

PERSONALIA

PACS numbers: 01.60.+q
DOI: 10.1070/QE2014v044n01ABEH015374

Fedor Vasil'evich Bunkin (on his 85th birthday)

Academician Fedor Vasil'evich Bunkin, an outstanding physicist and science administrator in Russia, a prominent representative of the Russian school of Radiophysics and Quantum Electronics celebrated his 85th birthday on 17 January 2014. F.V. Bunkin's fundamental works extended the ideas of this school, laying the basis for new directions in laser physics, nonlinear optics and condensed matter physics.

F.V. Bunkin, being a student of Moscow Institute of Physics and Technology (MIPT), began his scientific carrier at the Laboratory of Oscillations of the P.N. Lebedev Physics Institute, USSR Academy of Sciences. All his subsequent activities have been associated with the A.M. Prokhorov General Physics Institute (GPI), Russian Academy of Sciences, which united in this laboratory research teams specialising in a wide range of fields.

The scientific style of F.V. Bunkin, characterised by the breadth and depth of theoretical approaches and mandatory ties to experiment and possible applications, was formed at the early stage of his carrier (1949–1964). Fedor Vasil'evich started with the calculation of the fluctuation sensitivity of radiometers for measuring the temperature of astronomical objects. His studies received continuation in constructing the theory of thermal radiation of anisotropic media and in addressing the general problems of the theory of fluctuations in nonlinear and nonequilibrium physical systems. The results of these works were reflected in F.V. Bunkin's CandSc (1955), and later DSc (1964) theses.

Since the mid-1960s laser physics has become the priority research field for F.V. Bunkin, and from that time on he began his fruitful collaboration with A.M. Prokhorov. First studies of F.V. Bunkin in this area were devoted to constructing the theory of excitation and ionisation of atoms in a strong radiation field, dissociation of molecules, cold electron emission and bremsstrahlung. These classic works performed in collaboration with A.M. Prokhorov were experimentally confirmed. Also predicted and experimentally studied were the phenomena of laser discharge in the regime of cold combustion and low-threshold optical breakdown of a gas near a solid surface; proposals were made for the use of military laser technology for defense.

Kvantovaya Elektronika **44** (1) 94 (2014)
Translated by I.A. Ulitkin

F.V. Bunkin and his co-workers predicted and experimentally studied the effects of light-induced critical opalescence, concentration self-action of light and light-induced spinodal decay in stratified liquid solutions. The Wave Research Center at the GPI headed by F.V. Bunkin continues the research, the results of which are associated with the possibilities of technological applications of the effects of formation of nanoparticles and surface nanostructures by laser ablation.

Since the mid-1990s the research interests of F.V. Bunkin have been focused on physics of water and aqueous solutions. His own approaches to the study of the dynamic short-order structure characteristics of water and formed by intermolecular hydrogen bonds with picosecond lifetimes were outlined in studies on optothermodynamics of solutions and on lidar diagnostics of the impurity composition of seas. The most promising method is four-photon polarisation spectroscopy with high sensitivity in the range of Brillouin to Raman frequency shifts. An original integrated system devised at the Center for four-photon spectroscopy made it possible to reliably detect for the first time a multi-peak excitation spectrum of liquid water and aqueous solutions at frequencies below 100 cm^{-1} in the range of characteristic rotational motions of light molecules and molecular complexes.

Based on his theoretical investigations of laser discharges in gases, Fedor Vasil'evich in these years began to develop the theory of light-induced breakdown of optically transparent liquids, followed by experiments with weakly absorbing aqueous solutions.

F.V. Bunkin pays much attention to the improvement of organisation of research. In the 1980s–1990s as a Deputy Director of the GPI and a professor of the MIPT, he trained a highly qualified team of researchers for the Wave Research Center that he organised and headed since 1998.

In 1977–1992 F.V. Bunkin headed the Scientific Council on Coherent and Nonlinear Optics. Since 1988 he has been the Deputy Chairman of the Scientific Council of the RAS on the Hydrophysics Complex Problem, which develops a strategy of development of the Russian Navy. Later, he became a member of the Scientific Council of the RAS in the field of defense.

F.V. Bunkin's contribution to solving fundamental and applied problems of modern physics is highly acclaimed by the State and the scientific community. He was awarded the USSR (1982) and Russian Federation (1999) State Prizes. He was elected a corresponding member of the Academy of Sciences of the USSR (1976) and a full member of the Russian Academy of Sciences (1992). F.V. Bunkin was decorated with the Order of Red Banner of Labour (1979); the Order of Friendship of Peoples (1985); the Order For Merit to the Fatherland, 4th Class (2000); and the Order of Honour (2004). Scientific achievements of F.V. Bunkin are widely recognised: He is an honorary doctor of the Szeged University (Hungary) and honorary professor of the Valenciennes University (France).

Being the author of over 300 scientific papers and several monographs and one of the most cited Russian physicists, F.V. Bunkin actively continues his multifaceted work. We congratulate Fedor Vasil'evich on his jubilee and wish him new scientific success and sound health for many years.

O.N. Krokhin