

## In memory of Vadim Vasil'evich Afrosimov

DOI: <https://doi.org/10.3367/UFNe.2019.07.038605>

The outstanding scientist and corresponding member of the Russian Academy of Sciences (RAS), Vadim Vasil'evich Afrosimov, passed away on 25 March 2019.

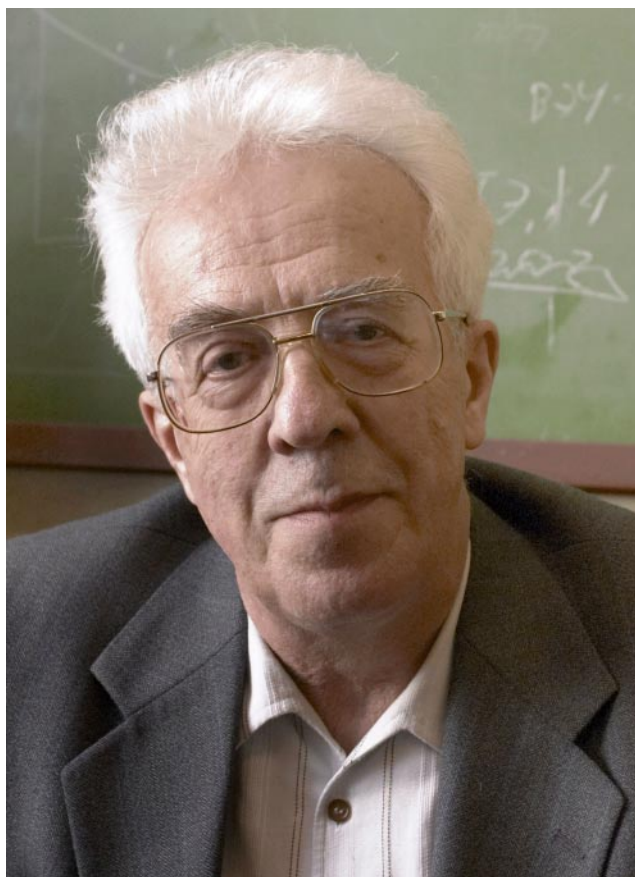
Vadim Vasil'evich's scientific activity was all his life connected to the Ioffe Institute (PTI), where he was admitted as a laboratory assistant in 1953 after graduating with honors from the Faculty of Physics and Mechanics of the Polytechnic Institute.

At the beginning of his scientific pathway, V V Afrosimov carried out research closely connected to solving the important practical task of providing physical data for work on isotope separation by the electromagnetic method. Intense ion beam production required knowledge of cross sections for the interactions between ion beams and gas atoms and molecules, as well as understanding the physics underlying this interaction.

On the turn between 1950s and 1960s, the team of researchers led by V V Afrosimov applied in atom collision physics experimental techniques and methods already known at that time in nuclear physics. This changed the character of research radically. Instead of the integral characteristics of collisions, it became possible to examine each of the colliding particles and to determine its physical and dynamical characteristics, which provided the understanding of the atomic particle interaction physics at the quantum-mechanical level. These results brought the team into the ranks of leaders in our country and in the world in studies of the physics of fundamental processes of collisions of electrons, atoms, and ions actively developing in those years. The national school of world-class specialists in atomic collision physics was created at PTI with the active participation of V V Afrosimov. In 1972, a group of scientists, with V V Afrosimov among them, was awarded the Lenin Prize for work on the physics of electronic and atomic collisions.

In the 1960s, a problem of measuring the ion temperature in the plasma of the thermonuclear installations then being constructed arose. Fundamental studies on atom ionization in collisions with hydrogen atoms and ions allowed the team of researchers led by Vadim Vasil'evich to develop the methods and equipment for the corpuscular diagnostics of high-temperature plasma, essentially new in world practice. It was based on measurements of the energy and mass spectra of hydrogen, deuterium, and tritium atoms freely leaving the plasma. This allowed separate measurement of the energy distribution function of different isotopes of hydrogen ions and the concentration of isotopes of hydrogen and impurity ions in thermonuclear plasma.

In the 1960s–1970s, the elaborated methods and equipment were successfully applied in tokamaks at the Kurchatov



Vadim Vasil'evich Afrosimov  
(03.04.1930 – 25.03.2019)

Institute of Atomic Energy, which furthered a great interest in corpuscular diagnostics from global centers of fusion research. The series of studies with the participation of V V Afrosimov, including the development and application of corpuscular diagnostics, was awarded the 1981 USSR State Prize.

At the present time, devices for corpuscular diagnostics designed at the Ioffe Institute are being widely employed at the largest thermonuclear installations in the world. The diagnostics created under the leadership of V V Afrosimov underlay equipment worked out in Russia to control plasma parameters of the International Thermonuclear Reactor ITER being built in Cadarache (France).

For many years, Vadim Vasil'evich was head of the Scientific Council of the USSR Academy of Sciences (RAS) for the problem “Physics of Electronic and Atomic Collisions”, took an active part in the development of international relations, and organized and headed the work of many Russian and international conferences.

V V Afrosimov was elected secretary of the commission of the International Union of Pure and Applied Physics

(IUPAP) and was a member of the European Physical Society (EPS). In line with the scientific work in the laboratory, Vadim Vasil'evich was deputy director for science at PTI in 1987–1989 and from 1989 to 1991 fulfilled the duties of the chief academic secretary of the Leningrad (St. Petersburg) Research Center of the USSR Academy of Sciences (RAS). In 1991–1995, he was a member of the Presidium of this center.

V V Afrosimov was head of the Dissertation Council at PTI RAS, spending much time and effort to train young scientists in the field of plasma physics, atomic physics, physical electronics, and astrophysics. More than 20 candidate and doctor theses were defended under his guidance.

Vadim Vasil'evich was for many years an active member of the editorial board of *Zhurnal Tekhnicheskoi Fiziki* (the *Journal of Technical Physics*), one of the oldest physical journals in the country, and was its editor-in-chief for almost 10 years.

V V Afrosimov was awarded the orders Badge of Honor (1976) and Red Banner of Labor (1986) and medals For Labor Valor (1962) and In Memory of 300 Years of St. Petersburg (2003). In 1987, Vadim Vasil'evich was elected a corresponding member of the USSR Academy of Science.

With the death of Vadim Vasil'evich Afrosimov, we lost a prominent scientist, friend, and colleague, whose life and creative activity were closely interrelated with the history of the Ioffe Institute. His bright image will forever remain in our hearts.

*V I Afanas'ev, S V Bobashev, A M Bykov,  
Yu S Gordeev, A G Zabrodskii, A N Zinov'ev,  
S V Ivanov, A A Kaplyanskii, M N Panov,  
M P Petrov, R A Suris, A P Shergin*