

## Yurii Efremovich Nesterikhin (on his 80th birthday)

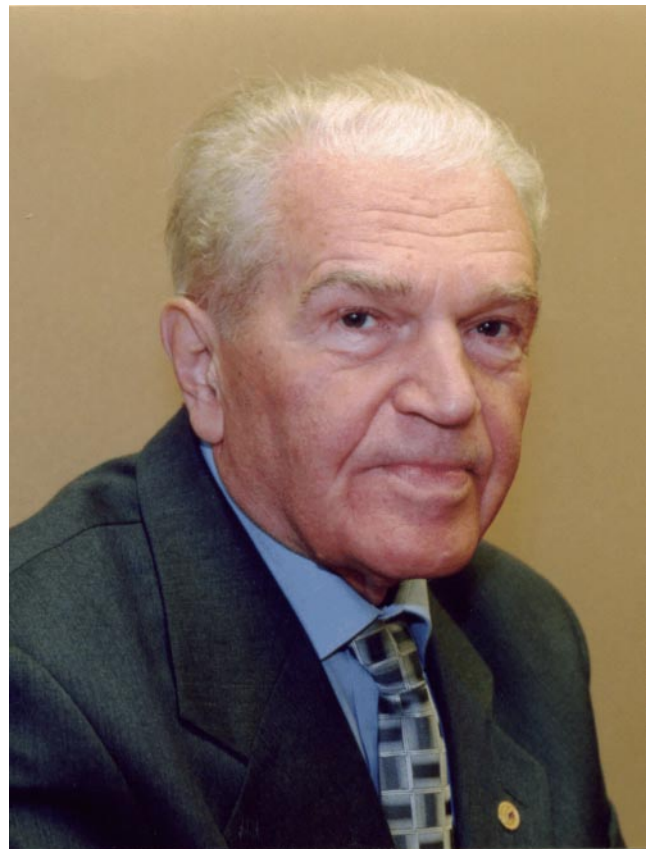
DOI: 10.3367/UFNe.0180.201010h.1119

On 10 October 2010, Yurii Efremovich Nesterikhin, outstanding experimental physicist, science organizer, Full Member of the Russian Academy of Sciences, celebrated his 80th birthday.

Yurii Efremovich was born in 1930 in the town of Ivanovo, where he graduated from high school in 1948. Until 1953, he was a student at the Physicotechnical Faculty of M V Lomonosov Moscow State University (now Moscow Institute of Physics and Technology — MFTI in *Russ. abbr.*); he belonged to a group of students supervised by A M Prokhorov. After a stint at P N Lebedev Physical Institute of the USSR Academy of Sciences (FIAN in *Russ. abbr.*), he completed his diploma thesis under the guidance of Academician A I Alikhanov, after which he was sent to USSR Academy of Sciences Laboratory No. 2—the current Russian Research Centre ‘Kurchatov Institute’ (to Academician L A Artsimovich’s division) where he began to engage in plasma physics research. In 1961, by agreement with Academicians L A Artsimovich and M A Lavrent’ev, he was transferred together with R Z Sagdeev to the recently organized Institute of Nuclear Physics, SB USSR AS (Novosibirsk) created at that time by G I Budker. At INP, he first worked as Chief Engineer, then as Head of the Laboratory of Plasma Physics. In 1967, he submitted and defended his thesis for Doctorate of Physicomathematical Sciences.

These were years marked with active research in plasma physics aimed at controlled thermonuclear fusion. Yu E Nesterikhin’s research during this period laid the foundation for a number of effective methods of plasma diagnostics, including a number of developments that were subsequently adopted by Soviet industry; this helped his maturation as a scientist of world renown in plasma physics, physical micro- and nanoelectronics, and information technologies and their applications in science and production.

The best known are Yu E Nesterikhin’s classic work started on the initiative of G I Budker and R Z Sagdeev for detection and investigation of collisionless shock waves, which was seminal for a new direction in plasma physics. He conducted an extensive series of experiments which confirmed the theoretically predicted possibility of plasma heating in such waves to thermonuclear fusion temperatures, and had a number of experimental facilities created, which allowed the detection of shock waves with a frontwave width less than the mean free path, and effects of steepening the wave front and its fine structure. These effects were of fundamental importance for understanding many physical processes (e.g., interaction of the “solar wind” with Earth’s magnetic field), and their studies were conducted on a wide scale in the United States, Great Britain, Germany, and Italy.



