PERSONALIA

Aleksandr Ivanovich Palovskiĭ (Obituary)

E. N. Avrorin, V. A. Belugin, R. I. Il'kaev, G. A. Mesyats, V. N. Mikaĭlov, E. A. Negin, Yu. S. Osipov, Yu. A. Romanov, A. N. Skrinskiĭ, Yu. A. Trutnev, V. E. Fortov, and Yu. B. Khariton

Usp. Fiz. Nauk **163**, 93–95 (November 1993)

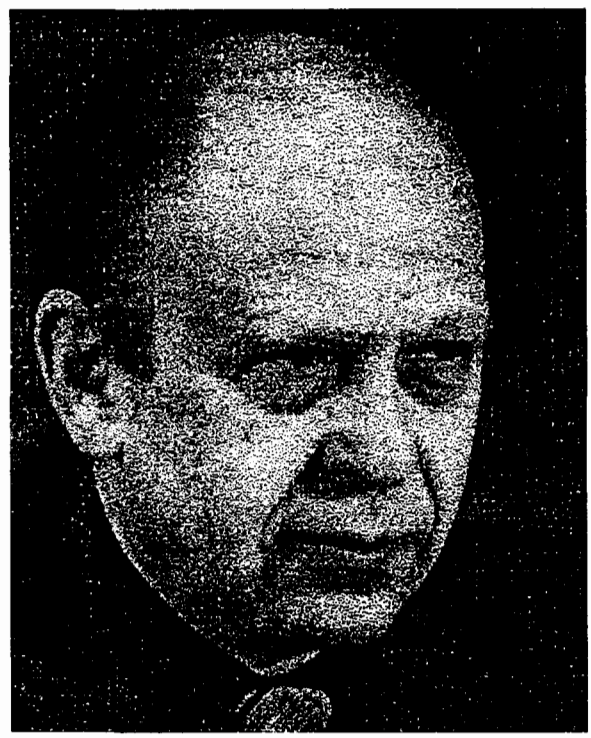
Academician Aleksandr Invanovich Palovskiĭ, eminent Russian physicist and scientific administrator, First Deputy Scientific Director of the Russian Scientific-Research Institute for Experimental Physics and Hero of Socialist Labor died suddenly on 12 February 1993.

A. I. Palovskiĭ was born on 27 June 1927 at Zaporozh'e in the family of a prominent builder. In 1951, after graduating from the Khar'kov State University, he was sent to Arzamaz-16 where he took part in intensive work on the development of thermonuclear weapons under the direction of A. D. Zakharov and Yu. B . Khariton.

The young experimental physicist displayed unusual abilities and developed an apparatus that was used in a number of studies conducted at the time. This was recognized in 1953 by the award of the State Prize. In subsequent years he worked on high-intensity neutron sources, neutron physics, and the physics of nuclear fission. These researches were subsequently exploited in the development of new nuclear weapons.

In the late 50s, Pavlovskiĭ and his group suggested and developed an original small pulsed cyclic electron accelerator in the form of the iron-free betatron. Machines of this type have produced electrons with energies up to 100 MeV and electron currents much higher than those in conventional betatrons. This ensured that the machine was widely used in the solution of many important problems, including the development of simple and compact generators of intense pulses of bremsstrahlung for studying fast processes in massive objects. By analogy with pulsed x-ray photography, the new method has been referred to as γ-photography. Applications of this technique were of major importance for the successful completion of weapons development programs. These accelerators continue to play an important part in the development of new versions of the technology. This work was rewarded in 1963 by the award of the Lenin Prize and was the basis of a doctoral thesis presented by Pavlovskiĭ in 1963.

Since 1960, A. I. Pavlovskiĭ was the head of a major research division of VNIIEF. He initiated and directed development work on a new type of pulsed linear inductive electron accelerators, using radial lines with distributed parameters. These accelerators combine the ability to produce high energies and high currents, typical of the direct discharge of low-impedance lines. The priority of Russian science in the development of this type of accelerator is



Aleksandr Ivanovich Pavlovskiĭ
(1927–1993)

assured by the work of A. I. Pavlovskiĭ and his students, and is generally acknowledged. These new developments relied on the completion of a range of theoretical and experimental researches and the solution of some fundamental electrophysical problems. The accelerators are used in studies of the physics of the effects of high-intensity radiation. A. I. Pavlovskiĭ was also one of the originators of the idea of combining the linear accelerator with other physical installations. Since 1971, he headed the Division of Fundamental and Applied Studies, a major division of VNIIEF, and devoted much effort to the development of the experimental basis of the Institute, i.e., the development of powerful pulsed nuclear reactors and major physical installations for the investigation of the interaction of neutrons, gamma rays, and charged particles with matter, as well as underground nuclear tests. He often took direct part in these tests and was one of the initiators of the use of such equipment in the interests of fundamental research. The 1983 State Prize emphasized the importance of his contributions in this field. In 1979, he was elected a Cor-

 1063-7869/93/111079-02$10.00

responding Member of the Academy of Sciences in the Division of Nuclear Physics.

Another major field of his activity was the development and the practical implementation of A. D. Zakharov's idea of magnetic cumulation, i.e., compression of a magnetic flux by a controlled explosion. He is internationally known for the development under his direction and with his direct participation of magnetocumulative generators of pulsed magnetic fields and for his research into the properties of different materials in such fields. He continued to devote considerable effort to this work. An extensive program was established for using the generators in fusion studies. Fields in excess of 17×10^6 G were being planned, and the possibility was examined of using nuclear explosions to produce fields of hundreds of MG.

A. I. Pavlovskiĭ must also be credited with the development of many compact and powerful electric power generators based on the principle of magnetic cumulation, and also the associated high current devices. For example, there is a high-current circuit breaker known in the literature as the Pavlovskiĭ circuit breaker. His work on these generators was highly regarded by specialists both here and abroad.

A. I. Pavlovskiĭ used this power base to develop large-scale high-power installations for physical studies. They included, above all, the pulsed laser. Pulsed solid state and photodissociation lasers were developed in which large volumes of active media were pumped by an open multichannel discharge, producing radiation of 100 kJ per pulse. There were also pulsed electric-discharge CO_2 lasers combining preliminary ionization with main pumping discharges, and excimer lasers. A. I. Pavlovskiĭ was actively involved in supporting research into nuclear-pumped lasers. Other developments included powerful plasma x-ray sources, microwave sources, and simulated lightning discharges as sources of electromagnetic radiation.

Many dozens of inventions and publications reflected A. I. Pavlovskiĭ's original technological solutions. In 1988, he was awarded the title of Distinguished Scientist and Technologist of Russia. He directed a large staff of experimental physicists, and his pupils have been awarded doctoral and other degrees.

A. I. Pavlovskiĭ participated in the organization of international links and many international conferences. He was for many years a member of the international organizing committee of the *Megagauss* series of conferences on strong magnetic fields and the associated experiments. He provided invaluable service to collaboration with nuclear centers in the USA, France, China and Germany.

A. I. Pavlovskiĭ's scientific work was distinguished by the search for new ways of solving complicated problems, determination in overcoming difficulties, administrative ability combined with extensive scientific erudition, ability to undertake pioneering work and purposeful endeavor. He was elected Academician of the Russian Academy of Sciences 1992 and this gave him new vigor. He was full of creative plans for fundamental and applied research and the development of fundamentally new technologies. His sudden demise is a tragic loss for the whole Russian scientific community.

Translated by S. Chomet