

Kirill Borisovich Tolpygo

(1916–1994)

To the centenary of the birth

On May 3, 2016, we celebrate the 100th anniversary of an outstanding Soviet physicist and theoretician Kirill Borisovich Tolpygo, Dr. of Sci. in Physics and Mathematics, a professor, a corresponding member of the Academy of Sciences of Ukraine, who was a student and a colleague of S.I. Pekar. When celebrating the date, we pay our respects to a man who significantly contributed to the development of solid state physics. K.B. Tolpygo had graduated from Kiev State University in 1939. He was a participant of the Great Patriotic War, a gunner, wounded in action at Yelnya. In 1944, Kirill Borisovich entered the post-graduate courses at Institute for Physics, Academy of Sciences of USSR. Since 1948 to 1960, he worked at the institute. In 1949, he had passed his Ph.D. defense in Physics and Mathematics; in 1962, he had presented his doctoral thesis in Physics and Mathematics. Since 1960, when Institute for semiconductors of the Academy of Sciences of USSR was founded, to 1966, K.B. Tolpygo worked there as the head of the Dept. of the theory of semiconductor devices. At the same time (since 1946 to 1966), K.B. Tolpygo was teaching at Kiev State University and since 1960 to 1966, he headed the Dept. of Theoretical Physics. In 1963, he was confirmed in the academic rank as a professor. In 1965, K.B. Tolpygo was voted in the Academy of Sciences of Ukraine as a corresponding member (at Donetsk Scientific center), majoring in Theoretical Physics. Kirill Borisovich was a founder of the school of theoretical physics in Donetsk. The last 28 years of his life were devoted to Donetsk State University and Donetsk Institute for Physics and Engineering named after A.A. Galkin, NAS of Ukraine. Since 1966, K.B. Tolpygo worked as the head of the Dept. of Theoretical Physics at Donetsk Institute for Physics and Engineering named after A.A. Galkin, NAS of Ukraine. Since 1988 to the last days of his life, he held the position of the Chief Researcher of the institute. At the same time (since 1966 to 1988), he was a professor the head of the Dept. of Theoretical Physics at Donetsk State University.

Even the first works of Kirill Borisovich (1949–1956) laid the foundation of the progress in the dynamical theory of crystal lattice. They reported consistent ab-initio adiabatic approximation that allows account of the deformation of electron shells of ions in the course of nuclei oscillations. The reported approach was known as shell model by Tolpygo. For the first time, he considered optical lattice oscillations inclusive of delay and mixed states of photons and phonons were obtained. Later they were experimentally verified and called polaritons. Long-range Coulomb forces were introduced to the dynamics of covalent and molecular crystals. This theory by K.B. Tolpygo allowed consideration of electron interaction with phonons of all branches and in the whole range of the wavelength. The description was successfully applied to the theory of polaritons, *F*-centers and excitons in alkali halide crystals. K.B. Tolpygo devised a method of calculation of short-range defects in semiconductors and dielectrics. He contributed to the development of many-electron theory of valence crystals that was an effective method including allowance for many-electron correlation in band theory. He developed a quasi-molecular model of covalent crystals and a new interpretation of the spectra of optical adsorption based on a concept of metastable Frenkel excitons. Kirill Borisovich designed a microscopic theory of adsorption of light wave incident to a semi-infinite crystal, a microscopic theory of Cherenkov radiation as a result of polariton generation by the field of a fast electron, etc. This was not a total list of the scientific achievements of the researcher. Besides the solid state theory, scientific interests of K.B. Tolpygo were centered around biophysics, too. Everybody who had the luck to work with him and to converse, remember Kirill Borisovich as an industrious, benevolent, decent and modest person, a man of principle.

Colleagues and students