Alekseĭ Mikhaĭlovich Bonch-Bruevich (On his seventieth birthday)

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On 23 May 1986 Alekseĭ Mikhaĭlovich Bonch-Bruevich, a prominent Soviet physicist, a corresponding member of the Academy of Sciences of the USSR, and a leading specialist in the field of quantum electronics and physical optics celebrated his seventieth birthday.

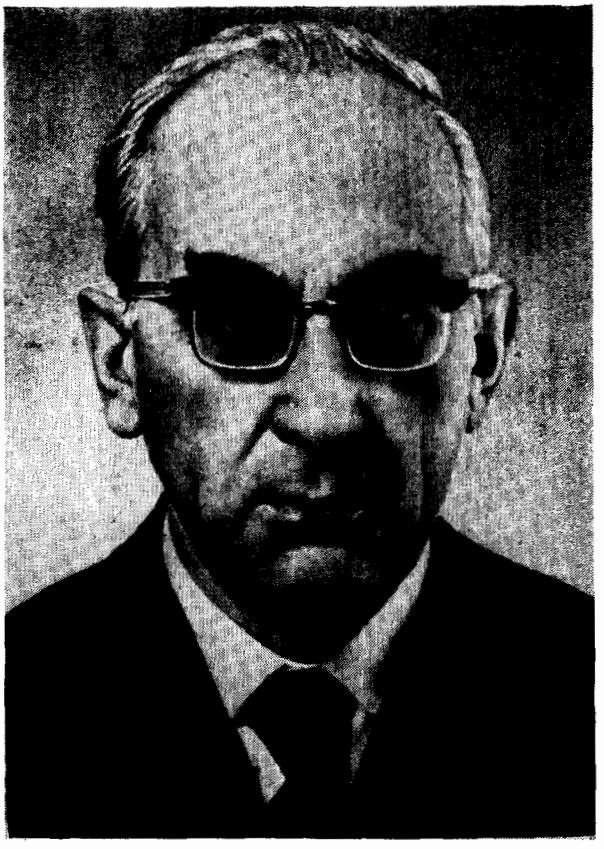
A. M. Bonch-Bruevich is a physicist with a wide range of scientific interests, based on great erudition and an exceptionally clear understanding of the deep essence and the unity of quite different, at first sight, physical phenomena. These traits combined with the pedagogical and organizational talent made Bonch-Bruevich the acknowledged leader of a scientific school, which has educated more than one generation of well-known scientists.

The greater part of Bonch-Bruevich's scientific activity over half a century is associated with physical optics and quantum electronics. By his work in the field of laser technology and the study of the interaction of radiation with matter Bonch-Bruevich made an important contribution to the development of Soviet and world science.

A. M. Bonch-Bruevich was born in 1916 in Tver' (now Kalinin) into the family of one of the pioneers of radio engineering, the founder and director of the famous radio-laboratory in Nizhniĭ Novgord (now Gor'kiĭ) and the constructor of the first in the world powerful Komintern radio broadcasting station, corresponding member of the Academy of Sciences of the USSR M. A. Bonch-Bruevich.

A. M. Bonch-Bruevich's work and scientific activity began in 1932 in the Leningrad Physico-Technical Institute where he served as a laboratory assistant. He took an active part in scientific work and already in 1934 the first paper in which he collaborated was published. In the same year he entered the Leningrad Polytechnical Institute and after graduating from it in 1939 he became a graduate student of the Physico-Technical Institute. Between 1939 and 1946 A. M. Bonch-Bruevich served in the Soviet Army. For some time he served in besieged Leningrad, and then he was selected to undergo officer training. In 1945 while still in the army Bonch-Bruevich defended his candidate's dissertation. In 1946 after demobilization he took part in the work that was urgent at the time on developing atomic energy.

Almost the entire postwar activity of A. M. Bonch-Bruevich is associated with the State Optical Institute (SOI), where at the suggestion of S. I. Vavilov he carried out a relativistic experiment of the first order of importance. The results of this work in which an experimental confirmation of the second postulate of special relativity was obtained formed the content of his doctoral dissertation which he defended in 1956. During the same period he investigated the mechanisms of photo-, cathodo- and electroluminescence and devoted much effort to the development of new experimental methods making use of radio electronics. A. M. Bonch-Bruevich's monographs "Application of Electron Tubes in Experimental Physics" (1951) and "Radio Electronics in Experimental Physics" (1966) have become widely known. The former has gone through four editions. These monographs have been translated and have been published in many countries.



