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IN MEMORIAM

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Georgii Mikhailovich Kukavadze

A talented physicist, graduate of the Tbilisi State University, Doctor of Physical Mathematical Sciences, Georgii Mikhailovich Kukavadze can equally be called a Georgian, Russian, and Ukrainian scientist. He was born in Kharkov on 18 January 1914. It was in Kharkov that he completed his postgraduate studies and gained the degree of Candidate (in the spring of 1941). He lived and worked in Moscow for over 46 years (from November 1945 to his death on 20 January 1992). He always regarded Georgia as his mother country, continued close contacts with it, and missed it very much; throughout his life he remained Georgia's tender and devoted son. In accordance with the will of Georgii Mikhailovich, his ashes were taken back to Tbilisi; the prodigal son returned home.

G M Kukavadze was born into a family of teachers. His father, Mikhail Savvich Kukavadze was born in Tbilisi and for many years taught at Tbilisi State University, where he was an assistant professor. His mother (maiden name Il'ina, born in the city of Tambov) Evdokiya Ivanovna was a schoolteacher.

In 1922 the Kukavadze family went back to Tbilisi. Here, G M Kukavadze completed his schooling (in 1930) at the First Tbilisi High School and was enrolled in the Physicomathematical Department of Tbilisi State University, where he graduated with distinction in 1937.

In 1938 G M Kukavadze was sent for his postgraduate studies to the Kharkov Physicotechnical Institute of the Ukrainian Academy of Sciences, known for its strong research school. After completion of his postgraduate studies and successful passing of the examinations for the degree of Candidate (on the subject of "Scattering of slow neutrons"), he continued to work at this Institute as a research scientist. Soon, however (in September 1941), he returned to Tbilisi to the Institute of Physics and Geophysics of the Georgian Academy of Sciences. This was a difficult time in the Soviet Union: at the height of the Great Patriotic War with forced retreat of our armies on all fronts. In May 1942, G M Kukavadze was called up to the Soviet Army (called at that time the Workers' and Peasants' Red Army); he started a course at the Tbilisi Artillery College. In view of the difficult situation on the fronts, the group that G M Kukavadze joined did not finish their course: in August 1942, the group was sent to the Caucasus front.

For exemplary performance of command duties during the war, G M Kukavadze was awarded the medals of 'Military Merit' and 'Defence of the Caucasus', and after the end of the war he received medals for 'Victory over Germany' and 'Valour in the Great Patriotic War'.

Georgii Mikhailovich Kukavadze.

In February 1943, by order of the Deputy Defence Commissar of the Soviet Union, G M Kukavadze was demobilised from the Red Army and directed to continue his scientific research at the Georgian Academy of Sciences. He was a senior research scientist at the Academy and at the same time lectured on physics at the Georgian Industrial and Tbilisi Railway Institutes.

Even in his youth, G M Kukavadze was an extremely disciplined and responsible person, very inquisitive, hard working, and a dynamic scientist. He loved his work and was devoted entirely to it. However, the times in which he lived when his personality was in the making had influence on his basically kind nature. These were times of suspicion and repression, extreme enthusiasm and fear, unquestioned fate and grave doubts, and these doubts had to be hidden not only from others but also from oneself.

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Maybe G M Kukavadze was more impressionable than others and more easily wounded, but it seems to us that the effects of those times were greater on his character than on most of his colleagues. To the end of his life he held his emotions in check, at least outside science. He was an extremely efficient and very reliable worker; there was never a shadow of doubt that Kukavadze would fail to carry out, or would carry out badly, the task he was given. Kukavadze's character and his contacts with people were characterised by natural intelligence and shyness, understanding, goodness, the thorough professionalism of a scientist, a high degree of orderliness, and, alas, the experience of many terrible years through which he lived with the rest of the country.

November 1945 saw the end of the Tbilisi period of the life of G M Kukavadze. He went to Moscow for good. He worked for a short time in the Vacuum Laboratory of Moscow's Electric Lamp Factory (as a senior engineer) and from October 1946 the rest of his life was connected with the Institute of Theoretical and Experimental Physics (called earlier Laboratory No. 3 of the USSR Academy of Sciences), which has gained wide international reputation and acclaim as a research centre. It was here that the talent of G M Kukavadze as a physicist and methodologist blossomed fully in fields such as vacuum technology, mass spectrometry, and microscopy. The contribution of Kukavadze to mass spectrometry both in the development of new methods and in their use for tackling important tasks in nuclear physics would be difficult to overestimate. He was a major specialist and recognised authority in the field of mass spectrometry in the former Soviet Union, where he lived and worked.

At the Institute of Theoretical and Experimental Physics, G M Kukavadze constructed one of the first Soviet mass spectrometers; a highly sensitive mass-spectrometric leak detector developed by him was used successfully in building the first Soviet heavy-water reactor, commissioned at his Institute in 1949. A successful development of nuclear energy in our country has been helped considerably also by the work of Kukavadze and his colleagues on measurements of various nuclear constants (absorption and radiative capture cross sections of fissionable materials and of fission products, half-lives, total neutron cross sections of a number of isotopes in the thermal and resonance regions, etc.). In addition to important technical applications, such work was of scientific importance and laid the foundations of nuclear physics.

The next stage in the scientific work of Kukavadze was in field-ion microscopy, which is a unique method for the analysis of the structure and properties of crystalline materials. This method has enabled humans to see for the first time individual atoms, as well as to determine the structure of linear, surface, and bulk defects on the atomic scale. G M Kukavadze was an initiator of field-ion microscopic studies at his Institute and he devoted much effort to this task. He and his colleagues did much pioneering work on the formation and behaviour of radiation defects on the surfaces and in the bulk of metals and alloys, carried out with the aid of a field-ion microscope; this work has been recognised by the scientific community, is well known, and is frequently cited.

During his long life in science G M Kukavadze participated, always very actively, in the work of many scientific organisational forums and conferences (including the First and Second Geneva Conferences on the Peaceful Use of Atomic Energy, as well as other meetings both at home and abroad). He spent much time and effort in various specialist councils and commissions of the Academy of Sciences and of its divisions, and he served on the scientific and Technical Council of his Institute. He approached very responsibly his special duties and for many years was a member of the Regional Soviet Council.

For about 30 years G M Kukavadze taught also at the Moscow Physicotechnical Institute where he presented courses on ''Fundamentals of vacuum technology'' and ''Physical methods of analysis''. As always, whatever he did, he did not regard teaching at the Physicotechnical Institute as a formality: he participated actively in scientific and research work, suggested diploma work and supervised it, and maintained a close relationship between the theoretical and experimental physics and physicotechnical institutes in a number of ways.

G M Kukavadze was an extremely original man with a great variety of interests. He was always open in his personal contacts, invariably courteous, and good-natured. This is the reason why the number of his friends was large and why even more people respected him and saw in him an outstanding personality.

The work of G M Kukavadze made a considerable contribution to our own and world science. His life left a bright mark at the Institute of Theoretical and Experimental Physics, and in the memory of his friends, colleagues, and all those who were lucky to know him, meet him, and work with him.

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