of utilizing future high current accelerators towards developing power production.

An extensive series of investigations of pion-nucleon interactions at an energy of several GeV was carried out by Dzhelepov's group using the synchrophasotron of the JINR and with the aid of a propane chamber. Rare processes of decay of resonances and multiple production of neutral strange and ordinary particles were investigated.

Dzhelepov is the initiator and pioneer of the development of a new promising direction of accelerator technology development of different variants of high current accelerators. Together with a group of collaborators he in 1959 for the first time constructed a cyclotron with spiral variation of the magnetic field and in 1967

put into operation an electron model of a relativistic cyclotron with an energy of 800 MeV and a current of up to 1 mA. Under Dzhelepov's direction the synchrocyclotron of the JINR was reconstructed into a high phasotron with spatial variation of the magnetic field.

On Dzhelepov's initiative in the Laboratory for Nuclear Problems during the last decade extensive scientific-organizational work was carried out on the creation of large scale experimental installations for research at the 70 GeV accelerator in Serpukhov. In experiments utilizing this equipment a number of fundamental results was obtained: antitritium was discovered, excited states of the pion were discovered, the polarizability of pions was measured for the first time, a noticeable polarization of nucleons on the scattering of hadrons with energies of tens of GeV was observed.

On the suggestion of Dzhelepov in 1967 and under his direction investigations were begun for the first time in the USSR on the use of fast protons for cancer therapy; an effective method was developed for obtaining intense beams of negative pions for use in beam therapy of malignant tumors.

Dzhelepov has devoted much attention to the education of young scientists. Many of his students have now become prominent physicists, are heading large institutes and laboratories in the Soviet Union and in other socialist countries. Dzhelepov made a large contribution towards the development of a base for experimental investigations in nuclear physics in the socialist countries members of JINR. Dzhelepov constantly carries on extensive scientific-organizational work outside his institute. In 1967 he was elected as the Associate Academic-Secretary of the Division of Nuclear Physics of the Academy of Sciences of the USSR. Dzhelepov is the Associate Chairman of the Interdepartmental Commission on Nuclear Physics of the Academy of Sciences of the USSR; he is a member of the Scientific-Coordinating Council of the Institute of High Energy Physics in Serpukhov, he is a member of the Committee on Future Accelerators of the International Union of Pure and Applied Physics.

The scientific and scientific-organizational activity of Dzhelepov has received wide recognition. In 1966 he was elected as a corresponding member of the Academy of Sciences of the USSR. Dzhelepov has been awarded two state prizes of the USSR, he has been decorated with the Order of Lenin, two Orders of the Red Banner of Labor, with Orders from Bulgaria, Mongolia, Hungary, many medals of the USSR and other socialistic countries.

The outstanding enthusiasm in the entire multi-faceted activity of Venedikt Petrovich, his talent as a scientist-organizer, his energy and tremendous capability for work evoke sincere admiration and good-natured envy of his friends, students and collaborators. We take pleasure in congratulating Venedikt Petrovich on his anniversary, and to wish him good health and new scientific achievements.

Translated by G. M. Volkoff