ALEKSEĬ MIKHAĬLOVICH BONCH-BRUEVICH

A. M. Bonch-Bruevich's talent as a scientist and an organizer of science has been displayed particularly prominently beginning with the 1960s when he concentrated his attention on work in the field of quantum electronics. He and the members of this laboratory have carried out experimen-

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tal and theoretical work which played an important role in the development of solid state quantum generators. A. M. Bonch-Bruevich is responsible for the development of the first quantum generator based on neodymium glass which has been industrially produced in our country in 1964, before industrial production of lasers based on glass began abroad. In 1974 A. M. Bonch-Bruevich as a member of a group of authors was awarded the State Prize of the USSR for having developed the basis for producing lasers based on neodymium glass and arranging their industrial production.

In 1962 A. M. Bonch-Bruevich and collaborators began for the first time in the USSR systematic investigations of the action of laser radiation on absorbing media. In subsequent years he elucidated all the fundamental regularities of the processes accompanying this and developed a theory of these phenomena. This made it possible to create the physical basis for the development of a new field—optical working of materials (laser technology), which is being intensively developed at the present time. In 1970 the first in the world monograph on the powerful effect of optical radiation—"Effect of powerful radiation on metals" was published under the editorship of A. M. Bonch-Bruevich and M. A. El'yashevich.

In 1972-1976 Bonch-Bruevich organized a complex project in the process of working on which a series of wide-ranging investigations was carried out on the action of laser radiation on transparent and weakly-absorbing media. In the course of this a number of new previously unknown phenomena was discovered and a model was constructed of the optical breakdown of real transparent media, based on a statistical approach to the processes taking place. These investigations served as the basis for the solution of the important problem of producing optical materials with a high resistance to damage by radiation and led to the establishment in physical optics of a new subfield "Power Optics". A. M. Bonch-Bruevich is a leading specialist in this new direction in science which has been acknowledged at present as an important independent chapter in optics and quantum electronics. Since 1969 he has headed the organizational committee for the All-Union Conferences on the nonresonance interaction of laser radiation with matter regularly arranged by the SOI and enjoying great popularity and authority. Under his immediate direction annual All-Union seminars take place on specific problems of Power Optics. At present A. M. Bonch-Bruevich with his collaborators is involved in front-line research on laser thermochemistry and on the generation by laser radiation of surface electromagnetic waves.

In work being carried out under the direction of and with the immediate participation of A. M. Bonch-Bruevich pioneering investigations have been accomplished on the change in optical and spectral properties of atoms in intense light fields of different spectral composition. These investigations are of fundamental significance for quantum electronics and atomic physics. Starting in 1975 A. M. Bonch-Bruevich with collaborators began the development of a new direction—the investigation of processes of interaction of optical frequency radiation with atoms in their collisions.

Together with fundamental work in science A. M. Bonch-Bruevich is involved in extensive work of a scientific-social nature. He is a member of the physics section of the committee on Lenin and State Prizes of the Council of Ministers of the USSR, an executive member of the Council on Coherent and Nonlinear Optics of the Academy of Sciences of the USSR, a member of the boards of editors of the journals "Quantum Electronics", "Journal of Technical Physics", "Letters to the Journal of Technical Physics" and "Optical-Mechanical Industry", chairman of the qualifications council of the higher attestation committee in the SOI and a member of the qualifications council of the higher attestation committee in the A. F. Ioffe Physico-Technical Institute of the Academy of Sciences of the USSR, the editor of the section on "Optics" in the Great Soviet Encyclopedia and in the Encyclopedic Dictionary of Physics now being prepared for publication, and also a member of several coordinating and scientific-technologic councils on specifc problems.

A. M. Bonch-Bruevich has been awarded the Orders of the Patriotic War of the II class and of the Red Banner of Labor. In 1976 he received the honorary title of "Honored worker in science and technology of the RSFSR".

A. M. Bonch-Bruevich represents an organic synthesis of the qualities of a scientist, a man and a citizen. His mind, his human charm, his invariable benevolence combined with strength of character and adherence to principle invariably attract people to him and evoke deep respect.

In congratulating Alekseĭ Mikhaĭlovich on the occasion of his distinguished anniversary, his colleagues, friends and students wish him from the bottom of their hearts health vigor and further successes.

Translated by G. M. Volkoff