

Konstantin Mikhaïlovich Polivanov (Obituary)

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Usp. Fiz. Nauk **145**, 175–176 (January 1985)

Professor Konstantin Mikhaïlovich Polivanov, a prominent Soviet scientist, an electrophysicist, and Doctor of Technical Sciences, died on September 17, 1983.

K. M. Polivanov was born on December 13, 1904 in Moscow in the family of the engineer Mikhail Konstantinovich Polivanov, well known for his work on designing and constructing electrical stations and electrical transport.

The scientific and pedagogical activity of Konstantin Mikhaïlovich Polivanov upon graduation from the Moscow Power Institute in 1930 began at that Institute under the guidance of Professors L. I. Sirotinskii and K. A. Krug. At the same time he worked in the field of technical physics in the Academy of Sciences of the USSR under the guidance of the Corresponding Member of the Academy of Sciences of the USSR, V. K. Arkad'ev. This work determined all his subsequent activity in the field of the physical theory of the electromagnetic field and its technical applications.

In 1942 K. M. Polivanov defended his doctoral dissertation "The Influence of Domain Structure on Surface Effects in Ferromagnetic Substances." Its main results were published in 1943 and in 1946. After the death of the Corresponding Member of the Academy of Sciences of the USSR, K. A. Krug, K. M. Polivanov in 1952 occupied the chair of the theoretical foundations of electrical technology at the Moscow Power Institute and in fact became the head of the Moscow Scientific School of Electrical Technology. His scientific articles at that time dealt with the investigation of problems which are still of importance today, such as the electrodynamics of material media, magnetic properties of ferrites, gyromagnetic phenomena and parametric effects, the dynamics of the processes of remagnetization, the phenomena in dielectric media taking into account their conductivity and the inertial properties of polarization.

K. M. Polivanov himself always very rapidly entered and brought his pupils into new directions of physical investigations in the field of static and low-frequency magnetism and the super-high-frequency gyromagnetism. Thus, after producing in 1948 new magnetic materials—ferrites—Polivanov, his collaborators and pupils immediately began an extensive theoretical and experimental investigation of their static and electrodynamic properties, at first merely as biocomplex media (using the terminology of V. K. Arkad'ev), and later as gyromagnetic (tensor) media.

In 1953 Polivanov among the first investigators demonstrated the resonance nature of the behavior of magnetic susceptibility related to the dimensions of the sample of the ferromagnetic material (volume resonance) and also predicted for the first time the dependence of absorption on the direction of the propagation of waves in a rectangular wave guide with ferrite in the case of transverse magnetization.

The fruitful scientific and organizational activity of K.



KONSTANTIN MIKHAÏLOVICH
POLIVANOV
(1904-1983)

M. Polivanov in investigating the static and dynamic magnetic properties of ferro- and ferrimagnetic materials led to the establishment in the Moscow Power Institute towards the middle of the 1950's of an actively working group of researchers which even now continues to develop and introduce into technology the results of physical investigations of the school of K. M. Polivanov who always regarded himself as a pupil of the school of P. M. Lebedev—V. K. Arkad'ev.

It should be noted that K. M. Polivanov determined the direction of the scientific research of many of his students and collaborators. Among these directions one should include the investigation of the relationship between real and imaginary components of the susceptibility as applied to a magnetic medium from the point of view of V. K. Arkad'ev and of a more general Kramers-Kronig approach; the development of the first methods in our country for measuring the

magnetic and dielectric susceptibilities of ferrites and magnetodielectric materials; the investigation of gyromagnetic phenomena in "isotropic" and magnetically-uniaxial ferrites; the analysis of the process of magnetization of ferrites; the investigation of the Faraday effect in disperse systems with a phase of magnetite and ferrite particles; the use of the volume resonance of a kind of a cavity for investigations within the field of ferromagnetic resonance of the nature of the change in the wavelength of the extraordinary wave arising in a transversely magnetized ferrite cylinder, and a number of other topics. In addition to this K. M. Polivanov, his pupils and collaborators have successfully undertaken research on the Mössbauer effect, on the electrodynamic properties of thin magnetic films, on static and resonance characteristics of ferrites with a uniaxial anisotropy.

Polivanov loved his students and never tired of reminding them that the output of each scientific investigation must necessarily contain "points of honesty (conscientiously recorded scientific data) and curves of shrewdness."

Polivanov in his scientific activity was in close contact with the Soviet school of physicists-magnetologists, participated actively in all the All-Union magnetic conferences, in which he and his pupils reported their principal scientific results. He was a permanent and active member of the Scientific Council of the Academy of Sciences of the USSR on the topic "Physics of Magnetic Phenomena."

The scientific activity of K. M. Polivanov was widely known not only in the Soviet Union, but also beyond our borders. He had scientific and friendly contacts with the scientists in Czechoslovakia, Poland, Bulgaria, France, and other countries. Many young scientists from socialist countries became Polivanov's pupils. Thus, for example, after a period of apprenticeship with K. M. Polivanov working on the subject of "pulsed remagnetization of a ferrite and of thin films" the young docent O. Benda in the late 1950's following the advice of K. M. Polivanov organized in the Slovak Technical University in Bratislava a group on applied magnetism, which is successfully working up to the present day. Polivanov's book "Ferromagnetic Materials" was recommended and is being used in Bratislava as a scientific refer-

ence for the program of instruction in the specialty "Physics and Technology of Ferromagnetic Materials."

The result of Polivanov's activity as chairman of the temporary commission on ferrites associated with the GKNT USSR (State Committee of the Council of Ministers of the USSR on Science and Technology) during 1956-1957 was the organization of a major industrial scientific research institute, and also of an industrial problem laboratory on ferrites in the Moscow Power Institute.

In 1971 Professor K. M. Polivanov gave up the directorship of the Department of Theoretical Foundations of Electrical Technology and became a professor-consultant to the Department of the Foundations of Radio Technology headed at the time by Academician V. A. Kotel'nikov.

During the last years of his life Polivanov worked intensively and fruitfully in the field of electrodynamics of moving bodies. He published a large number of scientific articles on this subject, and a monograph "Electrodynamics of Moving Bodies" climaxed this research.

Altogether K. M. Polivanov wrote more than 120 scientific articles and two monographs. His textbooks and reference books for institutions of higher learning and technical institutes are widely known and were published in several editions, while his textbook on the theory of the electromagnetic field on the new edition of which he worked intensively during his last days was already published in English by the publishing house "Mir" after his death.

The Soviet government had a high regard for K. M. Polivanov's activity and awarded to him Orders of Lenin, of Red Banner of Labor and many medals.

K. M. Polivanov, a wonderful human being and leader, a scientist with an exceptionally broad erudition, who possessed a truly encyclopedic knowledge, a high level of general culture and a limitless devotion to science will forever be fondly remembered in our hearts.

Translated by G. M. Volkoff