

## In memory of Yury Vladimirovich Gaponov

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Yury Vladimirovich Gaponov, an outstanding theoretical physicist, Doctor of Physicomathematical Sciences, Professor, Head of the Laboratory of the Theory of Electromagnetic and Weak Processes, and Deputy Director for Science at the Institute of Molecular Physics, Russian Research Centre ‘Kurchatov Institute’, died suddenly on 21 December 2009.

Yury Vladimirovich Gaponov was born on 3 September 1934 in the city of Sverdlovsk. He entered the Department of Physics of Moscow State University in 1952 and graduated from there in 1958. His diploma thesis, prepared under the supervision of Professor I S Shapiro, dealt with  $\beta$ - $\gamma$ -correlations in nuclear beta-decay and had a bearing on the then topical problem of parity violation in weak interactions. Yu V Gaponov was the first in the world to calculate these correlations; this work has still not diminished in importance.

In 1965, Yu V Gaponov reported determination of the cross section for neutrino dissociation of the deuteron in a neutral channel, a process of great importance for elementary particle physics discovered 8 years later. This process, investigated for the first time by Yu V Gaponov, provided a basis for unique experiments on neutrino oscillations in the Sudbury Neutrino Observatory (SNO), Canada that led to a solution of the solar neutrino deficit problem.

In 1963, Yury Vladimirovich joined the Kurchatov Institute of Atomic Energy to study, under the guidance of A B Migdal, the nuclear structure in the framework of the theory of finite Fermi systems. He predicted the giant Gamow–Teller resonance, and thereby made a major step toward understanding the nature of nuclear collective states as a prerequisite for efficient calculations of neutrino–nucleus interactions, the processes accompanying nuclear beta-decay, and prediction of the properties of nuclei with a great excess of neutrons, including the isotopes of superheavy elements.

The scope of research that interested Yury Vladimirovich Gaponov was unusually wide. He gave much attention to the development of scientific collaboration and greatly contributed to cooperation with the Joint Institute for Nuclear Research (Dubna) and other leading research centers. He did important research on neutrino physics, nuclear and double beta-decays, mathematical physics, and the physics of isotopes. His work on the application of isotopes in fundamental physics was aimed at searching for phenomena beyond the existing theories of elementary particles. In his last years, Yury Vladimirovich Gaponov proposed a new approach to the theory of Majorana neutrinos based on the use of Pauli symmetry. He was able to show that with this approach the normal hierarchy of neutrino masses is most probable and their absolute values were estimated. Moreover, new relations between the values of neutrino mixing angles were established.



Yury Vladimirovich Gaponov  
(03.09.1934 – 21.12.2009)

Yury Vladimirovich Gaponov made an extraordinary contribution to the development of studies on the history of the Soviet Atomic project. He initiated two international conferences, one in Dubna (1996), the other in Vienna (1999), and the publication of three volumes of collected material from these meetings, including memoirs of project participants of great interest for scientists and the lay public. Yury Vladimirovich won the I V Kurchatov Prize for this work popularizing achievements of the Kurchatov Institute of Atomic Energy and received the honorary degree of Veteran of Atomic Energy and Industry for his many-year fruitful work at this Institute.

Yury Vladimirovich Gaponov was a member of the Expert Council on Physics for the RF Higher Attestation Commission (VAK), a member of the Scientific and Technical Council at the State Atomic Energy Corporation ‘Rosatom’, an expert for the Scientific Council of the RAS Presidium ‘Physics of Neutrino and Neutrino Astrophysics’ program, deputy chair of the RAS Scientific Council on Neutrino Physics. For a long time Yu V Gaponov was a member of the Program Advisory Council on Nuclear Physics at the Joint Institute for Nuclear Research. Also, Yury

Vladimirovich was among the organizers of a regular seminar on the history of the Soviet Atomic project at the Institute of the History of the Natural Sciences and Technology of the RAS.

A man of creative initiative, Yu V Gaponov was engaged in versatile public activities. He was among the pioneers of the student construction team movement that originated at the Department of Physics of Moscow State University in 1959 (he received a medal ‘For the opening up of virgin lands’). In 1964, he worked at the main headquarters of student construction teams. Yury Vladimirovich was among the initiators of celebrating the Archimedes Birthday, an annual tradition at the Department of Physics of Moscow State University. For many years, he headed the Archimedes Creative Studio of physicists, whose performances were always met with great enthusiasm in many universities and research institutions of this country. The performance of the *Archimedes* opera at Moscow State University on 12 May 1961 was attended by such celebrity physicists as Niels Bohr and Lev Landau. Yury Vladimirovich actively participated in the celebration of Physicists’ Day at the Kurchatov Institute of Atomic Energy. He was deeply involved in the organization of the evening faculty of the Moscow Engineering Physics Institute on the premises of the Kurchatov Institute. Possessing many and varied gifts, Yu V Gaponov published in the *Journal of the History of the Natural Sciences and Technology* his admirable memoirs about the campus life at the MSU Department of Physics, full of subtle humour and interesting observations.

Yu V Gaponov’s activity as a scientist is widely acclaimed, both in this country and abroad. Many of his students work at leading research centers in the most promising fields of nuclear and elementary particle physics. He was a remarkable Teacher: his sympathetic attitude, attentiveness, benevolence, and willingness to share his knowledge with others gave immense encouragement to his students and colleagues.

The fundamental scientific work of Yury Vladimirovich Gaponov, his guiding activities in projects and initiatives of great public significance perpetuated his name in the history of Soviet and Russian science and culture. The entire life of Yury Vladimirovich was dedicated unselfishly to science and people.

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