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In memory of Mikhail Arnol'dovich Blokhin

Professor Mikhail Arnol'dovich Blokhin, doctor of physics and mathematical sciences and one of the leading specialists in the field of X-ray spectroscopy who made a significant contribution to developing the fundamental principles of this method while making great strides towards its practical application, died on December 13, 1995.

Specifically, he studied the excitation mechanism of the inner electronic shells of atoms and the emission of X-rays spectra, the interaction of X-ray radiation with matter, carried out seminal research into the conversion of X-ray spectroscopy into an effective method for studying the nature of chemical bonding and special features in the electronic structure of molecules and solid state bodies and developed the basic physical principles of X-ray spectral element analysis.

M A Blokhin was born in Odessa in 1908. In 1932 he graduated from the Leningrad Institute of Physics and Mechanical Engineering. An industrious student, he became involved in A I Alikhanov's research team and devoted himself from 1931–1934 to X-ray radiation studies which were undertaken by the Leningrad Institute of Physics and Technology at the initiative of the academician M A Ioffe. By request of the latter M A Blokhin undertook research into X-ray spectra, to which he devoted his entire life.

After graduating from Institute, M A Blokhin was assigned to work at the Leningrad Institute of Geological Sciences AS USSR. He was transferred to Moscow along with this Institute in 1934.

In the years leading up to the war, drawing on the support of academician A E Fersman, he was actively engaged in developing the X-ray spectral method of element analysis along with the proper research equipment. In 1939 M A Blokhin co-authored (with I B Borovsky) his first monograph, entitled *X-ray spectral analysis*.

During the same period of time M A Blokhin also launched research into the relationship between the electronic structure of atoms and their X-ray spectra. Using the results of this research he defended his doctoral dissertation in 1938. M A Blokhin began his teaching career at the Moscow State University in 1939, to which he devoted a considerable part of his life.

In the summer of 1941 M A Blokhin was evacuated together with part of the Institute of Geological Sciences to the city of Sverdlovsk, where he concurrently taught at the Urals Institute of Industry. In 1943, by request of the Urals branch of the AS USSR M A Blokhin set up an X-ray spectral laboratory at this Institute and relocated there to begin work. In 1945, after the lab had been staffed with qualified research personnel and was able to operate on its own, he returned to Moscow.

Mikhail Arnoldovich Blokhin

From 1945 to 1951 M A Blokhin supervised an X-ray spectral laboratory at the All-Union Institute of Raw Mineral Material. These years were devoted to the practical realization of previously-conducted experiments: developing high-tech X-ray equipment and spectral units for use in X-ray spectral analysis, organizing their production at an experimental factory of the AS USSR, publishing summaries on the application of X-ray spectral analysis, which included a research technique for dividing electronics according to their states [see *Usp.Fiz.Nauk* **28** (4) (1946) and **29** (1 – 2) (1946)].

In 1951 M A Blokhin accepted an invitation by the Rostov State University to move to Rostov-on-the-Don, where he remained for the rest of his life. The University is linked to the most productive time of his life. Here he designed a number of X-ray spectrometers and arranged their production at the Rostov State University. Dozens of these instruments are still being used across Russia. Several types have been showcased over the years at the Exhibition for the Achievements of the

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National Economy of the USSR, the Supervise Committee of which awarded the inventor with the Great Silver Medal.

In 1954 he defended his doctoral dissertation, in 1956 he organized the sub-faculty of solid state physics, which M A Blokhin supervised continuously for nearly 30 years. This was the only sub-faculty in the USSR which trained specialists in the field of X-ray spectroscopy.

A large experimental and theoretical school of X-ray spectroscopy was set up at the Rostov University, which also studied problems of the electronic structure of atoms, molecules and solid states and various issues relating to the interaction of X-ray radiation and matter. M A Blokhin also directed a Scientific Research Institute attached to the University of Rostov.

M A Blokhin did a great deal on the organizational level to popularize scientific research among the population at large. In conjunction with the widespread introduction of the X-ray spectral method in various spheres of production attached to the University of Rostov yearly training courses for X-ray equipment were held at the end of the Fifties that were attended by specialists not only from the Soviet Union but also abroad.

M A Blokhin actively promoted the establishment in Leningrad at the beginning of the Sixties of a special design bureau for X-ray equipment (currently called the "Burevestnik" science and production department) and organized there the production of X-ray spectral equipment. Some of the equipment he designed personally was also transferred there.

For a number of years M A Blokhin acted as chairman and active member of the X-ray section of the Council for solid state physics and the Council for X-Ray and Electronic Spectroscopy of the AS USSR, chairman of a working group of X-ray spectral analysis of the Council of the AS USSR for analytical chemistry, the Scientific Editor of a Leningrad-based periodical collection entitled "Equipment and Methods of X-Ray Analysis". He was the chairman and member of the organizational committees of many all-Union, international conferences and conventions on X-ray spectroscopy and X-ray spectral analysis, while maintaining continuous scientific contacts with colleagues from many countries all over the world.

M A Blokhin is the author of approximately 250 publications, including four books, five inventions, a host of articles concerning X-ray radiation and X-ray spectroscopy for the Big Soviet Encyclopedia and Encyclopedic Dictionary of Physics. His monograph *The Physics of X-Ray* has been published in two editions in the Soviet Union, as well as Poland, Germany , USA, India and Japan, the monograph *The Methods of X-ray Spectral Investigations* has been also published in Germany, United Kingdom, USA, India and Japan. Until his death, M A Blokhin published briefs on X-ray spectroscopy for the Physics Journal of Briefs.

Over the years he succeeded in training hundreds of specialists. His students work in many cities of Russia, the CIS and abroad. They include a dozen or so doctors of sciences and scores of candidates of science. M A Blokhin's contributions to science have on numerous occasions won government awards.

M A Blokhin was a highly cultured man: he mastered four foreign languages, was interested in the history of science, astronomy (published an article), music, painting and travelling.

The glowing memory of Mikhail Arnol'dovich Blokhin will long remain enshrined in the hearts of all who had the opportunity to associate with him during his life.

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