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Igor' Ekhiel'evich Dzyaloshinskiĭ (on his seventieth birthday)

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February 1, 2001 is the 70th birthday of one of the most vivid and original personalities from the Landau science school, Corresponding Member of the Russian Academy of Sciences Igor' Ekhiel'evich Dzyaloshinskiĭ.

I E Dzyaloshinskiĭ is an outstanding theoretical physicist who made a principal contribution to several fields of theoretical physics: magnetism, statistical physics, solid-state physics, low-temperature physics, and physics of complex liquids.

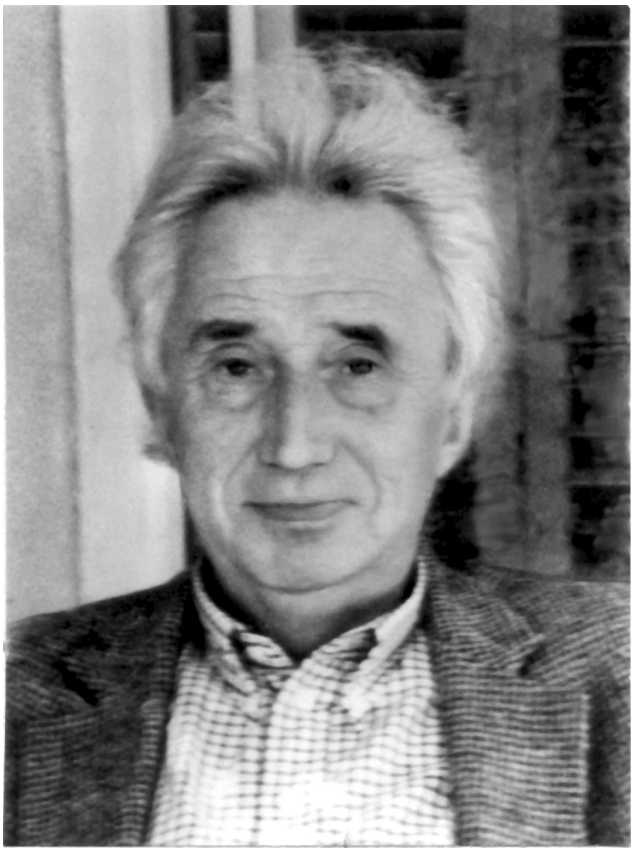
All the research done by I E Dzyaloshinskiĭ bears the mark of his outstanding personality, of his ability to get through to the essence of things and address the truly complex problems which cannot be handled using traditional approaches. This is why most of the work done by I E Dzyaloshinskiĭ belongs to the gold reserve of modern theoretical physics. A refined theoretician, adhering to intellectual and even aesthetic principles, Igor' Ekhiel'evich is the author of many papers that have become handbooks for experimenters.

The science scope of I E Dzyaloshinskiĭ covers almost the entire field of condensed matter physics. In the theory of magnetism, he explained the phenomenon of weak ferromagnetism: the occurrence of spontaneous magnetization in antiferromagnets due to nonexchange forces. The new type of interaction has been referred to ever since as the 'Dzyaloshinsky interaction', and has to be taken into account in most calculations for specific magnets. This study, done by Igor' Ekhiel'evich in 1957, founded a new trend in the physics of magnetism that has been actively progressing up to now. His work in weak ferromagnetism paved the way for two new discoveries, important both in their applications and in their conceptual value: piezomagnetism and the magnetoelectric effect. The volume containing Dzyaloshinskiĭ's doctoral thesis at the library of the Institute for Physical Problems has been worn down almost to pieces.

I E Dzyaloshinskiĭ's papers on the theory of helical and sinusoidal magnetic structures (the so-called spin density waves) also made a great impact on the development of the physics of magnetism. Once again, it should be said that while Dzyaloshinskiĭ's theory fully explained the origin of these structures in dielectrics and metals, and had all its predictions brilliantly corroborated by experiment, it is probably even more important that his theoretical ideas in this field made a crucial and productive impact on other areas of theoretical physics.

