
GALYNA OLEKSANDRIVNA PUCHKOVSKA (TO HER 70-TH ANNIVERSARY)

On June 22, 2004, Galyna Oleksandrivna Puchkovska, the recognized scientist in the area of optics and spectroscopy of molecules and crystals, solid-state and molecular physics, Doctor of Science in Physics and Mathematics, Professor, head of the Department of Photoactivity of the Institute of Physics of the NASU, was seventy.

G.O.Puchkovska was born in Kyiv in a family of physicians. In 1951, she left the secondary school with a silver medal and, the same year, entered the physical faculty of T.G. Shevchenko Kyiv State University.

The whole Galyna Oleksandrivna's creative labor activity is connected with the Institute of Physics of the National Academy of Sciences of Ukraine. She came here right after the graduation from the University. In 1960, she became a postgraduate student at that institute and, in 1966, defended the Ph.D. thesis on the topic "Influence of temperature and phase transformations on infrared spectra of normal paraffins". G.O. Puchkovska is working at that institute up till now, being the head of the Department of Photoactivity since 1993.

Main objects of the scientific quests of Galyna Oleksandrivna belong to various areas of solid-state physics, molecular physics, vibrational spectroscopy of disordered systems, and so on. The results of studies of intermolecular interaction mechanisms, dynamics of molecules, and phase transformations in the condensed state have been summarized in her doctoral dissertation "Manifestations of structure, dynamics, and polymorphism in vibrational spectra of molecular crystals", which was successfully defended in 1988. That year, she was conferred the academic status of Professor in the "Optics" specialization. In 2000, Galyna Oleksandrivna was conferred a rank of the Soros Professor. Her scientific results are presented in more than 200 publications. In 1984, G.O.Puchkovska became the winner of the State Premium of Ukraine in the area of science and technique for the participation in the researches related to the development of physical



fundamentals of a new generation of pyroelectric detectors of infrared radiation. Galyna Oleksandrivna was awarded the several State medals: "For valorous labor in commemoration of V.I.Lenin's centenary" (1970), "For labor merit" (1976), "In commemoration of the 1500-th anniversary of Kyiv" (1982), and "The Labor Veteran" (1985).

In 1960, Galyna Oleksandrivna started regular researches of the dynamics of molecules in the condensed state. Those studies allowed her to obtain certain fundamental results, in particular to discover the phenomenon of conformational polymorphism in crystals composed from long-chain compounds (mono- and dicarboxylic acids, cholesterol ethers, etc.) and to reveal its spectral manifestations in the vicinity of a phase transformation temperature.

At the beginning of the 1980s, the search for experimental confirmations of the validity of A.S.Davidov's exciton theory for vibrational states of molecular crystals was one of the challenging problems of solid-state physics. Galyna Oleksandrivna was the first who proposed to use the phenomenon of Davydov splitting in vibrational spectra of molecular crystals for the analysis of phase transformations and crystal lattice dynamics. In particular, she revealed a number of correlations between the value of Davydov splitting of IR absorption bands and parameters of the crystal lattice of long-chain compounds, which allowed her to establish the existence of a crystalline rotational phase in crystals of normal paraffins and their solid binary solutions, and to study the features of this phase depending on the molecule length and symmetry.

Galyna Oleksandrivna made a sound contribution into the theoretical study of the vibrational dynamics of molecules that contain alkyl chains with polar end groups, which gave the opportunity to explain the evolution of the IR-absorption spectra of mono- and dicarboxylic acids in various crystalline modifications of those substances. With her participation, the methods of calculation of such characteristics of molecular dynamics in crystals as the parameters of mechanical and optical anharmonicities, the activation energy, the relaxation times of the hindered rotation of molecules and complex ions in crystals, etc., were developed and proposed for application.

