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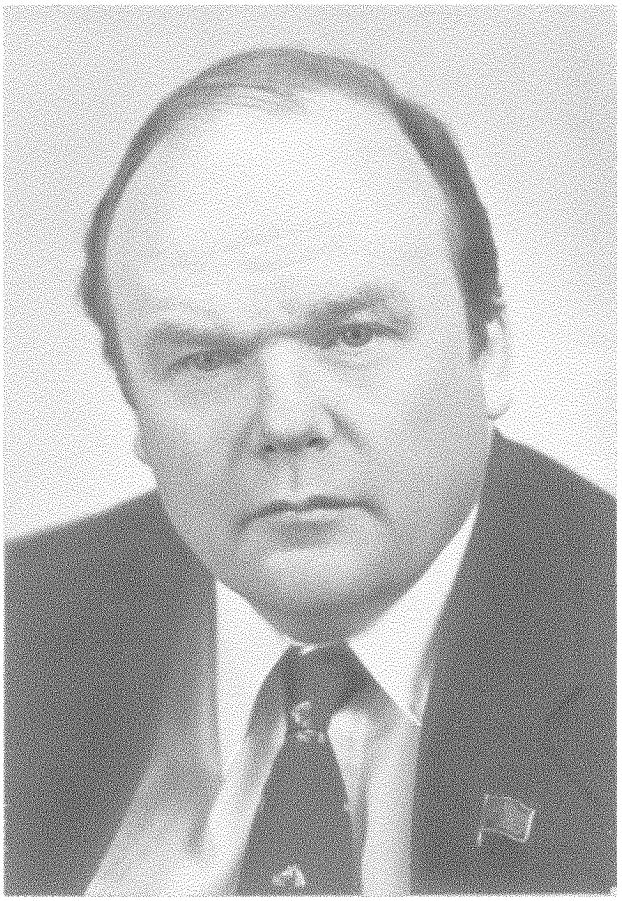
Evgenii Pavlovich Velikhov (on his 60th birthday)

Evgenii Pavlovich Velikhov — an outstanding scientist and a major scientific organiser — celebrated his 60th birthday on 2nd February.

E P Velikhov was born in Moscow to the family of a communications engineer. After graduating from school in 1952, he joined the Faculty of Physics of Moscow State University. Having graduated from the university in 1958, Velikhov set out on his path in science as a postgraduate at the Kurchatov Atomic Energy Institute (AEI) (Academician M A Leontovich's laboratory), where he carried out a number of theoretical studies on the stability of magnetohydrodynamic flows. After completing his postgraduate studies, Velikhov began to work at the Atomic Energy Institute in the field of controlled thermonuclear synthesis. After a short time, he was recognised as an authority on the theory of the stability of high-temperature plasma. Together with A A Vedenov and R Z Sagdeev, he took a major step in the study of the manifestations of instability — he created the quasi-linear theory of a weakly turbulent plasma. This theory made it possible to describe the relaxation of beams in the plasma and a diminution of the Landau attenuation in the propagation of a high-amplitude plasma wave. The 'plateau' which appeared in the electron distribution function as a consequence of nonlinear effects led subsequently to many other problems in plasma physics.

However, a purely theoretical activity did not agree with Velikhov's temperament. Having a lively character and an acute perception of new ideas, Velikhov soon initiated and organised, with the support of Academician M D Millionshchikov, studies at the AEI on the MHD transformation of thermal energy into electrical energy. A new type of powerful MHD generator, which has found extensive application in geological prospecting, was soon created under his supervision. Together with his research activity, he lectured at Moscow State University, where he also helped to organise major scientific investigations. Studies designed to create powerful CO_2 lasers with a nonselfsustained discharge were soon initiated under his supervision at the Institute of Nuclear Physics of Moscow State University and were advanced up to technological applications in the treatment of metals.

During studies on these lines, Velikhov and coworkers obtained a whole series of important scientific results in the physics of low-temperature plasma. In particular, in the study of the stability of low-temperature plasma in crossed E, H fields, the ionisation turbulence of low-temperature plasma was observed and investigated in detail with Velikhov's participation. This electrical type of turbulence was subsequently noted as a discovery. Its specific feature is the fact that the turbulence with its powerful electrical manifestation (not described by the quasi-linear theory) can develop against the background of small fluctuations in the density of the plasma. It is of interest that, by virtue of Velikhov's initiative and personal contribution, the ionisation turbulence of low-temperature plasma became the first example of plasma turbulence investigated numerically with the aid of mathematical modelling. Yet another physical study, which arose in the investigation of the magnetohydrodynamics of plasma, involved the prediction of a nonequilibrium ionisation wave in a gas subjected to an electrical field. This phenomenon makes



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possible the operation of not only MHD generators but also of any other device employing a stream of gas without preliminary ionisation at the inlet. Like combustion, ionisation progresses against the stream of gas. This phenomeon was subsequently used in laser engineering for the creation of fast-flow lasers. A physically similar phenomenon involving the propagation of the ionisation front in an optical discharge was observed several years later.

In 1968, Velikhov was elected Corresponding Member and in 1974 Full Member of the USSR Academy of Sciences. After Academician L A Artsimovich's death, he became Director of the State Programme for Controlled Thermonuclear Synthesis. In 1977, Velikhov was elected Vice-President of the Academy of Sciences of the USSR.

The dynamic and constructive approach typical of Velikhov's character were also manifested during his tenure of the position of Vice-President of the Academy of Sciences. Being profoundly aware of the importance for the country of the accelerated development of automation devices, he took the initiative in setting up a series of institutes for the development of progressive foundations for computer technology and automation. Whilst performing the duties of Academician-Secretary of the Division of Information Science, Computer Technology, and Automation, he has been devoting much effort and energy to the development of this important field.

Velikhov's achievements in science and as an organiser have been recognised both in our country and abroad. In 1977, he was awarded the State Prize and in 1984 the Lenin Prize. In 1981, he was elected Member of the Royal Academy of Technical Sciences in Sweden.

Velikhov has made a major contribution to the organisation of international cooperation among scientists. He initiated the international project for a thermonuclear experimental reactor ITER and at the present time is Head of the ITER Council.

We convey to Evgenii Pavlovich Velikhov our heartfelt wishes for new successes in his fruitful scientific activity and his activity as an organiser.

A F Andreev, V Yu Baranov, A S Dykhne,
B B Kadomtsev, V D Shafranov