Physics – Uspekhi **42** (1) 103 – 104 (1999)

PERSONALIA PACS number: **01.60.+q**

In memory of Leon Mikhaĭlovich Biberman

Leon Mikhaĭlovich Biberman, an outstanding scientist and recognized specialist in plasma physics, thermal physics and energy generation and utilization, a Corresponding Member of the Russian Academy of Sciences, died on 23 September 1998.

Leon Biberman was born on 7th April 1915 in the town of Poti, Georgia. In 1941, Biberman graduated from the Moscow Power Engineering Institute. Biberman spent the World War II years 1941 – 1945 in the Soviet army; he was awarded two distinguished service medals.

The main direction of Leon Biberman's research effort at the end of the 1940s and the beginning of the 1950s was the creation of the theory of radiation transfer in spectral lines. The kinetic equation derived for the number of resonance excitations is known in the literature as the Biberman – Holstein equation; it occupies a central place in the study of the kinetics and transport of excited resonance states in gases and plasmas and in condensed media.

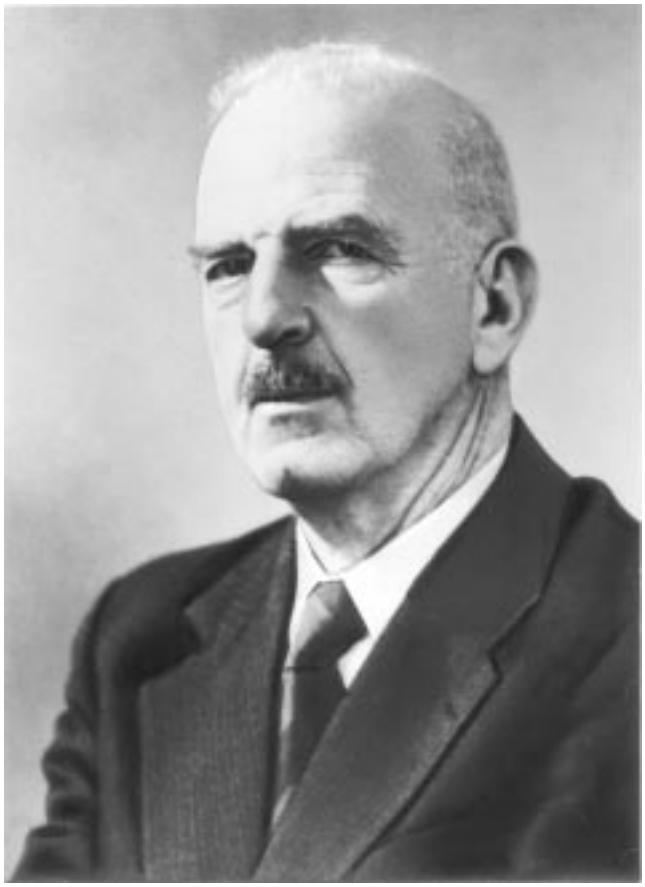
This was an exceptionally fruitful period when Leon Biberman also published papers on the theory of the photographic effect of electrons in matter and on the theory of electron microscopy, and first suggested the double-probe method that became a classic in plasma diagnostics. In this period Biberman carried out the well-known experiment, together with V Fabrikant and N Sushkin, on the diffraction of individual electrons.

In the second half of the 1950s, Leon Biberman took on a complicated physicotechnical problem: the development of the theory of radiative heat exchange. Biberman was able to show in his papers of 1955 – 1957 that when a space vehicle moves through dense layers of atmosphere, the shock wave radiation in front of the apparatus generates a significant, and at high velocities the principal contribution to aerodynamic heating. The results of this research were used in calculations for the thermal insulation of Soviet space vehicles.

The efforts of a number of research teams in these years have created the novel field of gas dynamics — the radiative gas dynamics — in the progress of which Biberman played an important role.

Research in this vast important applied field has led to generation of a wide scope of physical problems formulated by Leon Biberman. One of these was to obtain reliable data on the optical properties of low-temperature plasma. Biberman initiated a systematic study of the optical properties of hot gases and plasma. His monograph "Optical Properties of Hot Air", published in 1968, even now remains a handbook for researchers and engineers.

In 1965, Biberman began his research at the Institute for High Temperatures of the USSR Academy of Sciences, where he organized the theoretical department. He and his disciples carried out a series of research programmes on the theory of nonequilibrium low-temperature plasma. They developed general approaches that made it possible to treat low-temperature plasma as an integrated system that involves both radiative transitions between excited states of atoms and radiation transfer processes in the plasma.



Leon Mikhaĭlovich Biberman
(07.04.1915 – 23.09.1998)

Very attentive to solving applications-oriented problems, Biberman used the theoretical results to investigate non-equilibrium phenomena in the propagation of strong shock waves through gases, in the processes occurring in a non-equilibrium-plasma magnetohydrodynamic generator and in the pre-breakdown phenomena in gases.

Leon Biberman paid much attention to the problems born of the new era of plasma energetics, including the theory of magnetohydrodynamic lasers, the problem of radiative-convective heat exchange in the channel of the magnetohydrodynamic generator, and the search for the most efficiently implementable idea of the magnetohydrodynamic generator using a nonideal plasma.

In the last years of his life Biberman was developing a theory of condensation of supersaturated vapor in an external

Uspekhi Fizicheskikh Nauk **169** (1) 111 – 112 (1999)
Translated by V I Kisin

electromagnetic field. He also significantly improved the similarity theory for processes of complex heat exchange.

Biberman's teaching career of more than 30 years was devoted to reading the course of general physics at the Moscow Power Engineering Institute.

Biberman was elected a Corresponding Member of the Russian Academy of Sciences in 1979. The Order of the Red Banner was conferred on him for his fruitful research activities. For many years Biberman was chairman of the Scientific Council of the Russian Academy of Sciences on the problem "Physics of Low-Temperature Plasma"; in his last years he was a member of executive bureau of the Division of Physicotechnical Problems in Energetics, RAS.

Leon Biberman established a recognized scientific school. He was always surrounded by younger colleagues, his disciples. Among them all we see twenty Doctors of Sciences and a large number of Candidates of Sciences. Biberman's seminar in IHT RAS was widely known and everybody working in the physics of low-temperature plasma wished to get its approval.

Numerous colleagues and disciples, all those who were lucky to know him, will carry in their hearts the wonderful memory of Leon Mikhaĭlovich Biberman, a wonderful scientist and teacher, and an excellent person.

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