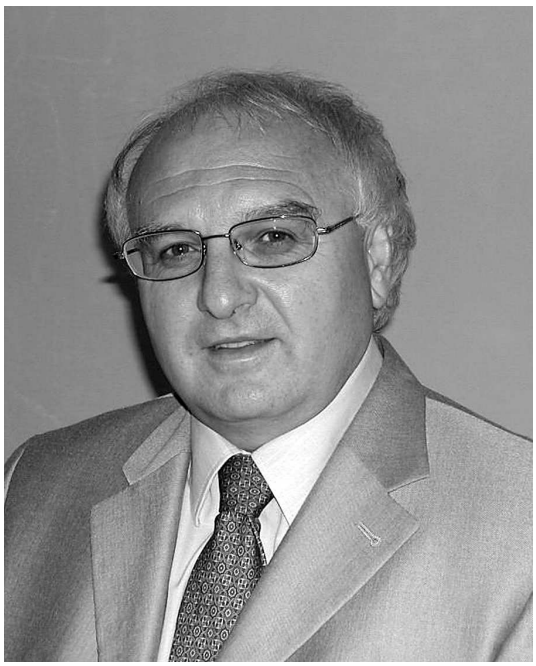
The 60th anniversary of Ivan Vakarchuk



Professor Ivan Vakarchuk is a well-known Ukrainian physicist internationally recognized among theoreticians owing to his works on quantum liquids, phase transitions and critical phenomena, disordered systems and quantum mechanics. Being the author of 230 scientific papers and 5 textbooks, he is widely known for having developed various approaches and techniques in theoretical studies of many-particle quantum systems as well as a brilliant lecturer in theoretical physics.

I. Vakarchuk was born in the village of Stari Bratushany, Jedynets District (Moldova) on March 6, 1947. He graduated from the Physical Faculty of Ivan Franko State University of Lviv in 1970, and his scientific career was subsequently closely linked to the Lviv school of statistical physics initiated by Academician Ihor Yukhnovskii. Under I. Yukhnovskii's advisorship in 1974 I. Vakarchuk defended his candidate dissertation "Application of the displacements and collective variables method to the study of interacting Bose particles system in the vicinity of absolute zero" and a few years later in 1980 he defended the doctorate dissertation "Microscopic theory of the Bose-liquid". I. Vakarchuk was one of the organizers of the Lviv Division of the Institute for Theoretical Physics of the National Academy of Sciences of Ukraine in 1980 and he was the first Head of the Quantum Statistics Department there. In 1984 he moved to Ivan Franko State University in Lviv and in 1985 became the Head of the Theoretical Physics Department there. In 1990 I. Vakarchuk was elected Rector of Ivan Franko State University in Lviv.

I. Vakarchuk started his research in 1970s examining many-particle Bose systems using the displacements and collective variables method. He shows interest in this subject matter until the present time suggesting an improved accurate description of liquid helium. During 35 years I. Vakarchuk, under supervision of I. Yukhnovskii and then in collaboration with O. Honopolskii, Ye. Zubko, I. Skorobohat'ko, P. Hlushak, K. Vasylyna, V. Babin, A. Rovenchak, obtained many important results in this field. He studied the ground state and the energy spectrum of liquid helium, calculated s-particle density matrices of many-particle quantum systems, elaborated various functional representations for many-particle quantum systems. He developed a microscopic theory of thermodynamic and structural properties of liquid helium and a theory of λ-transition in liquid helium, evaluated the number of Bose condensate, examined the properties of quantum liquid mixtures.

I. Vakarchuk, in collaboration with I. Yukhnovskii, Yu. Rudavskii, Yu. Holovatch, V. Kolomiets, has performed important studies in the theory of phase transitions and critical phenomena. In particular, he suggested a new differential equation for renormalization group transformation. Another direction of I. Vakarchuk's research is the theory of disordered systems (in collaboration with Yu. Rudavskii, H. Ponedilok, I. Margolych, V. Tkachuk, V. Myhal, P. Matskevych, T. Kuliy). In order to correctly realize specific averaging procedures inherent in the disorder systems theory he applied the path integral approach and the Green function method. He suggested to derive the relevant Green functions avoiding explicit calculation of path integrals. The main results concern the thermodynamic and structural properties of amorphous and liquid one- and many-component magnets, disordered spin systems, electron and phonon excitations in disordered systems.

I. Vakarchuk's research interests also include modern quantum mechanics. He examined some standard problems of quantum mechanics in deformed spaces (together with V. Tkachuk and

T. Fityo). His recent results on the Dirac equation for a particle with position-dependent mass and in the space with deformed Heisenberg algebra have received much attention in the community of scientists studying the foundations of quantum theory. I. Vakarchuk contributed considerably in addressing hot topics of modern quantum theory to students. His textbook "Quantum mechanics" (the first edition appeared in 1998, the second edition appeared in 2004, the third edition should appear in 2007) is a valuable source of pedagogically adapted transparent explanations of recent findings in the field.

Persistently working in the above mentioned areas Prof. Vakarchuk has promoted numerous theoretical studies in such fields as classical scattering theory (the inverse problem of potential reconstruction based on the known scattering cross-section), theory of star spectra (modelling processes in the star atmosphere), geophysics.

I. Vakarchuk is known to be an excellent lecturer for his fascinating general and special courses in theoretical physics. He wrote several brilliant textbooks on quantum mechanics, general theory of relativity, many-body physics, stellar spectra theory which are widely used not only by students in Lviv but all over Ukraine. He is also well-know as popularizer of science owing to his numerous lectures and papers for general audience, in particular, for pupils and students of younger courses.

I. Vakarchuk is an outstanding organizer of education and research, Head of the Theoretical Physics Department of Ivan Franko National University in Lviv (since 1985), Rector of Ivan Franko National University in Lviv (since 1990). His former students are now first-class researchers in many areas of theoretical physics. I. Vakarchuk is the founder and Editor in Chief of the journals "Journal of Physical Studies" and "World of Physics", Editor in Chief of the journal "Physical Collections of the National University of Lviv", member of the Editorial Board of the journal "Condensed Matter Physics". During his career Prof. Vakarchuk has received numerous honors and awards in Ukrainian and international scale.

On the occasion of Professor Ivan Vakarchuk's 60th anniversary his colleagues and collaborators from the Institute for Condensed Matter Physics, members of the "Condensed Matter Physics" Editorial Board, all who had the good fortune to work with him and to learn from him, express their warmest greetings to him and wish him to stay in a good health, happiness and to be successful in his research, educational, administrative and public activities.