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***PERSONALIA***

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# Vladimir Georgievich Kadyshevsky (on his 70th birthday)

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Vladimir Georgievich Kadyshevsky — an outstanding theoretical physicist and organizer of science, member of the Presidium of the Russian Academy of Sciences (RAS), Science Leader of the Joint Institute of Nuclear Research (JINR), and full member of the RAS — had his 70th birthday on May 5, 2007.

Kadyshevsky has made important contributions to elementary particle theory and high-energy physics. He is always focused on solving key problems in physics and on nonstandard research methods; he makes excellent use of his rich intuition.

Kadyshevsky's name is inseparable from relativistic formulation of quantum field theory in quantized spacetime that satisfies the requirements of unitarity and generalized causality. His work in this field has gained the recognition and support of some of the prominent scientists in the field and has anticipated work on the 'noncommutative geometry' of the 1990s that is nowadays the focus of theorists.

In the internal symmetry theory Kadyshevsky established a number of relations for the effective cross sections, masses, and magnetic moments of hadrons; they were subsequently experimentally confirmed. Even before the emergence of the Standard Model of electroweak interactions, he started working on the lepton – hadron symmetries that manifest themselves in weak processes.

Kadyshevsky was born on May 5, 1937 in Moscow. Between 1946 and 1954 he was a cadet in the Sverdlovsk Suvorov Military School. Having graduated with a gold medal, Kadyshevsky enrolled in the Physics Department of Moscow State University. Theoretical physics attracted him most even in his early student years. In 1959 Kadyshevsky's graduation project "On mass spectrum and fundamental length in field theory" (supervised by D V Shirkov) won the 1st prize and received the medal of the USSR Ministry of Higher Education at the all-USSR Student Projects Contest. On graduation from Moscow State University in 1960, he stayed on as a graduate student at the Chair of Academician N N Bogoliubov. In 1962 Kadyshevsky successfully submitted and defended his PhD thesis and started working at the JINR Laboratory of Theoretical Physics.

In 1964 Kadyshevsky started publishing a series of papers devoted to the covariant Hamiltonian formulation of quantum field theory. He developed an original diagram technique which, in contrast to the familiar Feynman technique, operates with amplitudes on the mass shell. Application of this method to the problem of interaction between two relativistic particles made it possible to reduce the number of variables and to establish a three-dimensional integral equation for the relativistic scattering amplitude now known in the literature as the Kadyshevsky equation.

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Vladimir Georgievich Kadyshevsky

Kadyshevsky's technique, being theoretically consistent, allowed him to transfer to elementary particle physics the research methods, intuition, and experience accumulated in the theory of similar non-relativistic systems, such as few-nucleon atomic nuclei. It is not surprising that the Kadyshevsky equation is used by physicists of different countries for practical computations of hadron – hadron and hadron–nucleon interactions, as well as for descriptions of the quark structure of hadrons.

In view of the relativistic nature of the problem, in the extended formalism Kadyshevsky applied the expansion in unitary representations of the Lorentz group, instead of the Fourier transform. As a result, it proved possible to have in the theory a three-dimensional relativistic position operator and the corresponding relativistic configurational representation. The Kadyshevsky equation in the new configurational space is found to be a finite-difference equation with an increment equal to the Compton wavelength of the particle. When looking for specific physics applications of his equation, Kadyshevsky was also able to develop efficient methods of solving difference equations.

In recent years, Kadyshevsky developed a new geometrical approach to describe electroweak interactions beyond

the Standard Model, which allowed one to make a number of experimental predictions.

Since 1970 Kadyshevsky has been a professor in the Physics Department of Moscow State University. At the moment he heads the Chair of Elementary Particle Physics of this department. Among his students, 15 have acquired PhD degrees and five have received a DSc, many have become well-known scientists and work successfully in Russian research centers and abroad. On many occasions he has conducted sessions of young scientist schools, international symposia, and conferences.

On Kadyshevsky's initiative a new university was founded in Dubna in 1994: the Dubna International University of Nature, Society, and Man. Since 1995 he has been its president.

From 1977 to 1978 Kadyshevsky headed a group of Soviet physicists who worked in the Enrico Fermi National Laboratory in the USA and in 1983 – 1985 he supervised work on the DELPHI program at the JINR in connection with experiments on the LEP collider at CERN. He also headed the theoretical investigation effort in the framework of this program.

In 1987, on Academician Bogoliubov's suggestion, Kadyshevsky was elected to the position of Director of the JINR Laboratory of Theoretical Physics. He occupied this position until 1992 and contributed importantly to sustaining the lofty traditions of research at the Dubna theoretical school of researchers and to further expanding international cooperation.

From 1992 until 2005 Kadyshevsky headed the JINR, one of the largest international research centers. During these difficult years he and his team of collaborators not only kept the institute going but greatly strengthened its position. Thus, the following work was carried out, which created quite a stir in the scientific community: experiments were run on Russia's first superconducting accelerator of relativistic nuclei — the nuclotron; the research reactor IBR-2 with record-parameter neutron beams was modernized; an important breakthrough was achieved in nuclear physics, namely new superheavy elements were synthesized for the first time with the U400 cyclotron; plus considerable progress was achieved in developing a research program in particle physics for accelerators at the JINR and at the largest research centers in the world. These days, as always, Kadyshevsky continues to contribute in important ways to progress in the main research fields and, in his capacity as JINR Science Leader, to international cooperation.

The scope of Kadyshevsky's science organizer activities is very wide. He is a member of the RAS Presidium and of the Consultative Expert Council with the Office of the Chairman of the Russian Federation Audit Chamber. For a number of years Kadyshevsky was President of the Association of Russian Scholarly Societies, and a member of the IUPAP Commission on Particles and Fields and of the Commission of the President of the Russian Federation on Awarding State Prizes of the Russian Federation in Science and Technology.

Kadyshevsky's achievements in science were rewarded with prizes of the National Academy of Science of Ukraine — the N M Krylov (1990) and the N N Bogolyubov (2001) Prizes, as well as the N N Bogolyubov Prize of the JINR (2006). He has *honorary degrees* of several foreign universities, and was elected as honorary or foreign member in a number of academies of science.

Kadyshevsky is an honorary citizen of the town of Dubna and of the Moscow region, was given the Order of Friendship of Nations, the Order of Honor, and the Order of Merit for the Country Class IV, and has received a number of orders and medals of other countries; he also received the Gold Medal of the International Association of Academies of Sciences "For assistance to progress in science" (2002) and the Gold Medal "For Work Useful to Society" (The Institute for European Integration, 2003).

Kadyshevsky actively defends the values of fundamental science and fights constantly to enhance the prestige of the Russian science and of Russian Academy of Sciences in society at large. He follows his acute sense of responsibility, is devoted to science, is focused on goals once he defines them, and possesses an exceptional capacity for work. He combines these qualities with refined innate intelligence, kindness, warmth, and attention to people around him.

We wish Vladimir Georgievich Kadyshevsky good health, well-being, and new creative achievements glorifying our science.

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