To the memory of Alexej Sitenko (Oleksij Sytenko)

Ukrainian and world science has suffered an irrelievable loss. A prominent theorist in physics, brilliant individual, true Ukrainian patriot Alexej Sitenko (Oleksij Sytenko) passed away on February 11, 2002, one day before his 75th birthday.

Alexej Sitenko was born on February 12, 1927, in the Novi Mlyny village of the Baturyn region in Chernihivshchyna, Ukraine. In 1949 he graduated (with distinctions) from Kharkiv State University and continued his postgraduate studies under the supervision of academician Akhiezer. In 1952 he became Ph.D., in 1959 – Doctor of Science in Physics and Mathematics. During the years 1952–1959 he was assistant professor and in 1960–1961 – full professor in the theoretical physics department of Kharkiv University.

In 1961 Prof. Sitenko moved to Kyiv and began his work at the Institute of Physics as the head of the newly created department of theoretical nuclear physics. In 1964 Prof. Sitenko, together with Prof. M.M.Bogolyubov, founded the subdepartment of nuclear and elementary particles theory at the physical department of Taras Shevchenko State University and headed it for about ten years. Alexej Sitenko had been a professor of Taras Shevchenko University since 1963 till the last days of his life.

Since 1968 Professor Sitenko has worked at the Bogolyubov Institute for Theoretical Physics of the National Academy of Sciences of Ukraine, since 1988 he has been the Director of the Institute.

In 1967 A.Sitenko was elected the Correspondent Member, in 1982 – Member of the Ukrainian Academy of Sciences. He was Foreign Member of the Royal Swedish

Academy of Sciences (since 1991), Honorary Member of the Hungarian Academy of Sciences (since 1997), Member of the American Physical Society, Correspond Member of the International Union of Radio Science.

Professor Sitenko was the author of over 400 papers in various fields of theoretical physics, author and co-author of 17 books and manuals in nuclear and plasma physics whose English translations were published in the USA and in Great Britain. His books belong to the classics of physics. They are constantly used by professors and students of many universities and widely referred to in literature. It should be noted that his "Nuclear Theory" is the first book in this field published in the Ukrainian language.

Prof. Sitenko's scientific interests concerned mainly theoretical nuclear physics and plasma theory. In particular, he was a pioneer in the development of the kinetic theory of plasmas with external magnetic fields. He was the first who obtained the plasma dielectric permittivity tensor in the kinetic approximation and employed the results to formulate the most general dispersion equations for waves in magnetoactive plasmas with regard for particle thermal motion. He found the general solution of the problem of electromagnetic field generation in a plasma with an arbitrary electric current distribution, calculated energy characteristics of these fields and derived general relations for the polarization vectors of electromagnetic waves propagating in the plasma.

Professor Sitenko has made basic contribution in the development of the statistical theory of electromagnetic processes in plasma-like media. Together with academician Akhiezer he worked out the kinetic theory of electromagnetic fluctuations in plasmas. In particular, he calculated fluctuation spectra for various quantities (electron and ion densities, electric and magnetic field intensities, microscopic particle distribution functions), found cross-sections of wave scattering and transformation by plasma fluctuations, revealed peculiar features of the spectra of scattered radiation associated with collective phenomena occurring in plasmas. He predicted the phenomenon of combination wave scattering in plasmas and developed a theory of induced wave scattering taking into account the parametric effect of the external field and nonlinear saturation of induced fields. Prof. Sitenko's theory of wave scattering in plasmas has provided a basis for an advanced method of noncontact plasma diagnostics that is widely used in the studies of both native and laboratory plasmas. It is not an exaggeration that nearly all scientific papers in this field contain references either to pioneer papers by A.Sitenko or to the relevant sections of his books.

An important stage in the development of the fluctuation theory was the extension of the fluctuation-dissipation relation to nonequilibrium systems and the inversion of the fluctuation-dissipation theorem, proposed by Prof. Sitenko.

An important part of the research carried out by Prof. Sitenko is devoted to the study of nonlinear wave interactions and to the effect thereof on plasma fluctuations. He calculated nonlinear dielectric susceptibilities (both scalar and tensor) and derived nonlinear equations for electromagnetic fields and correlation functions of fluctuating quantities. These equations are applied to study the nonlinear saturation of critical fluctuations in unstable plasmas, anomalous transport in turbulent plasmas, and to work out the renormalized plasma electrodynamics.

