

Sergei Ivanovich Anisimov (on his seventieth birthday)

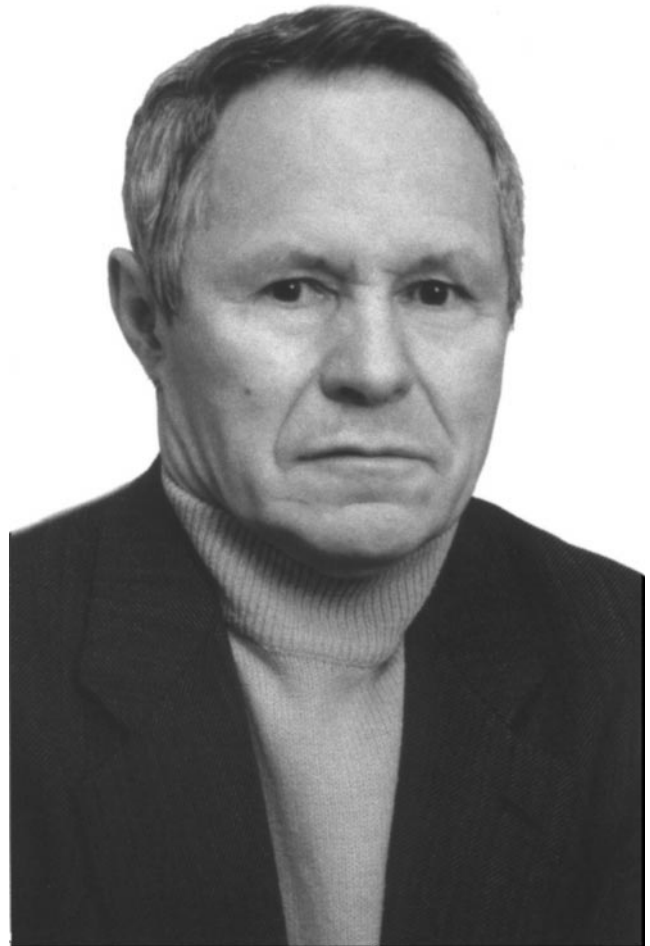
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Sergei Ivanovich Anisimov, outstanding theoretician physicist, known to scientists the world over as an expert in physical hydrodynamics and physics of high energy densities, and corresponding member of the Russian Academy of Sciences, celebrated his 70th anniversary on December 11, 2004.

Anisimov started his work at the Physics Institute of the Academy of Sciences of the Belorussian Republic in Minsk immediately after graduating from the Department of Physics and Mechanics of the Leningrad Polytechnical Institute in 1958. In 1965 he was invited to the recently organized Institute of Theoretical Physics of the USSR Academy of Sciences (now the L D Landau Institute of Theoretical Physics of the Russian Academy of Sciences) as a head of the Sector of Physical Hydrodynamics and Plasma. Ever since then, Anisimov's research activities have been inseparable from the Landau Institute of Theoretical Physics.

Anisimov obtained a number of fundamental results in plasma physics, hydrodynamics, solid state physics and low temperature physics. He published seminal papers on solid hydrogen in which he was able to derive from first principles the equation of state of the molecular phase (up to megabar pressures) which was subsequently confirmed by experimental results. Together with I E Dzyaloshinskii, he discovered in 1972 a new type of topological defect in nematic liquid crystals.

The main field in Anisimov's scientific activity was the study of interaction of high-power laser radiation with matter, including the problems of inertial confinement fusion. His first work in this field dates back to his Minsk period when he developed a model of quasistationary laser-induced ablation of metals, which immediately gained popularity and is still used to develop various laser-driven technologies. Subsequently, he published a series of papers on the hydrodynamics and kinetics of thermonuclear combustion of microtargets, where he found exact criteria of uniform and spark-triggered combustion, discovered an important phenomenon of subsequent additional compression of targets, and established an optimum relation between concentrations of components of thermonuclear fuel. Anisimov was one of the initiators of a large-scale numerical simulation (for the first time ever) of the collapse of Langmuir waves — the fundamental mechanism for generating high-energy electrons in inertial fusion targets. The results on interaction of laser radiation with matter formed the basis of his book (in collaboration with Ya A Imas, G S Romanov, and Yu V Khodyko) *Action of High-Power Radiation on Metals* published in 1970; it was the first monograph in the world on this subject (it was later translated into English in the USA). It was in the work in this field that Anisimov fully



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demonstrated the broad span of his scientific erudition and his highest professional level.

Anisimov's fundamental contributions to the physics of nonstationary processes at high energy densities are the comprehensive investigation of multi-quantum effect in metals caused by high-intensity laser radiation and the theory of optical breakdown in insulators initiated by absorption in microinclusions. He also developed a theory of deep melting in metals treated by high-power radiation (e.g., CO-laser radiation), as well as a two-temperature model of interaction of ultra-short laser pulses with metals which recently became well known, especially with the advent of femtosecond lasers. We should also mention his pioneering results on ablation of polymers irradiated by excimer lasers. He developed in detail photophysical, photochemical, and thermal mechanisms of ablation, which made it possible to explain a large amount of experimental data. Another important step in the research career of Sergei Ivanovich was the prediction of instability of laser-induced sublimation and the investigation of its thermal mechanism. It became

clear later that when matter is exposed to laser radiation, numerous instabilities of various types appear. He also proposed a very original theory on high-temperature evaporation that took into account the collective behavior of surface oscillations on the evaporating specimen.

Of special importance is Anisimov's work in the framework of one of the most successful Soviet space projects: the VEGA project to study Halley's Comet. He took part in designing and developing protection systems for the space probes 'Vega-1' and 'Vega-2' against cosmic dust — work which still remains quite relevant and useful, especially in connection with the development of interplanetary travel projects. For this work, Anisimov received the USSR State Prize in 1986.

Anisimov's achievement in plasma physics earned him the Alexander von Humboldt Foundation International Prize. He was elected to the commission of the International Union of Pure and Applied Physics (IUPAP) and to the executive Committee of the International Association for the Advancement of High-Pressure Science and Technology (AIRAPT). He is a member of the editorial boards of a number of leading Russian and international scientific journals. For his fruitful activities in science, Anisimov was awarded the "Sign of Merit" order (1975) and medals of the USSR and the Russian Federation.

During his scientific career Anisimov devoted much attention to training younger generations of researchers to the highest qualifications. His scientific school in physical hydrodynamics and physics of high energy densities is regarded as one of the leading in the world in these fields. Anisimov is a professor of the Moscow Institute of Physics and Technology (MIPT), is scientific adviser at the Laboratory of Nonlinear Optics at MIPT, and for a long time headed the Theory Department of the Joint Institute of High Temperatures of the Russian Academy of Sciences. Among his students he counts 6 DSc's and more than 30 PhD's.

Anisimov's kindness and sympathetic attitude attracts many different people to him. Now, at 70 years of age, he is full of energy, creative plans, and ideas.

Friends, colleagues, and pupils extend their best wishes to Sergeĭ Ivanovich Anisimov from all their hearts on this jubilee and wish him happiness, good health, and new and significant achievements.

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