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Evgeniĭ Akimovich Turov (on his eightieth birthday)

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Evgeniĭ Akimovich Turov, well-known theoretical physicist, corresponding member of the Russian Academy of Sciences, celebrated his 80th Birthday on January 27, 2004.

Turov was born in the Perm region. In 1941, he enrolled at A M Gor'kiĭ Urals State University but soon volunteered for active military service. He was in the army at the Volkhov Front. Severely wounded in 1944, after a prolonged medical treatment, Turov returned to Urals University, graduated *cum laude* in 1949, and entered a postgraduate course with the Institute of Metal Physics of the Ural Division of the Academy of Sciences of the USSR. From this time on, Turov's entire scientific career was connected with this institute where he worked at every position, from senior laboratory assistant to head of division and deputy director of the institute. For 25 years he headed the Department of Theoretical Physics and combined it with professorship at Urals State University. During this period he trained and supervised the work of 20 future PhD and 10 future DSc scientists, thereby creating his science school — one of the branches of the extended Urals school of theoretical physics.

Turov's work covers practically all aspects of the theory of magnetism: the development of the symmetry approach to studying the properties of magnetically ordered materials; the development of the quantum mechanic theory of magnetic resonance in magnets and its utilization for studying the properties of magnetic materials; detailed theoretical analysis of kinetic phenomena in magnetic media; the study of the dynamics of domain boundaries and other soliton-like objects, etc.

We can mention a number of specific results derived by Turov himself or involving his direct participation. He was the first to apply the secondary quantization method to S V Vonsovskiĭ's s–d exchange model (1953) which made calculations of magnetic properties of magnets much less cumbersome, and the first to calculate the magnetic component of electric resistance. Then, together with Yu P Irkhin (1956), he analyzed for the first time coupled magnon–phonon waves. This publication laid the foundation for an extended field that was later called 'magnetoacoustics of magnets'. In particular, this led E A Turov and V G Shavrov to use the concept of spontaneous symmetry breaking in magnetoacoustics. The magnetoelastic gap in the magnon spectrum, discovered by A S Borovik-Romanov and E G Rudashevskiĭ in Haematite, was interpreted by Turov in terms of these concepts. He resolved the discrepancies that existed in the literature in the debate between the models of the so-called 'free' and 'frozen' lattices ('free' for quasiphonons and 'frozen' for quasimagnons). His work (together with M I Kurkin) on nonlinear dynamics of nuclear spins in materials with large dynamic frequency shift played an important role in characterizing signals of nuclear spin echo.

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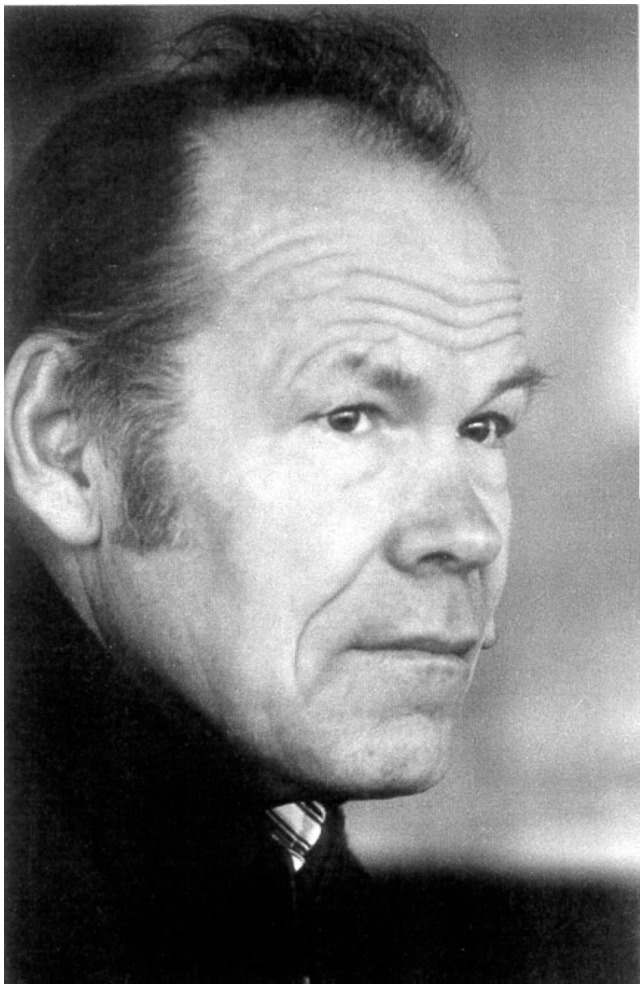

