

## 25 Years of A.M. Prokhorov General Physics Institute, RAS

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The General Physics Institute named after A.M. Prokhorov is a living monument to this leading physicist and scientific administrator, one of the founders of quantum electronics and laser physics, Nobel Prize winner in Physics, laureate of

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the Lenin Prize and State awards of the USSR and Russian Federation, decorated twice as the Hero of Socialist Labour.

By 1968, the Laboratory of Oscillations at the P.N. Lebedev Physics Institute, USSR Academy of Sciences (which was headed by Aleksandr Mikhailovich since 1954) became the leading scientific body of the Division A of the Institute. This division formed the base on which Academician A.M. Prokhorov founded the General Physics Institute, USSR Academy of Sciences (which remains his main creation in the field of science), and became its first Director (1982–1998). The decree of the State Committee on Science and Technology of the USSR Council of Ministers, and the

decision of the Presidium of the USSR Academy of Sciences concerning the establishment of the General Physics Institute, USSR Academy of Sciences, were issued in 1982.

As a matter of fact, even the most important decrees or decisions do not suffice for setting up an institute. Without A.M. Prokhorov, his reputation as a great scientist and citizen, and the public awareness of these traits in him, an institute of the type of General Physics Institute could not be founded by any decree or order of any State Committee or any Presidium.

The Institute inherited all the achievements of the Division A of the Lebedev Physics Institute and all that had been conceived, realised and accomplished by Aleksandr Mikhailovich and his disciples. The Institute was named after Aleksandr Mikhailovich Prokhorov in the year 2002.

The 1980s were marked by a rapid growth of the Institute and its recognition as a world leader in a number of scientific fields. The trend continued until 1990s when the Institute, like the entire scientific community of the USSR and the country as a whole, felt the jolts of disintegration of a great empire. Nevertheless, the foundation laid by Aleksandr Mikhailovich not only ensured the survival of the Institute under the new circumstances, but also maintained its position in the world science.

What is the current status of the Prokhorov General Physics Institute, Russian Academy of Sciences? The Institute has a staff of 961 people, including 510 scientists of which 113 are Doctors of Science, 260 are Ph.D.'s and 46 are working towards their doctoral theses.

The Institute has three Academic councils for awarding D.Sc. degrees in the fields of laser physics, theoretical physics, plasma physics, physics of the condensed state, radio physics, acoustics, optics and instrument technology for production of semiconductors, materials and instruments for electronics engineering. Since the year 2000, 42 D.Sc. and 67 Ph.D. degrees have been defended at the Institute. The Institute serves as the base for six departments of leading education institutions in Russia, including the Moscow Institute Physics and Technology, Moscow Institute of Radio Engineering and Automation, and the Mendeleev Russian Chemical Engineering University.

Since 2000, scientists at the General Physics Institute have published 24 monographs. In 2006 alone, over 900 research papers were published, a third of these appearing in foreign journals. According to the information supplied by the Editorial Board of the Quantum Electronics journal, the Institute is the leading 'supplier' of papers (the number of publications by scientists from Prokhorov General Physics Institute in 2004 and 2005 was about 100). The overall financing of the Institute grew from 111 mln roubles in 2000 to 480 mln roubles in 2006. The basic allocation from the Russian budget in 2006 was 127 mln roubles, while the non-basic allocation was 353 mln roubles.

The Institute has entered into mutual scientific cooperation projects with research institutes from 15 countries. Joint laboratories have been set up in scientific collaboration with Canada, Italy and France. Up to 300 foreign scientists and specialists visit the General Physics Institute annually.

The Institute organises International annual conferences on Advanced Laser Technologies, International Laser Physics Workshops, Complex Systems of Charged Particles and their Interaction with Electromagnetic Radiation, as well as the annual conference in Zvenigorod on plasma

physics and controlled nuclear fusion. It is also one of the organisers of the International conference IQEC/LAT.

The main fields of basic research to be carried out at the Institute were laid down in a resolution of the Presidium of the Russian Academy of Sciences. These include physics of condensed media, optics and laser physics, radio physics and electronics, acoustics and plasma physics. A more detailed list includes 29 items embracing virtually all contemporary fields of investigations in the above scientific trends.

The Centre of Physical Instrumentation organised by A.M. Prokhorov and operating as a branch of General Physics Institute continues its successful functioning. The Centre is intended for bringing the projects developed at the Institute to small-scale batch production. In particular, ophthalmologic MicroScan TsFP excimer lasers produced at the Centre for refraction surgery make it possible to correct hypermetropia, myopia, and astigmatism using the flying laser spot technique.

A 'Maria' laser device for curing destructive forms of lung tuberculosis was awarded Gold medal at the 51st Brussels-Eureka Saloon.

Crystals based on stabilised zirconium dioxide (fianites) developed by the research workers of the Institute as early as the 1970s were modified and have found applications in unique medical instruments, biological artificial limbs for various purposes and bio-inactive implantations with a high fatigue strength for dental and orthopaedic surgery.

Research in a new field of nanotechnologies is being carried out on a large scale. The foundations for this field (surface physics and nanophysics) were laid at the General Physics Institute.

The term innovation is currently considered quite common. It is not certain if Aleksandr Mikhailovich used this term, but the implementation of scientific research for practical purposes was also considered as a priority at the General Physics Institute, and considerable advances were made during his tenure.

The Institute is engaged in implementation of innovative technologies even today. However, the number of problems encountered in this direction has been on the increase in spite of the fact that the need for a transition to innovative economy has been recognised at the highest level.

At the General Physics Institute, we adhere to the views of Aleksandr Mikhailovich Prokhorov about the impossibility of separating basic research from the applied one. Only an inseparable link between these trends and their interaction can ensure the development of modern science and prosperity of the society as a whole.