

Obituary

Professor Alexander Kessenikh (1932-2021)

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On September 15, 2021, professor Alexander V. Kessenikh had passed away. He was known for his works on nuclear magnetic resonance (NMR) and history of science (Figure 1).

Alexander V. Kessenikh was born on February 13, 1932 in Tomsk, a scientific capital of Siberia at that time, where his parents-physicists worked. Due to the work on military subjects of his father, Vladimir N. Kessenikh, the family moved to Moscow Region in 1943. In 1949-1953, Alexander Kessenikh studied at the Faculty

of Physics of the Lomonosov Moscow State University (MSU). It was a momentous time for both Soviet physics and Soviet student community, and Alexander Kessenikh took an active part in the events of that moment. In late 1940s-early 1950s, science in the USSR has been subjected to the strongest ideological press or even (in some scientific fields) to almost complete destruction. In physics, the relativity theory and quantum mechanics were declared "idealistic and hostile" branches of sciences. Fortunately, the burning need of the USSR for atomic weapons prevented the defeat of physics, but in MSU and many other universities of the country, modern physics education was practically destroyed. In the MSU Faculty of Physics, students rebelled with the demand to return them to a full-fledged physics education, although this was an unprecedented and threatened danger for the initiators. This resulted in a revolution in physics education at MSU (and hence in other universities) and in students' self-awareness bringing a breath of freedom to the student community. Alexander Kessenikh was one of the organizers of that revolution^[1].

Another manifestation of freedom in the student community was the flourishing of student amateur art. In this area, Alexander Kessenikh was also one of the most popular student leaders due to his poetic talent (later, he authored several published books of poetry, e.g.^[2]) that he applied not only to writing poetry: together with his like-minded friends, he wrote several humorous operas on the themes of student life and created a student festival, Archimedes Day. One of the first Archimedes Days was visited by Niels Bohr, who was delighted and said that if students were capable of the same



Figure 1. Alexander V. Kessenikh (1932-2021). Source: Personal archive of A.V. Kessenikh.



Figure 2. Alexander Kessenikh among the other authors of the first Physics Faculty opera and the Archimedes Day festival. Left to right: Yu. Gaponov, S. Soluyan, A.V. Kessenikh, V. Pismenny, Yu. Dnestrovsky. Around 1980. Source: Personal archive of A.V. Kessenikh.

ingenuity and wit in physics, he would feel secure about the future of physics. The Physics Faculty operas and Archimedes Days became a model for students and catalyzed the emergence of similar student festivals across the country, and not only among physicists^[3,4] (Figure 2).

From his first steps in science, Alexander Kessenikh linked his scientific fate with the recently discovered NMR. His research interests included dynamically and chemically induced polarization of nuclear spins, double nuclear-nuclear resonances, paramagnetic relaxation mechanisms, and structural and chemical applications of nuclear magnetic resonance. Among his most cited works are works on the dynamic polarization of protons^[5]. In this area, Alexander Kessenikh made an outstanding scientific discovery: a new (three-spin) mechanism of dynamic nuclear polarization (DNP) in solids was proposed theoretically and confirmed experimentally^[5-7]. This mechanism (named “cross effect”) is currently recognized as one of the main DNP methods and is successfully used in nuclear physics, NMR tomography, and other fields^[8]. The priority of the Kessenikh group in this discovery is now generally recognized.

Since the late 1990s, Alexander Kessenikh started his research in the history of physics. He made a truly huge contribution to the creation of the history of research in the field of NMR in the USSR. In fact, his works constitute an encyclopedia of this history. He desired also to compose a database of literature in the field of magnetic resonance. Fortunately, he managed to publish the results of this work^[9,10]. Studying the interaction of physics and chemistry in the history of NMR research allowed him to contribute to the analysis of

interdisciplinarity in physics research. He also studied the social history of Soviet science focusing on the Golden Age of the Soviet science (mid-1950s-1960s) which had previously been poorly studied. The other focus was on scientific schools in physics, and his research gave a fruitful example of considering the Soviet physics history as the history of formation and development of scientific schools in physics. Along with his own scientific research in the field, he did a lot of editorial work^[11-14]. Unfortunately, most of his research on history of science remained published only in Russian (e.g., in ^[11-14] and other collections of articles).

Despite his poor health, he did not stop working until the very last days. Thus, in recent years, he developed a fruitful cooperation with the journal *Substantia*, for which he wrote two articles^[15,16]. Alexander Kessenikh did not live a few months to be 90.

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