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Viktor Anatol'evich Matveev (on his sixtieth birthday)

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December 11, 2001 brings us the 60th Anniversary of the full member of the Russian Academy of Sciences Viktor Anatol'vich Matveev, an outstanding physicist and science administrator, member of the Presidium of the Russian Academy of Sciences, director of the Institute for Nuclear Research of the Russian Academy of Sciences (INR RAS).

The physics community well knows the contribution of V A Matveev to the progress of quantum field theory techniques, the construction of relativistic quark models of hadrons, the investigation of dynamics of processes at high energies and high momentum transfer, to the creation of the quark theory of nuclei and the study of manifestations of the quark degrees of freedom in atomic nuclei, and to the study of the structure of the vacuum in gauge theories and related effects observed under extreme conditions.

Viktor Anatol'evich is a brilliant representative of N N Bogolubov's school. His career as a physicist started in 1964 when, having graduated from the Physics Department of Leningrad State University, he joined the theoretical physics laboratory of the Joint Institute of Nuclear Research (JINR) in Dubna. The talents of the young scientist flourished under the inimitable atmosphere reigning in Dubna.

V A Matveev, together with B V Struminsky and A N Tavkhelidze, carried out work which played a key role in the progress of the quark theory of hadrons in 1965 – 1966. Their publications developed the model of color quarks in detail, worked out the quark theory of electromagnetic and weak decays of mesons and baryons, gave an explanation for electromagnetic splitting of masses in isotopic hadronic multiplets, suggested an interpretation for higher-order hadronic resonances as excitations of quark systems, and derived the corresponding mass formulas.

While working at Dubna, V A Matveev made an important contribution to the development of the relativistic approach to describing bound systems of particles in quantum field theory and to the creation of quantum field methods for describing particle scattering at high energies. In 1973 he received the Lenin Komsomol Prize for a series of papers on "Approximate methods of quantum field theory of quantum high-energy physics".

One of the most important directions of research for V A Matveev is a search for dynamic symmetries in high-energy physics and identification, on this foundation, of general types of behavior manifested in interactions between particles. A series of papers prepared together with P M Muradyan and A N Tavkhelidze formulated the principle of self-similarity in high-energy physics which made it possible, using the laws of physical similarity and generalized dimensions analysis plus the quark structure of hadrons, to develop a unified approach to describing the phenomena of scale-invariant behavior of deeply inelastic and inclusive processes at high energies. The concept of scale invariance and the model of quasi-independent quarks led to the derivation of the widely known quark calculus rules of Matveev – Muradyan – Tavkhelidze, which express the general behavior of elastic scattering of hadrons at high energies. These rules received a discovery certificate in 1987.

Viktor Anatol'evich Matveev

V A Matveev proposed the concept of hidden color in nuclei and pointed to the crucial importance of quark degrees of freedom for understanding the short-distance structure of nuclei. The development of the theory of colored quarks, the quark structure of hadrons and nuclei, to which V A Matveev made an important contribution earned the Lenin Prize which he received together with the other authors in 1987.

A serious of papers published by V A Matveev together with V A Rubakov, A N Tavkhelidze, V F Tokarev and M I Shaposhnikov for the first time formulated and solved the problem of instability of baryon matter at superhigh baryon densities.

Matveev's recently published joint work with N V Krasnikov in which they analysed the potential of the LHC collider currently being built at CERN; the analysis concentrated on the search for supersymmetry in the physics of fundamental interactions and caused quite a stir.

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Translated by V I Kisin

An approach to formulating and studying gauge theories using light wavefront variables that V A Matveev and J B Pivovarov are currently developing, is attracting considerable attention.

Viktor Anatol'evich Matveev has worked at the Institute for Nuclear Research of the Russian Academy of Science since 1978, first as a deputy director, and since 1987 as its director. The basic research directions of the Institute, neutrino physics, neutrino astrophysics, and research using high-current proton beams, have been substantially expanded under his guidance.

Viktor Anatol'evich has devoted much energy and time to development and expansion of the basic facilities of the institute: the high-current accelerator and the experimental complex of the Moscow meson factory, the neutrino telescopes and the surface systems of the Baksan neutrino observatory, and the deep underwater neutrino telescope at Lake Baikal.

In 1998 V A Matveev, together with the other members of the team, received the State Prize of the Russian Federation "for creating the Baksan neutrino observatory and for research in neutrino astrophysics, elementary particle physics and cosmic rays".

In 2001 Viktor Anatol'evich and his colleagues from the Institute for Nuclear Research of Russian Academy of Science received the Prize of the Russian Federation Government for their work on the "Development and construction of the high-current linear proton accelerator".

V A Matveev devotes much attention to the development of international scientific cooperation employing both the newest nuclear physics facilities in this country and experiments abroad. It is owing mostly to his efforts that the links were strengthened between the Institute for Nuclear Research of RAS and the National Laboratory of Gran-Sasso where the most important field of cooperation with the Russian physicists is the large-scale LVD underground experiment.

Matveev's contribution to the success of the Russian-American SAGE experiment is invaluable (the experiment is in run on the gallium-germanium neutrino telescope of the Baksan neutrino observatory of the Institute for Nuclear Research of the RAS).

V A Matveev chairs the subcommittee of the international collaboration on the Russia-CERN cooperation, and is a member of the International Committee of the International Union of Pure and Applied Physics (IUPAP) on "Particles, neutrino physics and gravitation".

The scale of V A Matveev's science management activities is very impressive. He is a member of the RAN Presidium, Chairman of the Troitsk Research Center Presidium, and a member of the JINR Learned Council.

Viktor Anatol'evich successfully combines his multifaceted research and science-management activities with work on the training of new generations of scientists. Since 1950 he has been a professor of the M V Lomonosov Moscow State University Physics Department, and since 1995 he has headed the chair of "Fundamental interactions and cosmology" of the Moscow Physico - Technical Institute (now Moscow Institute of Physics and Technology). Many of V A Matveev's pupils have grown into well known scientists; they are now successfully working in research centers both in Russia and abroad.

Viktor Anatol'evich has always had an exemplary sense of responsibility, demonstrated his devotion to science, his perseverance in achieving his goals, and his exceptional ability to work hard. In him these characteristics are combined with innate intelligence, kindness, warmth and attention to those who surround him.

Viktor Anatol'evich's colleagues, friends and students warmly congratulate him on this anniversary and wish him robust health, happiness and success, new ideas and achievements for the glory of his beloved science.

G T Zatsepin, V G Kadyshevskiĭ, V M Lobashev, A A Logunov, N V Krasnikov, V A Kuz'min, Yu V Novozhilov, V A Rubakov, O G Ryazhskaya, A N Skrinskiĭ, A N Tavkhelidze, D V Shirkov