I E Dzyaloshinskiĭ belonged to the remarkable team of first-generation pupils of Landau's school of theoretical physics and inherited all its best features: virtuoso mathematical techniques plus profound insight into the physics of phenomena and the experimental situation.

One of the founding fathers of the Landau Institute of Theoretical Physics (ITP) and the coworker of this institute for a quarter century, Igor' Ekhiel'evich has endowed the institute with some of his own character: his unusual integrity, a noncompromising and yet magnanimous personality, and his wide scope of learning. It is symbolic that the first paper ever to be submitted for publication by the ITP was I E Dzyaloshinskiĭ's joint paper with Yu A Bychkov and L P Gor'kov on one-dimensional superconductivity, a paper that laid the foundation for the physics of synthetic, organic quasi-one-dimensional metals. To this day, most of the research in this interesting and important area is based on Dzyaloshinskiĭ's results.



Igor' Ekhiel'evich Dzyaloshinskiĭ

Igor' Ekhiel'evich played a major part in the creation of new methods of quantum statistical physics, the main instrument used in theoretical physics. Dzyaloshinskiĭ's work created the temperature technique of field theory — the simplest and most universal method for calculating the equilibrium and nonequilibrium properties of many-particle quantum systems at finite temperatures. It would be no exaggeration to say that the creation of this very technique has determined most of the progress of condensed matter physics in the last few decades. Igor' Ekhiel'evich himself used this technique (in collaboration with E M Lifshitz and L P Pitaevskiĭ) to build the general theory of van der Waals

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forces in macroscopic systems and to lay the foundation of theoretical descriptions of Fermi and Bose quantum crystals.

Developing new ideas and methods of theoretical physics has always been in the scope of I E Dzyaloshinskiĭ's scientific interests. In papers written in the 1980s, he elaborated new methods of using topological approaches to condensed matter physics. I E Dzyaloshinskiĭ obtained a number of fundamental, conceptually original results in singular structures of magnets, liquid crystals, spin glasses and other frustrated systems. Igor' Ekhiel'evich built an elegant theory of topological phase transition to the state of spin glass that has attracted much attention world-wide.

In such a brief article, there is never enough room even to list the main trends of I E Dzyaloshinskiĭ's long and fruitful scientific work. His interests range from mathematics to chemistry. A physicist by vocation, Igor' Ekhiel'evich is also an expert on Russian history, psychoanalysis and art (especially painting and music).

Igor' Ekhiel'evich generously shares his ideas with colleagues, students and the scientific community. Throughout his scientific career, I E Dzyaloshinskiĭ paid much attention to bringing up a highly skilled new generation of academics. A demanding scientific teacher who never made allowances for his pupils' youth or incompleteness of education, Igor' Ekhiel'evich created a scientific school of statistical condensed matter physics. For many years, Igor' Ekhiel'evich has collaborated with the editorial staff of leading Soviet physics journals (*Zh. Eksp. Teor. Phys.* and *Pis'ma v Zh. Eksp. Teor. Phys.*). It is owing to the strict and utterly scientific criteria that Igor' Ekhiel'evich invariably uses to select papers for publication that the journals maintain their high scientific rating.

In 1972, 1984 and 1989, I E Dzyaloshinskiĭ's contributions to theoretical physics won him the M V Lomonosov Award, the State Award and the L D Landau Award.

In 1991, I E Dzyaloshinskiĭ moved to the USA, where he now works at the University of California, Irvine. He continues to do research and to teach, and is full of new ideas and projects.

Friends, colleagues and pupils send I E Dzyaloshinskiĭ their warmest regards and wish him a very happy birthday, good health, many happy returns of the day and new creative results.

A A Abrikosov, A F Andreev, S A Brazovskiĭ,
Yu A Bychkov, V L Ginzburg, L P Gor'kov,
V E Zakharov, E I Kats, P S Kondratenko,
L P Pitaevskiĭ, I M Khalatnikov, G M Éliashberg