Evgeniĭ Akimovich Turov

Finally, the development of the description of various types of exchange magnetic structures allowed by crystal symmetry proved to be the necessary stage for studying magnetism in its relationship with other properties of magnetic materials (acoustic, kinetic, and optical). It was also possible to predict or interpret a number of new physical effects in these fields of the physics of magnets. The originality of the research carried out by Turov and his school lies in this integrated approach to studying magnets.

To complete every significant stage of research in the fields listed above, E A Turov published fundamental review papers in Soviet, Russian, and foreign publications, as well as original monographs. The number of monographs, including those written with a team of coauthors, is ten. Three of these monographs, *Physical Properties of Magnetically Ordered Crystals*, *Ferromagnetic Resonance,* and *Nuclear Magnetic Resonance in Ferro- and Antiferromagnets*, deserve special mention. These books were also published in the West and are now desktop books for several generations of researchers in

the physics of magnets. They also stimulated progress in the relevant fields of research in the science of magnets.

Yet another book by Turov, *Material Equations of Electrodynamics*, is original and profound. It was published in 1983; the new version, rewritten together with E A Pamyatnykh (2000), is used as a textbook for students.

It is noteworthy that Turov continues his research to this day. In the first three years of the new century, Turov and his colleagues published or sent to publishers 14 papers. Among them we find a detailed monograph (560 pages) *Symmetry and Physical Properties of Antiferromagnets* (2001) and two major articles for the journal *Uspekhi Fizicheskikh Nauk* (*Physics Uspekhi*). With these publications Turov has practically developed a new chapter in the spin dynamics of magnets, based on taking into account the occurrence of magnetoelectric and antiferroelectric interactions for most types of magnets (ferro-, antiferro-, and ferrimagnets). Owing to these interactions, the so-called electroactive magnons can be excited by AC electric fields or can interact with light, forming hybrid waves even where the net local magnetization in magnon oscillations remains constant ('antimagnons'). This work has also predicted a new effect: excitation of NMR by an alternating electric field — the nuclear magnetoelectric resonance (NMER). Magnetodynamics in alternating magnetic fields is the gap that Turov and his colleagues took upon themselves to fill.

Turov was regularly invited to a number of physics centers in the USA, Canada, France, and other countries for delivering lecture courses on various aspects of the physics of magnetism in transition metals. He also delivers invited talks at Russian and International Conferences on these topics. Turov supervises research projects financed by grants from the Russian Foundation for Basic Research (RFBR), as well as all directions of research within the institute.

Turov received the Order of Lenin, the Orders for "Service to the Motherland" of 4th Rank, and "The Great Patriotic War", as well as a number of medals such as "For Bravery"; he was also awarded the distinction of "Honored Contributor to Science in the Russian Federation". In 1986, Turov and a group of authors received the State Prize of Ukraine for their work on magnetoelastic properties of ferro- and antiferromagnets. In 1991, he was elected Corresponding Member of the Russian Academy of Sciences.

Colleagues and friends wish Evgeniĭ Akimovich Turov happy birthday and wish him health, vigor, and further achievements.

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Yu A Izyumov, Yu M Kagan, M I Kurkin,
G A Mesyats, M V Sadovskiĭ, V M Schastlivtsev,
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