During the past few years, Prof. Sitenko and his students have studied fluctuations in turbulent and dusty plasmas. They formulated microscopic equations for dusty plasmas which consistently describe self-consistent field and particle distributions with regard for electron and ion absorption by dust grains, derived the Bogolyubov-Born-Green-Kirkwood-Yvon chain of equations for such plasmas and considered stationary distributions and fluctuations of grain charges. These papers laid the foundation of a consistent kinetic theory of dusty plasmas.

Professor Sitenko obtained significant results in theoretical nuclear physics. His fundamental contribution in the theory of high-energy particle-nucleus interactions is of basic importance. His theory of diffraction nuclear processes is called "Sitenko-Glauber method" in literature and is widely used to draw information on the nuclear structure. In terms of this theory, he predicted a new physical phenomenon, deuteron diffraction dissociation, that was later confirmed experimentally. Prof. Sitenko formulated the generalized Huygens principle for diffraction hadron-nuclear interactions. He was the first who substantiated the application of phenomenological optical nuclear potentials in terms of microscopic scattering amplitudes. He proposed a comprehensive theory of high-energy nuclear processes in complex nuclear systems of various nature, worked out a theory of inclusive reactions involving light ions. The diffraction theory of multiple scattering, developed by Prof. Sitenko and his school, considerably influenced the studies of the interaction of complex particles with nuclei. Sitenko-Glauber theory is recognized by the specialists in the scientific centers throughout the world.

Professor Sitenko worked much on the analysis of high-energy electron-nucleus interactions. He was the first who considered inelastic scattering of fast electrons by nuclei accompanied by nucleon knockout and studied the effect of nucleon correlations on the inelastic scattering spectra.

Prof. Sitenko also made an important contribution to the theory of direct nuclear reactions involving polarized particles and to the theory of three-body systems. He derived integral equations for three-nucleon systems with regard for spin and isospin degrees of freedom and proposed new methods of solution thereof.

Prof. Sitenko obtained interesting results concerning relativistic nuclear systems, worked out the Hamiltonian approach in the formulation of relativistic equations for systems of strongly interacting particles.

Prof. Sitenko's scientific interests concerned all the most important fields of nuclear and plasma physics. His fundamental results are widely recognized in Ukraine and abroad. In 1976 he was awarded the K.D.Synelnykov Prize for a series of papers concerning the theory of nuclear reactions. A series of his fundamental papers on the theory of electromagnetic fluctuations and nonlinear wave interactions in plasmas was distinguished by the National Prize of Ukraine in 1992. In 1994 he was awarded (together with O.M.Sharkovsky) the M.M.Bogolyubov Prize for the scattering theory in quantum systems and in one-dimensional dynamical systems. In 1996 Prof. Sitenko was awarded the title of Honored Scientist of Ukraine. In 2000 he was awarded the International Walter Thirring Prize for the great contribution in the development of theoretical nuclear physics.

Prof. Sitenko always combined his research work with the education of young scientists. His books, based on the original lecture courses, were used by generations of young theorists to study the fundamentals of nuclear theory, theory of nuclear reactions, physical kinetics, plasma electrodynamics. Of his students, 19 have become Doctors of Sciences in Physics and Mathematics and 46 have obtained the Ph.D. degree. Representatives of his scientific school work in the leading scientific centers in Kyiv, Kharkiv, Dnipropetrovsk, Odesa, Tbilisi, Moscow, Tashkent, Sofia, Prague, Hanoi, Paris, Nancy.

Professor Sitenko was highly active in the organization of scientific research as Director of the Bogolyubov Institute for Theoretical Physics, member of the Board of the Division of Physics and Astronomy of the National Academy of Sciences of Ukraine, Editor-in-Chief of the Ukrainian Journal of Physics, Director of the International Center of Physics of the Division of Physics and Astronomy of the National Academy of Sciences of Ukraine, member of the Physical division of the State Committee of the National Prizes of Ukraine in science and technology.

Professor Sitenko initiated the international conferences on plasma theory. The first and the second conferences were held in Kyiv at the Institute for Theoretical Physics in 1971 and 1974. The conferences were highly successive and since then have been called “Kiev (Kyiv) Conferences”. Beginning from 1977, the conferences bearing this name have been held in various countries. Prof. Sitenko brought important contribution into the organization of a series of international conferences “Nonlinear and Turbulent Processes in Physics” (Kyiv 1979, 1983, 1987, 1989, 1992, 1994) whose success is generally acknowledged. Prof. Sitenko was among the organizers of the first international conference “Physics in Ukraine” (Kyiv, 1993) and International Bogolyubov Conference “Problems of Theoretical and Mathematical Physics” (Moscow-Dubna-Kyiv, 1999).

Fond memories of Professor Sitenko will always live in the hearts of those who knew him.

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