

Yuriĭ Petrovich Nikitin (Obituary)

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Usp. Fiz. Nauk **160**, 91–93 (April 1990)

On 23 June 1989, the prominent Soviet theoretical physicist and doctor of physical and mathematical sciences, Professor Yuriĭ Petrovich Nikitin, died at 53 years of age.

Yu. P. Nikitin was born 8 January 1937 in Moscow. In 1954, after graduation from secondary school, he entered the Moscow Engineering-Physics Institute, with which his entire career was associated. The scientific interests of Yu. P. Nikitin were determined for his entire life by the influence of the outstanding Soviet theoretical physicist Academician I. Ya. Pomeranchuk. Yu. P. Nikitin completed his graduate studies at the Institute of Theoretical and Experimental Physics under Pomeranchuk's direction. Yuriĭ Petrovich was a member of the Moscow Engineering-Physics Institute, where he proceeded from senior engineer to professor in the department of theoretical nuclear physics.

Yu. P. Nikitin began to study the physics of elementary particles in the transitional 1960s, when there simultaneously arose a number of fundamental ideas and approaches which for many years determined the path of development of this field of science (symmetries, quarks, the analysis of the asymptotic behavior of amplitudes), and a breakthrough occurred in the experimental field (the discovery of resonances). Due to the influence of I. Ya. Pomeranchuk the first scientific investigations of Yuriĭ Petrovich were associated with the study of the behavior of the amplitudes of various processes at large energies (diffraction generation, analysis using Regge poles). At the same time Yu. P. Nikitin actively participated in the development of kinematic methods of identifying resonances. He showed that in the decay $\omega \rightarrow \pi^0 \gamma$ the momenta of γ quanta from the $\pi^0 \rightarrow 2\gamma$ decay lay in the surface defined by the mass of the decaying resonance. This prediction was used to identify in an experiment the decays of the ω resonance and to determine its characteristics. Afterward, this work was recorded as a discovery.

Beginning in 1964 Yuriĭ Petrovich and his colleagues studied the problem of detecting the W boson in an experiment. In a series of publications an analysis was made of the various mechanisms of forming the W boson in NN and νN collisions. The most important result of these studies, which made it possible in 1983 to detect the W boson in an experiment, was the establishment of the unambiguous link between the transverse momentum of the muon from the decay of the W boson generated in pp collisions and the mass of the W boson.

In the 1970s, when the Serpukhov accelerator went into operation, Yuriĭ Petrovich began, and continued to the end of his life, a very close interaction and collaboration with a number of experimentalists at the Institute of High Energy Physics and the Moscow Engineering-Physics Institute, per-



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forming experiments on this accelerator. He actively participated in the development of many experimental programs of the Institute of High Energy Physics and the Moscow Engineering-Physics Institute. With his direct participation a program of experimental studies of neutrino interactions in the SKAT chamber was developed and implemented.

A large number of the publications of Yu. P. Nikitin in collaboration with many students are devoted to a detailed kinematic analysis of the momentum distributions and angular distributions of the products of the decay of rare particles. Important results were obtained in this field regarding the characteristics of the decays of the W boson, the heavy lepton, charmed baryons, etc., which made it possible to identify these particles. It could be said that the investigations of Yu. P. Nikitin created a whole direction of research in particle physics associated with the analysis of the kinematics of complex multi-particle decays.

A number of Nikitin's papers are devoted to the physics of the quark-gluon plasma, to models of weak interactions, and to the application of particle physics to cosmology. The

comprehensiveness of his scientific interests is reflected in the fact that he, in collaboration with A. I. Alekseev performed important work on the electrodynamics of a continuous medium. He produced a total of about 250 scientific publications.

The unusually broad erudition of Yu. P. Nikitin and his deep understanding of the problems of high-energy physics naturally led him to work on monographs. In the last 10 years he published the following books: "Teoriya mnozhestvennykh protsessov" (The Theory of Multiple Processes, coauthored with I. L. Rozental'), "Atomy i mezony" (Atoms and Mesons, with V. G. Kirillov-Ugryumov and F. M. Sergeev), "Yadernaya fizika vysokikh energiĭ (High-Energy Nuclear Physics, with I. L. Rozental'), "Kinematicheskie metody v fizike vysokikh energiĭ" (Kinematic Methods in High-Energy Physics (with V. I. Gol'danskiĭ and I. L. Rozental'). The majority of the books of Yu. P. Nikitin have been translated into English. The creativity of Yu. P. Nikitin is characterized by the unique combination of the understanding of the details and characteristics of an experiment and a superior knowledge of the techniques of today's theoretical physics. Today, as the abyss separating physicists into theoreticians and experimentalists deepens, physicists such as Yu. P. Nikitin become more and more rare. And so it is even more difficult for Soviet physics to bear the early demise of Yu. P. Nikitin.

He made a great contribution to the education of young

theoretical physicists. He was an excellent lecturer, and knew how to explain clearly and intelligibly complex portions of quantum mechanics, quantum electrodynamics, and particle physics, with an accent on the physical essence of the phenomena. As the result of many years of pedagogical activity Yuriĭ Petrovich educated a whole constellation of talented and practicing theoreticians. Fifteen candidates' dissertations were defended under his direction.

The friends and colleagues of Yuriĭ Petrovich will all always value, first and foremost, his uncompromising loyalty to science, and his unusual capacity for work. But Yu. P. Nikitin was also a cheerful man, a voracious reader, and an interesting conversationalist on widely varied topics. A serious illness deprived him of the ability to move about effectively in the last years of his life, but this did not stop him from keeping up with all of the events in science and life.

A day before his premature death he was discussing with his characteristic enthusiasm his plans for future articles and monographs. Alas, these plans will not be carried out. His optimism, selflessness, and loyalty to his work inspired the admiration of all those around him, and will undoubtedly remain forever in their souls.

Translated by Christine Gallant