

OBITUARY

PACS numbers: 01.60.+q
DOI: 10.1070/QE2009v039n04ABEH014122

Vladilen Stepanovich Letokhov

Vladilen Stepanovich Letokhov, an outstanding physicist, professor, doctor of physics and mathematics, chief researcher at the Institute of Spectroscopy RAS, died on 21 March 2009.

V.S. Letokhov was born on 10 November 1939 in a small Siberian town Taishet, near Irkutsk. After graduating from Moscow Institute of Physics and Technology in 1963, he did his postgraduate studies under the supervision of academician N.G. Basov at the P.N. Lebedev Physics Institute, USSR Academy of Sciences. The beginning of the scientific activity of V.S. Letokhov coincided with the rapid development of quantum electronics and laser physics. He performed in this period a number of pioneering studies. He substantiated theoretically new nonlinear effects appearing upon amplification of a high-power laser pulse, in particular, the propagation of the maximum of this pulse at the velocity exceeding the speed of light (the so-called running superluminal light pulse). Vladilen Stepanovich developed the theory of nonresonance feedback lasers and found a deep analogy between these lasers and a nuclear reactor and atomic bomb, which gave him grounds to call a nonresonance feedback laser a 'photonic bomb'. V.S. Letokhov developed the fluctuation theory of generation and formation of ultrashort light pulses. He discovered a key role of intensity fluctuations of broadband multimode radiation during the generation of such pulses. He proposed the theory of trapping of atoms in the field of a standing electromagnetic wave and proposed and substantiated a number of new ideas and methods in the field of optical frequency standards, in particular, the method for obtaining ultranarrow spectral lines (4 – 5 orders of magnitude narrower than the Doppler linewidth) based on coherent excitation of atoms and molecules, and the frequency stabilisation based on nonlinear absorption of radiation in an intracavity gas cell.

In 1970 S.L. Mandelstam invited V.S. Letokhov to join the new Institute of Spectroscopy, Russian Academy of Sciences, organised in 1969, as a deputy director in science. Here, V.S. Letokhov headed investigations in a new scientific field of laser spectroscopy. V.S. Letokhov organised a group of young researchers and proposed and realised together with them a number of new ideas, which were ahead of the corresponding studies in the world. They include, in particular, the multiphoton isotopically selective dissociation of molecules by IR radiation, which was later used in an industrial setup for laser isotope separation developed together with a number of other organisations; laser photoionisation detection of single atoms and its application for ultrasensitive analysis; laser cooling of atoms, including the first experiments in the world, which resulted in the development of physics of ultracold atoms; optics of atomic beams (their collimation, reflection, focusing, etc.), which are now being developed as a method of optical nanotechnology; the extension of optical principles to other objects (electrons, neutrons, etc.); laser optical mass-spectroscopy of organic molecules; methods of picosecond and femtosecond nonlinear laser optics for studying and controlling ultrafast processes in condensed media. In the last years, V.S. Letokhov was engaged in studies in the fields of nanooptics and laser effects in the interstellar medium.

The scientific results obtained by V.S. Letokhov and his colleagues have found broad recognition in the scientific community, and his papers had one of the highest citation indices for many years. These results are published in more than 850 articles and 16 monographs. V.S. Letokhov was a laureate of the Lenin prize and the State prize of the Russian Federation. He was awarded the D.S. Rozhdestvenskii prize of the Russian Academy of Sciences and a prize of the European Physical Society, was a honourable doctor of a number of European Universities and foreign scientific societies and Academies, and was a honourable citizen of Troitsk town. V.S. Letokhov created and headed for many years a bright scientific school and was a supervisor of more than 60 PhD theses, and 12 of his pupils defended doctoral dissertations.

For several decades, from the foundation of Quantum Electronics until his last days, Vladilen Stepanovich was a member of the Editorial Board and Editorial Council of the journal.

V.S. Letokhov will always remain in the memory of his friends, pupils and colleagues – all those who admired him for his remarkable and bright talent of a scientist, inventor and organiser.

E.A. Vinogradov, O.N. Kompanets, E.A. Ryabov, O.N. Krokhin, R.V. Ambartsumian, A.Z. Grasyuk, I.G. Zubarev, P.G. Kryukov

Kvantovaya Elektronika **39** (4) 392 (2009)

Translated by M.N. Sapozhnikov