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VIACHESLAV BORISOVICH PRIEZZHEV (6 SEPTEMBER 1944–31 DECEMBER 2017)

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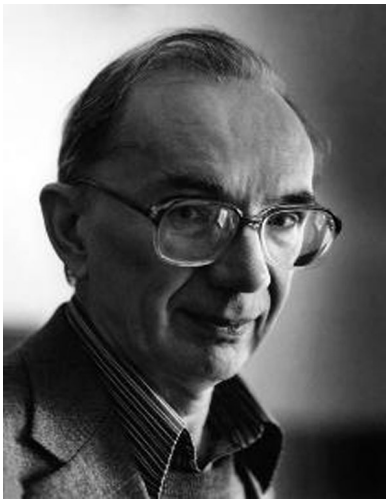

On 31 December 2017, Viacheslav Borisovich Priezzhev, an outstanding Russian theoretical physicist, Doctor of Physical and Mathematical Sciences, Professor, and Chief Research Fellow of the Laboratory of Theoretical Physics (LTP) in the Joint Institute for Nuclear Research (JINR), died in his 74th year. The scientific activity of Priezzhev was inextricably linked with the LTP, where he began working in 1969 after graduating from the Physics Faculty at Moscow State University.

Priezzhev was a world-renown specialist in the fields of statistical physics and the physics of condensed matter. He was distinguished by an original approach to problems, a fresh view of the research subject, an ability to plunge deep into a problem, and an independent way of thinking. He was an artist of his craft and always at the forefront of science—modernity and relevance were integral and unique features of his scientific style.

Priezzhev's first scientific works were devoted to studying the spectrum of collective excitations of a liquid. The JINR Laboratory of Neutron Physics was then investigating the spectrum of liquid lead excitations, which was mysteriously similar to the Landau spectrum of superfluid helium. Priezzhev was able to explain this similarity using a quasicrystalline model of a liquid that he had developed. Based on this work, he prepared to defend his thesis. But not having time to defend it, Priezzhev went to serve in the ranks of the armed forces. After returning to Dubna and defending his thesis in 1973, Priezzhev radically changed the field of his scientific activity, turning to a new, actively developing field of exactly solvable models of statistical physics, the field in which he obtained the most significant results, widely known both in our country and throughout the world.

During the 1970s and 1980s, Priezzhev obtained many important results concerning the statistics of different variants of random walks on lattices and the packing of dimers and polymers and discovered a remarkable connection between dimer configurations and spanning trees. To calculate the partition functions in dimer and spanning tree models, he proposed an original method for proving the Kirchhoff matrix theorem, which allowed not only enumerating all spanning trees but also describing the statistics of their subsets, distinguished by both local and nonlocal properties. These results formed the content of his doctoral dissertation, which he defended in 1985.

In the 1990s, Priezzhev turned his attention to nonequilibrium statistical physics and, in particular, to a young, rapidly developing field, the theory of self-organized criticality. Studying the central model of this theory, the Abelian sandpile model, he obtained remarkable general results: he calculated the probabilities and correlation functions of heights, obtained a wave representation of avalanche dynamics, and predicted the critical indices characterizing the distribution of wave sizes. The results obtained in studying the sandpile model subsequently played an important role in formulating and verifying the predictions of logarithmic

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conformal field theory, of which this model is a lattice example. In addition, as a generalization of the sandpile model, Priezzhev proposed a new model of self-organized criticality: Eulerian walkers. This model is currently studied intensively by both physicists and mathematicians.

Integrable models of interacting particles were another area of his interests. Using an original, completely new combinatorial approach to the Bethe ansatz technique, Priezzhev proposed an integrable model of the avalanche process and constructed the space–time transition probabilities for processes with simple exclusions. He and his collaborators calculated the most general correlation functions describing particle flows in simple exclusion processes, proposed an exclusion model with generalized update rules, constructed a phase diagram of this model on a lattice with open boundary conditions, and described the emergence of macroscopic jams in this model.

All these pioneering results of Priezzhev for exactly solvable models in equilibrium and nonequilibrium statistical mechanics were widely recognized internationally. Many new projects with Priezzhev's defining participation were in the process of intensive development.

Based on these and other results, Priezzhev published more than 150 scientific papers in leading world journals. For *Theoretical and Mathematical Physics*, he was not only a regular author (14 papers) but also a regular referee.

Priezzhev performed much pedagogical work. He was a professor in the Department of Theoretical Physics of the Dubna International University and lectured in international schools held at the LTP. Ten candidate dissertations were defended under his leadership. He actively participated in the international cooperation of the LTP with the scientific centers of the JINR member states and other countries and was a member of the editorial board of the *Journal of Statistical Mechanics*.

In the person of Priezzhev, we have lost not only an outstanding, talented scientist. He had a bright and unique personality and was a highly intelligent erudite man and a refined connoisseur of poetry and painting. Priezzhev showed the same originality in life as in science, always choosing unexpected means and ends unique to him. We will remember him as a benevolent, open, sincere person. Priezzhev knew how to listen, now a quality quite rare. At the same time, he was extremely principled and intolerant of any manifestations of rudeness or deviations from ethical norms. With all his outstanding qualities, Priezzhev was extremely modest and lacked any trace of arrogance or rigidity. For example, he customarily did not celebrate his jubilees publicly.

Priezzhev's vivid character, talent as a theoretical physicist, and high human dignity earned him sincere respect and unconditional authority from all who knew him. His friends, students, and colleagues will always cherish his bright memory.

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