

PERSONALIA

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On the 80th anniversary of V.S. Zuev

Professor Vitalii Sergeevich Zuev – doctor of Physics and Mathematics, academician of the Russian Academy of Natural Sciences, prominent scientist in the field of laser physics, principal researcher at the P.N. Lebedev Physics Institute and author of numerous scientific papers and two monographs – was 80 on 11 July 2013.

Vitalii Sergeevich Zuev was born in Minsk. Before graduating from the Department of Radiophysics at the Moscow Institute of Physics and Technology in 1957, he began his scientific career at the P.N. Lebedev Physics Institute (LPI) in 1956 as a member of the group headed by N.G. Basov. He defended his Ph.D. thesis in 1964 and his doctoral thesis in 1970.

The research activity of V.S. Zuev is closely associated with the birth of quantum electronics, namely, the development of first masers and lasers, including *Q*-switched lasers, and the first experiments on laser thermonuclear fusion, as well as with the creation of shock-wave-pumped photodissociation lasers and the development of nonlinear optics of active media.

He developed the first maser working on a beam of deuterated ammonium molecules and the first domestic *Q*-switched laser. He discovered the superlight propagation of light pulses in an amplifying medium. Vitalii Sergeevich is one of the initiators of the design and development of high-power gas lasers pumped by open optical radiation sources, i.e., by intense shock waves and high-current electric discharges initiated directly in the working gas mixture. In 1970, he was directly involved in the creation of explosive photodissociation iodine lasers with a record-high pulse energy of 10^6 J in one beam, which has not been surpassed to this date. These lasers were used in full-scale experiments for detailed investigations of the force action of laser radiation on solids. In 1973, the group headed by V.S. Zuev developed a nanosecond photodissociation iodine laser pumped by radiation of an open high-current electric discharge. This laser subsequently became the prototype of the most powerful domestic Iskra-5 laser facility launched in 1989 by the All-Union Research Institute of Experimental Physics within the framework of the laser thermonuclear fusion programme. In subsequent years, a new class of gas lasers (called photochemical lasers) was developed with open optical pump sources, lasing in the spectral range from the near-IR to UV. Vitalii Sergeevich is also known as the author of numerous papers on spectroscopy and applied photochemistry.

Vitalii Sergeevich made a significant contribution to the development of nonlinear optics of the active media of gas lasers. In the course of fundamental investigations of physical processes occurring in these media, V.S. Zuev and his coworkers discovered a new type of stimulated scattering of light, which they called stimulated enthalpy scattering. Upon such a scattering, partial vibrations of a medium are excited not by the energy of the scattered light, but by the energy of light-controlled reactions. These investigations led to an increase by many orders in the radiant intensity of high-power gas lasers whose development was carried out by V.S. Zuev for many years under several large-scale research programmes in close cooperation with other academic and applied-research organisations.

Breadth of scientific interest and enthusiasm for new ideas sparked the interest of Vitalii Sergeevich in other scientific directions, not related to the development of lasers. With characteristic energy he began studies of sub-wavelength localisation of objects in the optical and microwave scanning near-field microscopy, and of surface plasmon and polaritons. The paradoxical thinking and extremely high capacity for work allowed V.S. Zuev to achieve the same striking and impressive results in this area.

Education and scientific organisation have always played an important part in the activities of V.S. Zuev. He founded an efficient and creative collective of scientists – the sector of photochemical processes, which was later transformed into a laboratory. He was a member of the scientific council of the Academy of Sciences of the USSR on the problem of Coherent and Nonlinear Optics, the deputy editor-in-chief of Quantum Electronics journal since the moment of its foundation, chairman of the Council of Young Scientists of LPI, and chairman of the State Examinations Board at the Department of Physics of the Moscow State University. As the head of a research school, he devoted considerable attention to the training of new highly qualified scientific personnel. More than a dozen Ph.D.s have obtained their degrees under his supervision.

V.S. Zuev belongs to those eminent scholars who have made a significant contribution to the development of quantum electronics. His research and organisational activity have earned him the order of the 'Badge of Honour', the USSR State Award, and the Mandelshtam prize. He was awarded the title 'Honoured Worker of Science of the Russian Federation'.

The friends, colleagues and pupils of Vitalii Sergeevich as well as the Editorial Council, Editorial Board and the staff of Quantum Electronics congratulate him on his jubilee and wish him sound health, happiness and new scientific achievements.

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