Galyna Oleksandrivna's researches in the area of IR-spectroscopy of crystals with hydrogen bonds became an outstanding stage of her scientific activity. She revealed a relation between their structure and spectral parameters, which made it possible to discover the role of hydrogen bonds in phase transformations of alkaline iodate crystals, homologues of alkyl- and alkoxybenzoic acids, and their fluorine-substituted compounds in crystalline and liquid-crystal states. Those results were summarized in the monograph "IR spectroscopy of molecular crystals with hydrogen bonds" (L.M.Babkov, G.O.Puchkovska, S.P.Makarenko, T.A.Gavrillo, Kyiv, Naukova Dumka, 1989).

A substantial scientific achievement of G.O. Puchkovska is the research of surface polaritons in anisotropic crystals of alkaline iodates, zinc and beryllium oxides. On the basis of the studies dealing with attenuated internal total reflection, the dispersion branches of such polaritons for bulk crystals, films deposited onto various substrates, and ceramics were reproduced for the first time.

The creative stimulus of Galyna Oleksandrivna's scientific activity was always an aspiration for the new. Her extremely advanced intuition and skill to find perspective directions of scientific search can be considered as her main feature. The complex researches of the physical phenomena connected to the processes of self-organization and interaction of organic molecules in nanosized heterogeneous structures of the inorganic-organic type have been carried out intensively under her guidance and with her immediate participation for several last years.

Under the guidance of Prof. G.O.Puchkovska, an important trend in the field of vibration spectroscopy of nonmetallic and liquid crystals has been developed. Eighteen Ph.D. theses have been defended under her supervision. She promoted the defense of two theses for a Doctor's degree, those of O.I.Barabash and L.M.Babkov. Her disciples successfully worked and are working at the educational and scientific research institutions of Ukraine (Lutsk, Sumy, Zaporizhzhya, Kyiv), Russia, and the USA. The works of G.O. Puchkovska and her disciples have obtained the deserved recognition both in Ukraine and abroad.

G.O.Puchkovska actively participates in the international collaboration and is maintaining close scientific contacts with scientists of Russia, Germany, France, Poland, Uzbekistan, Estonia, Latvia, Armenia, and other countries.

Fruitful is G.O.Puchkovska's scientific-managerial activity. She is a member of the Scientific Council on solid-state physics of the NAS of Ukraine, a member of the Academic council of the Institute of Physics, and a member of the Specialized academic councils of the Institute of Physics and the F.D.Ovcharenko Institute of Biomolecular and Colloid Chemistry of the NAS of Ukraine. For many years, G.O.Puchkovska is acting as a member of editorial boards of several republican and foreign scientific editions and organizing committees of different international scientific forums. In 2001, she was elected the Associated member of the European Academy of Sciences, Arts and Literature (Paris, France).

With G.O.Puchkovska's active participation, the holding of the Republican research workshops "Spectroscopy of molecules and crystals", the regular Chairman of which she is during 30 years, has been started in Ukraine in 1973. With the assistance of scientists of republican educational institutions, universities, and institutes, 16 such workshops have been convened till now at various towns and cities of Ukraine

(Uzhgorod, Lutsk, Lviv, Chernivtsi, Mukachevo, Cherkasy, Ternopil, Kharkiv, Nizhyn, Sumy, Odesa, Chernigiv, Sevastopol). In 1989, these workshops obtained the international status. The participation of a wide circle of outstanding domestic and foreign scientists and scientific youth in these scientific forums has promoted the expansion of the advanced scientific approaches and methods of spectroscopy, the establishment of international scientific links, and the increase of the Ukrainian scientists' authority in the world.

G.O.Puchkovska meets her 70-th jubilee, being full of forces, creative energy, new scientific plans, and plans for the future. Significant achievements in science, as well as the cordiality and goodwill in her attitude to people, gained her a big authority in the physical community. On the behalf of many physicists, including her numerous disciples and collaborators, we wish dear Galyna Oleksandrivna health, welfare, and further successes in her scientific activity.

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