Yurii Efremovich Nesterikhin

In 1967, a still very young (by today’s standards) 37-year-old researcher, Yurii Efremovich, was promoted on the initiative of Academicians G I Budker and M A Lavrent’ev to directorship of the Institute of Automation and Electrometry (IAiE in *Russ. abbr.*) SB USSR AS. Within the span of a very successful 20-year leadership of the Institute, he managed to create an exceptionally professional, harmonious, and productive research team of experts in various fields (physics, mathematics, cybernetics, engineering, and technologies) which put the brand IAiE on the map worldwide. The high level of skill and academic achievements of representatives of this team in studies on the borderline between physics and informatics is confirmed by the fact that many of them are now working successfully in a number of leading universities around the world and in research centers in Great Britain, the USA, Germany, Israel, etc.

The unique ultrafast electron optics and laser systems developed by Yu E Nesterikhin, both with and without collaborators, have revolutionized the techniques and methodology of experiments with various fast processes in plasma, ballistics, cosmodynamics, gas dynamics, and others. Problem-oriented systems for automation of research in plasma

physics, semiconductor electronics, hydrodynamics, gravimetry, and biology have been developed under his supervision and with his participation.

Among the major areas of Yu E Nesterikhin's activities (who at the time headed the Council for Research Automation under the Presidium of the Siberian Branch of the USSR Academy of Sciences and an appropriate profile chair at Novosibirsk State University) there was his work on creating highly efficient systems for solving specialized tasks that required particularly high productivity. Among the outstanding achievements of Yu E Nesterikhin and his colleagues and students in this area, we select the development of systems of synthesis of the visual environment for aviation and space flight simulators, integrated systems for aerospace image processing, multiprocessor switching nodes for integrated digital communications networks, diverse high-precision measurement systems, and new information technologies which organically combined elements of computer and laser technologies.

When the IAiE became head institute on research automation, Yu E Nesterikhin as its director supervised the creation of the Special Design Bureau for Scientific Instrumentation of SB USSR AS (optics, electronics, computers) and two interdisciplinary engineering design departments linked to Novosibirsk industrial plants of the defense and electronics industries for practical implementation of specialized integrated systems and devices (holographic memory, signal processing, and target designation devices). On this basis the IAiE introduced over two decades (1967–1987) a few dozen major innovation projects for use in industry and scientific experiment. In 1985, one of them — the design and development and mass introduction into science and a number of branches of industry of innovative automation systems based on a standard KAMAK (Computer Automated Measurement and Control) — brought Yu E Nesterikhin and a group of leading experts from IAiE (Yu N Zolotukhin, Z A Livshits, P M Peslyak, and some others) the Prize of the Council of Ministers of the USSR. From 1969 till 1988, Yu E Nesterikhin was Editor-in-Chief of the journal *Avtometriya* (*Optoelectronics. Instrumentation and Data Processing*).

He was elected Corresponding Member of the USSR Academy of Sciences in 1970, and Full Member in 1981.

In 1987, he returned to the I V Kurchatov Institute of Atomic Energy where he headed the division of Applied Electronics which worked on, among other topics, the creation of a software package for three-dimensional computer tomography. In 1996, he became Chief Researcher at the A A Blagonravov Institute of Machines Science of the Russian Academy of Sciences (IMASH RAN in *Russ. abbr.*). Between 1996 and 2002 he worked as science supervisor of the Center for Computer Technologies in Control Systems of the Academy of the National Economy under the RF Government, which conducted the training and advanced retraining of the personnel of the Directorate of Information and Documentation Support of the President of the Russian Federation and the staff of the Government of the Russian Federation.

Yu E Nesterikhin devoted and continues to devote much of his time and energy to educating young people, to various educational and science-strengthening activities. Many of his students have received DSc and CandSc degrees. Since 2000, he has continued to head another creation of his: the Chair of Computational Models of Technological Processes at the Department of Aerophysics and Space Research of MFTI (an affiliate of IMASH RAN). In 2001, Yu E Nesterikhin became a Councillor of the Russian Academy of Sciences.

Each activity pursued by Yurii Efremovich is marked by selfless devotion to science, a rare sense of purpose, and the ability to stimulate people to work together on solving large-scale problems. He is very demanding of himself and colleagues, yet at the same time remains benevolent and responsive. His achievements in science have received numerous State awards.

We heartily congratulate Yurii Efremovich Nesterikhin on his birthday and wish him health, prosperity, and new creative successes.

*A G Aganbegyan, V E Zakharov, Yu N Zolotukhin,  
V S Kirichuk, E P Kruglyakov, E A Kuznetsov,  
G A Mesyats, S L Musher, A M Rubenchik,  
R Z Sagdeev, G I Smirnov*

As work was being completed on the English translation of material for *Physics – Uspekhi* (the English version of *Uspekhi Fizicheskikh Nauk* journal), the Editorial Board received the sorrowful news about the death of Academician Yurii Efremovich Nesterikhin on 22 December 2010. We express our heartfelt condolences to his relatives and good friends.