In honor of Leonid Keldysh 85th birthday

EDITORIAL

This issue of ZhETF collects papers written by colleagues, former students, and friends of Leonid Veniaminovich Keldysh in honor of his 85th birthday.

Leonid Veniaminovich (LV) has made many milestone contributions to the modern physics of solid state and semiconductors, of quantum theory of nonequilibrium processes, and nonlinear optics. His pioneering contributions to fundamental physics include the concept of "inelastic" tunneling in semiconductors and the theory of ionization in strong electric fields (1957–1958, the principle of work of the Esaki diode and the Franz–Keldysh effect), multiphoton ionization of atoms in a strong laser field (1964), and the famous Keldysh diagram technique for nonequilibrium processes (1964). The latter become a powerful working tool for numerous theorists in all fields of modern physics, from high energy and astrophysics to the theory of strongly correlated, low-dimensional and nano systems in solid state physics, as well as in single-molecule tunneling spectroscopy and manipulation. LV was the first to envision band engineering using superlattices (1962); this field was later transformed into physics of heterostructures, the base of modern nanophysics and nanodevices. LV created a beautiful world of cold electron–hole systems. The theoretical predictions by LV of new states—the electron–hole liquid (1968), the exciton Bose–Einstein condensation (Keldysh and Kozlov, 1968), the excitonic insulator (Keldysh and Kopaev, 1964), and exciton polariton inelastic scattering (Ivanov and Keldysh, 1983, Keldysh and Tikhodeev, 1986)—generated intense experimental studies continuing for decades.

LV's role in maintaining the high ethical and scientific standards of Russian physics in the various and changing times is enormous. JETP is proud that most of his famous works appeared in print in our pages. We are delighted to join our colleagues who contributed to this issue in their best wishes on the occasion of LV's 85th birthday.