The 65th anniversary of Professor Ihor Stasyuk

On 23 September 2003, Professor Ihor Stasyuk, Research Deputy Director and Head of the Quantum Statistics Department of the Institute for Condensed Matter Physics will celebrate his 65th birthday.

Professor Ihor Stasyuk is a prominent Ukrainian scientist and high school teacher, Corresponding Member of the National Academy of Sciences of Ukraine, Doctor of Science in Physics and Mathematics.

Ihor Stasyuk was born on the 23rd of September 1938, in Berezhany Ternopil' region. He finished school in 1954 in Stryj. The same year he entered Lviv State University (Department of Physics) and graduated from it in 1959 with honours. The studies were continued during the postgraduate course (1959–1962) guided by the well known theorist, one of the founders of Lviv scientific school, Professor Abba Glauberman. The result of his postgraduate study was his Cand. Sci. (Ph.D.) thesis "The Method of Site Elementary Excitations in the Theory of Nonmetallic Crystals" (1963). In these early works Ihor Stasyuk developed mathematical methods of site operators for the description of multi-level systems. It is one of the forms of formalism of Hubbard operators developed later on.

I.Stasyuk accomplished a series of original research papers devoted to the correlation effects in crystals with narrow electron energy bands (together with L.Didukh). The appearance of the states with magnetic ordering in such systems was investigated. The proposed ideas and methods were further developed in the studies of strain effects in semiconducting and semimetal crystals. In particular, there was established the presence of self-consistent connection between filling of the electron states in conduction band and crystal deformation. A number of characteristics of phase transitions with the valence change were described. The effect of the external mechanical stress on the electron spectrum of narrow gap semiconductors was described as well.

Significant scientific achievements by Professor I.Stasyuk concern the theory of ferroelectric phenomena in dielectric crystals. Peculiarities of dynamic characteristics of KDP-type crystals were originally described based on the quasispin-phonon model. The role was determined of short-range proton correlations in crystals with hydrogen bonds as well as their contribution to the thermodynamics of these systems (together with R.Levitskii). Recently Professor I.Stasyuk studied the external stress effect on the behaviour of hydrogen bonded ferroelectrics.

The crystals with structural phase transition of Jahn-Teller type were also his objects of investigation. The methods proposed by Professor I.Stasyuk made it possible to describe various crystals with complex structure of electron spectra of Jahn-Teller ions. Isothermal and isolated dipole and quadrupole susceptibility, elastic constants, specific heat of such objects were also investigated.

Professor I.Stasyuk is widely recognized for developing the microscopic theory of a number of induced optical effects in dielectric crystals (electro- and piezooptic effects, electro- and piezogyration, magnetooptic effect, etc.). The microscopic mechanism of these effects was established. In 1985 the developed theory formed the basis of his Doctoral (Habilitation) thesis "Theory of the Effects Induced by External Fields in Crystals with Structural Phase Transitions".

Among the main scientific achievements by Professor I.Stasyuk there are the results of investigations of the systems with local lattice anharmonicity, strong electron correlations and the problem of high-T_c-superconductivity (HTSC). The role of kinematic mechanisms in superconductivity in the Hubbard model was studied together with the scientists of Joint Institute for Nuclear Research (Dubna). Professor I.Stasyuk developed the original scheme of generalized random phase approximation for the calculation of the correlation functions using a diagrammatic method when dielectric susceptibility is studied (together with A.Shvajka). The possibility of the appearance of instability with respect to the fluctuations of polarization or density of electron charge in HTSC crystals was shown. As a result, the phases with different types of ordering appear, such as ferroelectric, charge ordering, phase-separations. In the recent years, an approximate analytical scheme of the dynamic mean-field theory, that is used for electron systems with Hubbard correlations and is exact in the limit of the infinite dimensionality of a space, was developed by I.Stasyuk. The effective single-site problem arising within the framework of this method has been formulated in terms of the auxiliary Fermi-field.

Professor I.Stasyuk proposed a series of models of a proton subsystem of various types of crystals with hydrogen bonds. Based on these models the phase transitions, thermodynamic and dynamic properties of a such systems were successfully investigated.

Professor I.Stasyuk is a prominent teacher as well. Sixteen researchers under his supervision became Candidates of Sciences; two of them are now Doctors of Sciences. For the last forty years Professor I.Stasyuk has had lectures of different classical and modern courses on theoretical physics at the Ivan Franko Lviv National University.

Professor I.Stasyuk is associate editor of the "Condensed Matter Physics", member of the editorial board of the "Journal of Physical Studies", and Physical Collection volumes of Shevchenko Scientific Society. Ihor Stasyuk has been head and a member of organizing and programme committees of many conferences on physics.

Editorial Board of the "Condensed Matter Physics" and colleagues from the Institute for Condensed Matter Physics congratulate Professor Ihor Stasyuk on his 65th birthday and wish him to stay in good health and many more years of fruitful scientific work.