

Radii Ivanovich Il'kaev (on his 70th birthday)

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On October 9, 2008, outstanding physicist and organizer in nuclear weapons development, scientific leader of the Russian Federal Nuclear Center — All-Russian Research Institute of Experimental Physics (RFNC–VNIIEF in *Russ. abbr.*), and Full Member of the Russian Academy of Sciences, Radii Ivanovich Il'kaev, will be 70.

R I Il'kaev's scientific work covers the areas of theoretical and experimental nuclear physics connected with plasma dynamics, thermonuclear and neutron nuclear processes, interactions of radiation with matter, and laser fusion.

His applications-oriented research is first and foremost aimed at the production of nuclear and thermonuclear weapons for our country. Under his guidance and with his personal participation a number of nuclear charges, the foundation of the Russian nuclear arsenal, as well as theoretical models were developed, and unique experimental data on the behavior of matter in high energy density region were obtained.

R I Il'kaev is an eminent researcher on boosting — processes of hydrodynamic, radiative, and neutron interactions of heterogeneous and homogeneous media involving 'nuclear' and 'thermonuclear' plasmas, resulting in 'nuclear autocatalysis' which is extremely important in thermonuclear weapons efficiency.

One of the most significant parameters defining efficiency of nuclear and thermonuclear charges is energy release. The development of an original research method in this field, combining profound theoretical study and fine experimental feasibilities with the usage of unique apparatus, brought R I Il'kaev the USSR State Prize in 1968.

R I Il'kaev suggested original physical solutions, substantiated their scientific realizability and reliability, and led the production of new thermonuclear charges on the grounds, which appeared to be an effective response to the creation of the 'neutron bomb' in the USA. For his research in this field, R I Il'kaev was awarded the USSR State Prize in 1981.

In 1994, R I Il'kaev was awarded the Russian Federation State Prize for the creation of a new type of thermonuclear charges possessing 'variable power' quality, the use of which leads to considerable increase in the effectiveness of weapons systems and nuclear deterrent, and decrease in nuclear weapons side effects.

Throughout his scientific career R I Il'kaev has worked on a wide range of most important problems of ensuring the nuclear weapons safety. He himself carried out and actively participated in a series of theoretical and experimental works on chain reaction development under conditions of considerably asymmetrical hydrodynamics of a medium. Recently, he has been paying much attention to new approaches to the



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guaranteed protection of nuclear charges and ammunition against their unauthorized usage.

R I Il'kaev is an ideologist and the organizer of creating a new generation of high-power laser facilities utilized in modeling thermonuclear processes. A concept for the high-power new-generation laser facility Iskra-6, whose feasibility was demonstrated by creating its module, laser facility Luch, was developed under his leadership. He is actively developing research on the creation of modern weapons which are based on new physical principles.

R I Il'kaev is the founder of scientific schools in the fields of boosting and nuclear weapons safety.

Scientific and technical support for the projects, ensuring the efficiency, reliability, and safety of nuclear charges and ammunition, the basis for Russia's nuclear stockpile, are provided without conducting direct full-scale tests of nuclear components. The solution to this issue, one of the most complicated scientific tasks and the most important practical tasks directly related to safeguarding of Russia's national security, constitutes one of the primary practical undertakings of the Nuclear Center headed by R I Il'kaev.

R I Il'kaev's work as the scientific leader of RFNC–VNIIEF is extremely varied. He continues giving special attention to the creation of a powerful modern Computing

Center (CC), one of the largest such centers in Russia. High-performance new-generation computers make it possible to conduct physico-mathematical modeling of the more important processes proceeding in nuclear and thermonuclear charges, also taking into account changes in their production, exploitation, and conditions of their possible usage.

R I I I'kaev is the Chairman of Scientific and Technical Council of the RF Rosatom Nuclear and Armament Complex (NAC STC), Chairman of the VAK specialized council, Chairman of RFNC–VNIIEF STC, Chairman of the RFNC–VNIIEF dissertation council, Chairman of the NAC STC section looking into the questions of special systems on new physical principles, and Chairman of the interdepartmental committee on the development of estimation methods for reliability indices of special charges.

R I I I'kaev's scientific-technical achievements in the field of state security consolidation are marked by three State Prizes, the Prize of the Government of the Russian Federation, certificates of appreciation from the President of the Russian Federation, the Order of Service to Motherland of the Third Class, and the Badge of Honor. R I I I'kaev has been conferred the title of Honorable Scientist of the Russian Federation. In 2000, he was elected as a Corresponding Member of the RAS, and in 2003 became a Full Member of the Nuclear Physics Division of the RAS.

R I I I'kaev's outstanding scientific achievements were marked by awarding him the A D Sakharov Gold Medal of the RAS.

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