

To the memory of Aleksandr Alekseevich Manenkov



Aleksandr Alekseevich Manenkov, a well-known Russian physicist, doctor of science in physics and mathematics, professor, one of the pioneers of quantum electronics, died on 26 March 2014.

A.A. Manenkov was born on 2 January 1930 in the village of Kirel'sk, Tatar Autonomous Soviet Socialist Republic. After graduating in 1952 from Ul'yanov-Lenin Kazan State University, he continued his post-graduate study at the Kazan Institute of Physics and Technology under the supervision of S.A. Al'tshuler – one of the companions of E.K. Zavoiskii, whose name is associated with the discovery of electron paramagnetic resonance (EPR) in condensed media in 1944. On the recommendation of S.A. Al'tshuler, in 1953 A.A. Manenkov continued his study at the P.N. Lebedev Physics Institute, Academy of Sciences of the USSR (FIAN). From that moment, his close and fruitful cooperation with A.M. Prokhorov lasted many years. All his life Aleksandr Alekseevich worked at the Oscillation Laboratory at FIAN, and since 1983 at the General Physics Institute RAS.

The scope of scientific interests of A.A. Manenkov included EPR physics, solid state physics, quantum electronics, laser physics and nonlinear optics. He was the author of more than 350 publications in scientific journals, conference proceedings and books.

First, A.A. Manenkov was involved in EPR spectroscopy of paramagnetic crystals. In 1956 A.A. Manenkov and A.M. Prokhorov suggested using ruby as an active medium for quantum amplifiers. As a result of these studies together with the scientists of the Moscow State University, a ruby maser was created in 1958. Very soon, these devices found wide applications in navigation, astronomy and space communications.

A.A. Manenkov discovered new mechanisms of spin–lattice relaxation – the so-called resonance processes through an intermediate state, and a new type of spin–spin cross-relaxation, i.e., combinational processes.

Note also the important results obtained by A.A. Manenkov in studying the dynamics of quantum generators. By the example of masers based on ruby and rutile crystals doped with Cr^{3+} , the nature of radiation oscillations was elucidated, and their connection with the transient relaxation processes was revealed.

In the early 1970s A.A. Manenkov with his colleagues obtained important results in studies of condensation of excitons in semiconductors. In the late 1960s–early 1970s A.A. Manenkov together with his collaborators and post-graduate students and students studied the interaction of high-power laser radiation with matter, processes of destruction of optical materials, use of lasers in medicine. Of fundamental importance in those years were the experiments on observation of laser beam self-focusing points, which confirmed a multi-focus structure and nonlinear moving foci models of self-focusing proposed by V.N. Lugovoi and A.M. Prokhorov.

Among the important results we should also note a series of papers on the role of avalanche ionisation and 'seed electron' in the laser damage in transparent optical materials. The practical result of this work was an increase in the stability of optical materials to laser light and improvement of lasing characteristics of ruby lasers. Based on the results of work in the field of resistance of transparent polymers, A.A. Manenkov and his colleagues created a new optical material – modified polymethyl methacrylate, which made it possible to fabricate a solid passive shutter for Q -switched solid-state lasers in the visible and near-IR ranges.

Aleksandr Alekseevich predicted the phenomenon of nonlinear light scattering in heterogeneous media caused by the difference in the nonlinear refractive indices of the medium components. Studies of this phenomenon performed by him and his co-authors showed that it can have important practical applications, in particular, based on the use of the discovered effect of heterogeneous medium bleaching.

A.A. Manenkov was very demanding of himself and his colleagues. High scientific proficiency and erudition in different spheres of physics as well as scientific and civil adherence to his principles made A.A. Manenkov highly respectable in the scientific community both in our country and abroad. For many years, he was a member of the council of experts of the Highest Certificate Committee of the USSR, member of the International Council on Quantum Electronics, member of the Scientific Council of the RAS on Optics and Laser Physics. Under the supervision of A.A. Manenkov, many of his pupils became candidates and doctors of science and now are heading scientific institutions both in Russia and abroad.

Scientific achievements of A.A. Manenkov were highly appraised. He was awarded the State Prize of the USSR (1976) and the first A.M. Prokhorov Gold medal of the Russian Academy of Sciences (2008).

He generously shared his rich experience, knowledge, and spiritual wealth with his friends and colleagues. Aleksandr Alekseevich Manenkov, a prominent scientist and a remarkable man, will always remain in our hearts.

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