

PERSONALIA

PACS numbers: 01.60.+q
DOI: 10.1070/QE2001v031n10ABEH002114

Sergei Nikolaevich Bagayev

Academician Sergei Nikolaevich Bagayev, an outstanding scientist in the field of laser physics, an organiser of science, Director of the Institute of Laser Physics, Siberian Division, Russian Academy of Sciences, was 60 on 9 September 2001.

S N Bagayev was born in Novosibirsk. After graduating from the Novosibirsk State University, he defended a candidate thesis in 1975 and a doctoral dissertation in 1984. In 1990, Sergei Nikolaevich was elected an Associate Member of RAS and an Academician of RAS in 1994.

The scientific activity of S N Bagayev and his maturing as a scientist are associated with the Institute of Radiophysics and Electronics, Siberian Division, Academy of Sciences of the USSR, where studies on laser physics have been initiated in the 1960s. S N Bagayev has discovered new qualitative features of absorption of laser radiation by low-pressure gases, which made it possible to observe very narrow spectral lines at Doppler-broadened transitions and to improve the spectral resolving power by 5–6 orders of magnitude compared to that existing before the use of lasers.

From the very beginning of his creative activity, S N Bagayev successfully collaborated with his great friend academician V P Chebotayev. In 1991, they founded the Institute of Laser Physics, and in 1992 Sergei Nikolaevich became Director of the Institute.

At present under supervision of S N Bagayev in the Institute of Laser Physics, studies are successfully performed on nonlinear ultrahigh-resolution laser spectroscopy, laser frequency and time standards and their applications in precision physical experiments, the development of new lasers and their applications in medicine, biology, metrology, geophysics, industry, etc.

In the field of nonlinear laser spectroscopy, S N Bagayev has obtained and studied extremely narrow resonances with the absolute width of 50 Hz, corresponding to the relative width of 5×10^{-13}. The development of methods for obtaining narrow resonances made it possible to study in optics such phenomena as the recoil effect, anomalous Zeeman effect on vibrational–rotational transitions in molecules, and small-angle elastic scattering of excited molecules. As a result, the nonlinear dependences of the broadening and shift of optical resonances on gas pressure have been found. These studies attracted great attention of scientists over the world.

In recent years, S N Bagayev developed the physical principles of a femtosecond optical clock, which became a breakthrough in the field of high-precision optical measurements. He showed the theoretical possibility of improving the accuracy of absolute frequency measurements to $10^{-17} - 10^{-18}$ in the spectral range from radio waves to UV, which opens up new opportunities for performing physical experiments with extremely high accuracy. A highly stable, mobile $He - Ne/CH_4$ frequency standard operating with cold particles with the frequency stability of 3×10^{-15} has been created, which has been used for measuring the Rydberg constant with the highest accuracy up to now.

S N Bagayev supervises a complex program on the development of various laser devices. Within the framework of this program, the following devices were developed: a UV laser ophthalmology setup, a laser scalpel, a laser stomatology apparatus, a laser meter of small displacements for precision measurements of the Earth crust deformation, the earthquake forecast and control of the building stability, and a multipurpose laser technological complex. In addition, a number of system were developed for special purposes.

Sergei Nikolaevich made a great contribution to the strengthening of scientific and technical collaboration of the Russian Federation with the FSU countries. He is a coordinator of a number of the lines of collaboration of the Siberian Division of RAS with Belarus, Ukraine, Kazakhstan, and Kirghizstan.

S N Bagaev pays much attention to the education of young scientists and to the science organisation. He is a Head of Chairs at Novosibirsk State University, Novosibirsk Technical University, and Moscow Institute of Physics and Technology. Among his pupils there are five doctors and more than twenty candidates of science.

S N Bagayev combines scientific studies with great activity in the field of science organisation. He is a member of the Presidium of the Siberian Division of RAS, a member of the Bureau of the Department of General Physics and Astronomy of RAS, Chairman of the Scientific Council of RAS on Optics and Laser Physics and of other councils, as well as a Vice-President of the Joint Physical Society of the Russian Federation.

As a member of the Executive Committee of the European Physical Society and of the Commission on Atomic, Molecular and Optical Physics of the International Union on Pure and Applied Physics, S N Bagayev noticeably revived the activity of the representatives of our country in these international organisations. S N Bagayev is a member of the editorial boards in a number of native and international journals.

S N Bagaev was awarded an Order of the Peoples' Friendship and a State Prize in 1998.

Colleagues and pupils wish the hero of an anniversary with all their heart and soul good health, happiness, and further successes in his versatile activity.

Kvantovaya Elektronika **31** (10) 940 (2001)

Translated by M N Sapozhnikov

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