On Mykhailo Kozlovskii's 50th birthday

Mykhailo Kozlovskii is a renowned Ukrainian physicist, doctor of physico-mathematical sciences, deputy head of the Department of Condensed Matter Statistical Theory of the Institute for Condensed Matter Physics of the National Academy of Sciences of Ukraine.

Mykhailo Kozlovskii was born on August 30, 1952 in the province of Volyn' in the teacher's family. He finished with Gold Medal the Lubachiv secondary school and the Physics Department of the Ivan Franko State University of Lviv receiving a diploma with the highest honours. In 1974 he started a postgraduate course at the Institute for Theoretical Physics of the Ukrainian Acad. Sci. under the supervision of Prof. Ihor Yukhnovskii. Upon finishing the course, he got the position of junior researcher in the Lviv Department of Condensed Matter Statistical Theory of the Institute for Theoretical Physics of the Ukrainian Acad. Sci. In 1978, he defended the candidate dissertation, and in 1989 he successfully defended the doctor dissertation. His scientific growth from the position of a junior researcher (1977) to the leading researcher (1997) of the Institute for Condensed Matter Physics of the National Acad. Sci. of Ukraine was accompanied by a whole range of new and important results.

Mykhailo Kozlovskii is a scholar in a filed of theoretical physics, one of the founders of a new approach to the description of phase transitions in statistical physics. The developed method of description of critical behaviour of three-dimensional systems is successfully applied to an analysis of the properties of simple and multicomponent systems and is a promising field in the modern theoretical physics.

The scientific activity of Mykhailo Kozlovskii is connected with the elaboration and the development of the techniques for calculating the complete expressions for thermodynamic functions of three-dimensional model systems in the vicinity of the phase transition point. The microscopic theory of phase transitions is constructed based on the original collective variables method. The calculations are clearly illustrated by an example of an Ising-like system on a simple cubic lattice with an exponentially decreasing interaction potential. At present, Mykhailo Kozlovskii actively investigates the effect of an external magnetic field on the properties of a three-dimensional one-component spin system. The essential contribution was also done by Mykhailo Kozlovskii and by his collaborators to the calculation of thermodynamics of a system with an n-component order parameter and a binary fluid mixture.

Mykhailo Kozlovskii's investigations are based on the use of non-Gaussian measure densities. The effect of the complication of the measure density on the critical behaviour of a three-dimensional one-component system was studied. In this connection, the general recurrence relations for the coefficients of the effective measure densities including the sixth, the eighth, and the tenth powers of the variable in addition to the second and the fourth powers were derived and investigated. For the first time it was proposed to present the recurrence relations in the form of a nonasymptotic series. It is related to rejecting the traditional use of perturbation theory, which is based on the Gaussian measure density. The correction for the potential averaging being included in the step-by-step calculation of the partition function enables Mykhailo Kozlovskii to find the structural characteristics of the system near the critical temperature. Using the numerical integration of partition function of the Ising-like system, the behaviour of the coefficients of the effective non-Gaussian measure densities was studied in the critical region, and thus the existence of two fluctuation processes corresponding to the short-wave and the long-wave spin density oscillation modes was confirmed.

The two fluctuation processes having been taken into account allowed Prof. Ihor Yukhnovskii to propose and to realize together with Mykhailo Kozlovskii and other collaborators a unified approach for calculating the universal (critical exponents) and nonuniversal (the phase transition temperature as well as the free energy, entropy, leading critical amplitudes and correction-to-scaling amplitudes for specific heat, average spin moment and susceptibility) characteristics of the system. The advantage of the developed method is the possibility of deriving analytic expressions for the nonuniversal quantities as functions of microscopic parameters of the initial system (the lattice constant and the parameters of the interaction potential) which makes this method useful in describing the phase transitions in a wide range of three-dimensional systems.

Mykhailo Kozlovskii is the author of over 150 scientific papers, as well as one of the authors of a recent monography (I.R.Yukhnovskii, M.P.Kozlovskii, I.V.Pylyuk. Microscopic Theory of Phase Transitions in the Three-Dimensional Systems. Lviv, Eurosvit, 2001). He was a supervisor of three successful candidate dissertations.

Mykhailo Kozlovskii is overflown by creative vigour. He was a scientific secretary of the Lviv Division "Statistical Physics" at the Institute for Theoretical Physics of the Ukrainian Acad. Sci., an acting director of the Western Scientific Center of the National Acad. Sci. of Ukraine and the Ukrainian Ministry of Science. Now he is deputy head of the specialized Scientific Council at the Institute for Condensed Matter Physics of the National Acad. Sci. of Ukraine, a member of the Editorial Boards of the "Ukrainian Physical Journal" and the journal "Condensed Matter Physics", a member of the Shevchenko Scientific Society and the Ukrainian Physical Society.

Mykhajlo Kozlovskii's friends, his colleagues wish him to stay in good health, happiness and to be successful in his scientific activity. May his beloved hobby of a confirmed angler continue bringing him pleasure, and an active work lead him to novel results in physics.

Yu.Holovatch, M.Holovko, Z.Gurskii,
A.Zagorodny, M.Korynevskii, R.Levitskii,
O.Patsahan, I.Pylyuk, I.Stasyuk, M.Tokarchuk