

Dmitrii Vasil'evich Shirkov (on his 80th birthday)

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Dmitrii Vasil'evich Shirkov, Full Member of the Russian Academy of Sciences (RAS) and outstanding Russian theoretical physicist, reached his 80th birthday on March 3, 2008.

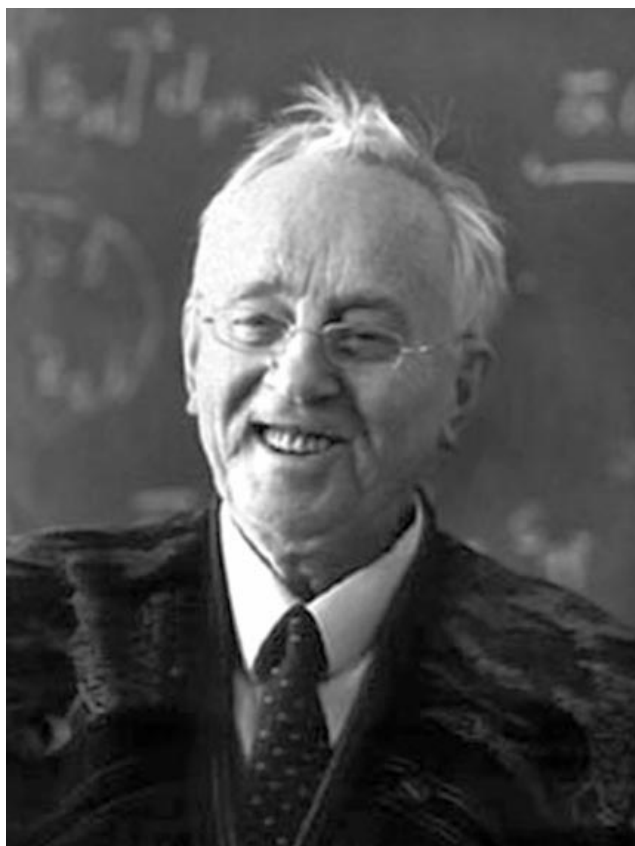
The scientific biography of D V Shirkov began already in his student days at the Department of Physics of Moscow State University (MSU) and is closely connected with the name of his teacher Nikolai Nikolaevich Bogoliubov. The first series of research papers that D V Shirkov started at the Institute of Chemical Physics of the USSR Academy of Sciences (AS) and continued at the classified research center in Sarov (formerly Arzamas-16) were focussed on the simplification of the Boltzmann kinetic equation of neutron transfer in complex media. Dmitrii Vasil'evich used these results to work on important applications-oriented projects. D V Shirkov was decorated with an Order of the Red Banner of Labor for taking part in one of them — the development of thermonuclear weapons. Another project in which D V Shirkov took part — the creation of a nuclear charge — was implemented under the guidance of M A Lavrent'ev and received the Lenin Prize in 1958.

After 1955, Dmitrii Vasil'evich conducted research in fundamental theoretical physics at the V A Steklov Mathematics Institute of the USSR AS and then at the Laboratory of Theoretical Physics (LTP) of the Joint Institute for Nuclear Research (JINR) in Dubna after it was created in 1956.

In the mid-1950s, D V Shirkov continued the work begun by N N Bogoliubov on the foundations of quantum field theory; together they created the renormalization group method. The monograph *Introduction to the Theory of Quantized Fields* by N N Bogoliubov and D V Shirkov became world-famous. Its first edition was published in 1957; it has gone through seven editions both in this country and abroad, but has still remained a must-have on the desktop for many generations of physical theorists.

This was the period when D V Shirkov also worked on the application of the renormalization group method to Bogoliubov's microscopic theory of superconductivity, whose results were included in the book *A New Method in Superconductivity Theory* written with the coauthors N N Bogoliubov and V V Tolmachev and published in 1958.

In 1960, Dmitrii Vasil'evich was elected Corresponding Member of the USSR Academy of Sciences. Having moved to the Akademgorodok in Novosibirsk, he created the Division of theoretical physics at the Institute of Mathematics of the Siberian Branch (SB) of the USSR AS and a chair of theoretical physics at the new Novosibirsk State University. In the same period, D V Shirkov played an active role in organizing the All-Siberian school olympiads and a physics and mathematics boarding school under the auspices of



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Novosibirsk State University; he also headed the Education Council of the Presidium of the AS SB.

In this period, Dmitrii Vasil'evich Shirkov largely focused his attention on the field of the dispersion theory of strong interactions at low energies. Away back in the late 1950s, he suggested at the JINR a method for obtaining integral equations for partial wave amplitudes. The application of this method to hadron physics was summarized in the monograph *Dispersion Theories of Strong Interactions at Low Energies* by D V Shirkov, V V Serebryakov, and V A Meshcheryakov issued in 1967.

