

## In memory of Mitrofan Fedorovich Stel'makh



Mitrofan Fedorovich Stel'makh – one of the outstanding Russian scientists and organisers of science and industry in the field of quantum electronics, founder of the 'Polyus' Scientific-Research Institute and its director from 1962 to 1982, USSR State Prize winner, doctor of technical sciences, professor, member of the editorial board of the *Kvantovaya Elektronika* (Quantum Electronics) journal – would be 100 years old on 21 December 2018.

M.F. Stel'makh was born on 21 December 1918 in the Donetsk region into the family of a blacksmith. In 1935–1941 he studied at the Physics Department of the Kharkov State University and his tutors were L.D. Landau, K.D. Sidel'nikov and A.A. Slutskii. Being a postgraduate, he volunteered for the front, fought on the Western and Volkhov fronts, and after being seriously wounded he served in counterintelligence in Saratov. In 1946 he was sent to the Moscow Artillery Instrumentation Scientific-Research Institute No. 5 (later, NII-5), and from 1954 he worked at the Central Scientific-Research Institute No. 108.

M.F. Stel'makh constructed a travelling-wave tube (TWT) with a low noise factor, which made it possible to increase considerably the radar range. He also developed TWTs for microwave repeaters used in trunk lines and anti-aircraft defence and invented a new microwave device, i.e., a backward wave tube (BWT) irreplaceable in radio countermeasure systems. These types of microwave devices are still being widely used in weapons systems.

The high scientific erudition and major experimental skills enabled M.F. Stel'makh to realise, even at the dawn of laser technology development, how wide the range of potential laser applications is. On his initiative, which was supported by the Ministry of Electronics Manufacturing Industry, the Central Committee of the USSR Communist Party and USSR Council of Ministers decided in 1962 to establish a specialised quantum electronics institute (now known as 'Polyus' Research Institute). M.F. Stel'makh was appointed its director.

M.F. Stel'makh devoted over 30 years of his life to his 'Polyus' Institute. Over a short period he formed a highly qualified team, which began research and development of lasers and systems based on them. Under the leadership of M.F. Stel'makh, the 'Polyus' Institute successfully developed

such areas of laser technology as semiconductor lasers for communication systems and for data storage and retrieval; solid-state lasers for laser technology, radar applications, and range finding; laser gyroscopes; technological laser instrumentation; and laser medicine. The researchers of the Institute were awarded with two Lenin Prizes, many State Prizes, Lenin Komsomol Prizes and in recent years with prizes of the Russian Federation Government. In 1977–1982 M.F. Stel'makh headed a large scientific production association 'Polyus' on the basis of the institute and seven production plants and in fact founded laser industry in the country.

M.F. Stel'makh paid great attention to the training of highly qualified scientific and engineering personnel in close cooperation with the Moscow State University, Moscow Institute of Physics and Technology, Moscow Institute of Electronic Engineering, Moscow Institute of Radio Engineering, Electronics and Automation, etc. In the sphere of his permanent attention were postgraduate students of the Moscow Institute of Physics and Technology and the Polyus Research Institute as well, and his Chair of Quantum Electronics at the Moscow Institute of Physics and Technology and All-Union and International Conferences on Quantum Electronics. He was a member of the scientific and technical sections and several scientific councils, the chairman of one of the councils and a member of the Bureau of the Interdepartmental Coordinating Council on Quantum Electronics. He also headed the *Lazernaya Tekhnika i Optoelektronika* (Laser Technology and Optoelectronics) journal. For many years, Mitrofan Fedorovich was an associate editor of the *Kvantovaya Elektronika* (Quantum Electronics) journal. M.F. Stel'makh encouraged scientific cooperation of the Polyus Research Institute with the Academy of Sciences, leading defence organisations, and the Laser Association of the USSR, where he chaired the laser medicine committee.

For his military service and professional work, M.F. Stel'makh was decorated with orders and medals of the USSR; he was also a laureate of the USSR State Prize. The role of Mitrofan Fedorovich in the development of quantum electronics is well known to the scientific and engineering-technical community in Russia and abroad.

Traditions of successful scientific and production work were continued at the Polyus Research Institute even after the death of M.F. Stel'makh in 1993. The products developed at the institute are widely used in the newest weapons systems. Since 1999 the Polyus Institute has been named the M.F. Stel'makh Polyus Research Institute, and a bronze bas-relief of its founder was installed in the lobby of the institute. On the basis of the institute, an innovative technopark 'Polyus' was founded in 2016, successfully developing the scientific directions laid out by M.F. Stel'makh.

The name of Mitrofan Fedorovich Stel'makh, a prominent scientist and organiser of science and industry, is forever inscribed in the history of domestic and world quantum electronics development.

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