

In memory of Yurii Nikolaevich Ovchinnikov

DOI: <https://doi.org/10.3367/UFNe.2025.09.040049>

On September 23, 2025, a remarkable scientist, part of the outgoing generation of outstanding Soviet theoretical physicists of the twentieth century, a chief researcher at the L.D. Landau Institute for Theoretical Physics (ITP), and a corresponding member of the Russian Academy of Sciences (RAS), Yurii Nikolaevich Ovchinnikov, passed away.

Yurii Nikolaevich Ovchinnikov was born on February 8, 1940, in Ufa, into a family of mathematics and literature teachers. He lost his father during the Great Patriotic War. In 1963, Yurii graduated from the Moscow Institute of Physics and Technology (MIPT), having written his diploma work under the supervision of A.I. Larkin. Yu.N. Ovchinnikov became Larkin's first student and remained his constant like-minded co-author and friend for over 40 years.

The joint studies of A.I. Larkin and Yu.N. Ovchinnikov made a fundamental contribution to the theory of superconductivity, which was the basis of the contemporary theory of the superconducting state of matter. In particular, they predicted an inhomogeneous state of a superconductor in a magnetic field (the Larkin–Ovchinnikov–Fulde–Ferrell state), formulated the theories of the collective vortex state, macroscopic quantum tunneling, and the Josephson effect (jointly with L.G. Aslamazov), and constructed a quasi-classical theory of nonequilibrium phenomena in superconductors. Ovchinnikov's work on superconductivity and the theory of dissipative quantum systems will forever be included in the treasure trove of theoretical physics. Many theoretical predictions and physical phenomena described by Yurii Nikolaevich were confirmed experimentally.

Yu.N. Ovchinnikov was never deterred by computational complexities occurring when describing physical phenomena. He overcame them the way he overcame inevitable difficult passes on mountain hikes. His co-authors remember his amusing and figurative sayings, which became part of student folklore: “if there is λ , then there is also δ ,” “you see, a rhizome will inevitably arise,” and so on. Discussions with Yurii Nikolaevich about science aroused the feeling that he lived in his favorite world of mathematical methods in physics with clear physical images and phenomena behind. The formulas he derived make it possible to transmit today gigantic currents through superconducting cables and record ultraweak electromagnetic signals using Josephson junctions.

Yurii Nikolaevich collaborated actively with scientists from many scientific centers. In Italy, colleagues with whom he worked on problems of macroscopic quantum effects in Josephson systems remember their contacts with him as a living link between the theoretical school of the L.D. Landau



Yurii Nikolaevich Ovchinnikov
(08.02.1940 – 23.09.2025)

ITP and the experimental resources of European institutes. Yurii Nikolaevich possessed a remarkable ability to transform experimenters' ideas into a theory capable of quantitatively describing and guiding an experiment. In particular, together with P. Silvestrini and R. Cristiano, he predicted the possibility of experimentally observing the energy level quantization under nonstationary conditions; this prediction was confirmed experimentally eight years later. Furthermore, he predicted resonant tunneling in SQUIDs (jointly with A. Barone, P. Silvestrini, and B. Ruggiero), which provided the theoretical basis for further experiments by the J. Lukens group at Stony Brook (New York, USA).

For many years, Yu.N. Ovchinnikov administered the ‘Mathematics-2’ exam in the framework of the Landau theoretical minimum. Few were the students who managed to pass this exam in one day. For those who did, theoretical physics became their life's work. Young people treated Ovchinnikov with deep respect and a little fear.

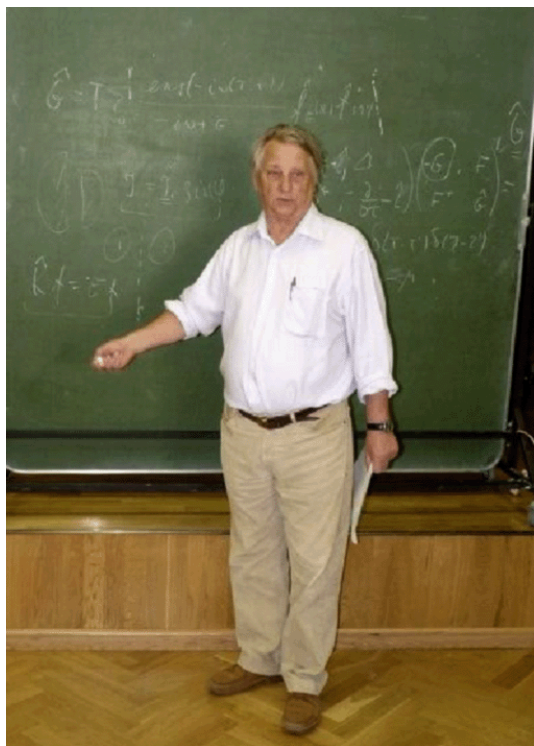
Yurii Nikolaevich was a man of high integrity and responsibility. For many years, he was a deputy director of the L.D. Landau ITP, and, in the 1980s, he headed the housing committee in Chernogolovka, and his colleagues



Yurii Nikolaevich Ovchinnikov and Anatolii Ivanovich Larkin at Summer School on Physics at University of Minnesota (Minneapolis, 1996). (From archive of R.E. Samoilova.)



Yu.N. Ovchinnikov's birthday in 1991 at ITP. (From archive of R.E. Samoilova.)



Yu.N. Ovchinnikov giving a talk at "Landau Days" Conference. (Chernogolovka, June 2013, from ITP archive, photo by A.A. Mikhailov.)

remember his scrupulous honesty and objectivity with gratitude. Few people today know that the artificial slope for Alpine-skier training in Chernogolovka was built on the initiative and by the hands of Yurii Nikolaevich and other enthusiasts.

Yura was a very passionate person. Whatever interested him within a given period of time (from superconductivity, where he was an undisputed authority, to number theory) consumed him completely and for some time became the main focus of his life. Yura always reacted vividly to what was going on; his reasoning about a wide variety of events and people was sometimes very categorical, and it was sometimes difficult to agree with him, but he always spoke frankly when expressing his opinion.

Yurii Nikolaevich left good memories of himself in many scientific centers in Italy, Canada, the USA, and various laboratories in Germany, including the University of Karlsruhe, where he worked as a 1993 Humboldt Prize laureate.

The vivid memory of Yu.N. Ovchinnikov will remain in the hearts of those who knew him, worked with him, and loved him and in the thoughts of generations of scientists reading his classical studies, and developing theoretical physics following him and his example.

*A.A. Varlamov, P.B. Wiegmann, A.M. Dyugaev,
B.I. Ivlev, E.I. Kats, I.V. Kolokolov,
L.P. Mezhev-Deglin, V.P. Mineev, N.N. Nikolaev,
P. Silvestrini, D.E. Khmel'nitskii, V.B. Shikin*