This was the time when D V Shirkov devoted much attention to managing science. He headed the Theoretical Physics Council of the USSR Academy of Sciences SB, which coordinated the work of all physical theorists of the Siberian Branch of the Academy of Sciences. Shirkov conducted regular Siberian Meetings on the physics of strong interactions.

Nowadays students of Dmitrii Vasil'evich continue to work successfully at the S L Sobolev Institute of Mathematics of the RAS SB and at Novosibirsk State University, as well as at Irkutsk State University and the Irkutsk Division of the Russian Academy of Sciences SB.

At the beginning of the 1970s, D V Shirkov again returned to the LTP at the JINR. His academic interest was concentrated on the high-energy asymptotic behavior of various quantum field models and on expanding the renormalization group technique. D V Shirkov's effort launched the well-known series of publications by Dubna theoretical physicists devoted to calculations in higher orders of perturbation theory in quantum chromodynamics and supersymmetric theories. D V Shirkov and his student D I Kazakov developed a method of summation of asymptotic (divergent) series, which proved very efficient, not only in quantum field theory but also in quantum statistical physics, in calculating critical exponents of phase transitions.

On D V Shirkov's initiative work began in Dubna from the mid-1970s on conducting complicated algebraic and analytical transformations directly by computers. A number of systems of analytical computations were introduced at the JINR to be used for cumbersome time-consuming calculations in theoretical physics. The stimulus for spreading such systems of analytical computations in this country was provided by the well-known review written by D V Shirkov and his colleagues V P Gerdt and O V Tarasov for *Physics – Uspekhi* in 1980, and also by the seminar D V Shirkov conducted at the MSU Department of Physics and by a number of All-Union meetings organized in Dubna.

Using the arsenal of computerized algebra, D V Shirkov's group carried out a number of computations in the higher orders of perturbation theory in quantum chromodynamics and supersymmetric theories, which attracted international attention and resulted in the Dubna and other Russian theoretical physicists gaining a reputation as world leaders in multiloop computations.

At the beginning of the 1980s, Dmitrii Vasil'evich elaborated a general approach to the nature of renormalization group transformations in various fields of theoretical physics. Using renormalization group transformations as a basis, he introduced the concept of functional self-similarity that generalizes the concept of the power self-similarity. This generalization made it possible to transform the renormalization group method into a general technique of mathematical physics and to generate new results in a number of fields, such as nonlinear optics. In the 1980s and 1990s, D V Shirkov organized a number of international conferences on the application of the renormalization group methods to various fields of physics; these clearly demonstrated the universality of the method.

During this last decade, the scientific activity of Dmitrii Vasil'evich Shirkov has been as vigorous as ever. Together with his students, he is developing a new approach to quantum chromodynamics based on the synthesis of renormalization group, analyticity, and causality, which in a way returns him to papers he wrote when collaborating with his teacher.

Beginning in 1972, Professor D V Shirkov has been teaching at the MSU Department of Physics. Together with N N Bogoliubov, his coauthor, he wrote a textbook *Quantum Fields* based on their lecture courses, which by now has gone through two Russian and two translated editions, and then together with his student V V Belokurov he wrote a review volume *The Theory of Particle Interactions* which was also translated into foreign languages. D V Shirkov initiated preparation of *The Library of Theoretical Physics* — a series of monographs intended for acquainting young scientists

with long-out-of-print classic works — for which he is the Editor-in-Chief.

For the last quarter of a century, D V Shirkov has been a member of the Bureau of the Division of Nuclear Physics and has sat on the editorial boards of a number of academy journals and journals abroad. In 1994, he was elected Full Member of the Russian Academy of Sciences. Between 1993 and 1998, D V Shirkov was appointed Director of the Bogoliubov Laboratory of Theoretical Physics at the JINR. In this capacity he made important contributions to maintaining the traditions of the Bogoliubov school of science in Dubna, and worked on attracting young people to the JINR, on retaining scientific ties to CIS countries, and on expanding international cooperation. These difficult years emphasized his position of responsibility as a citizen, his active stance in defending scientific values, and his efforts aimed at preserving the national cultural heritage.

D V Shirkov's achievements in domestic science were rewarded with Lenin and State Prizes of the USSR and with other distinguished awards; he also received the honorary degree of Distinguished Scientist of the Russian Federation.

Among Dmitrii Vasil'evich's former students we find DSc and PhD research scientists who are well known in the scientific community and are leaders of research teams both in this country and abroad. Professor D V Shirkov heads a large scientific school which was specially recognized by a grant from the President, Russian Federation.

It is our pleasure to wish Dmitrii Vasil'evich Shirkov good health, much success both in research and in teaching, and successful implementation of his many plans.

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