

The editorial board of *Uspekhi Fizicheskikh Nauk* announces with deep sorrow the untimely death on 8 August 1977, at the age of 51, of its member, the outstanding Soviet physicist, delegate of the Superior Soviet of the USSR, Vice President of the USSR Academy of Sciences, Rector of the Moscow State University, Lenin Prize laureate, Academician,

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To the fiftieth anniversary of the formation of quantum mechanics

Usp. Fiz. Nauk 122, 561 (August 1977)

PACS numbers: 03.65.Bz, 01.65.+g

The present issue is devoted to the history of the formation of quantum mechanics—the theory of the phenomena occurring in the world of the atom—which took place essentially half a century ago.

Physicists are well aware that the creation of quantum mechanics was not a single event in time and not the result of a flash of inspiration of a single genius. Over more than a quarter-century, starting with the 90's, new experimental facts were accumulated and could not be explained by the laws of classical physics. These were the results of investigations of equilibrium radiation, of the photoeffect, of spontaneous emission, of discrete states of atoms and the regularities of atomic and molecular spectra, of the Zeeman and Stark effects, of the Compton effect, and of many other phenomena. Flourishing ideas were advanced to explain these effects, based on new quantum concepts, but it was many years before a unified theory of atomic phenomena could be developed. The successful consolidation of all the experimental results and the ideas suggested by them into a unified theory was initiated in 1925, and consumed three years of very intensive work by the outstanding physicists of that time.

To mark the semicentennial of this titanic intellectual task, so abundant in revolutionary ideas, the editors publish in this (Russian) issue a number of articles. These include translations of the trail-blazing classical papers. Among them are: de Broglie's article (end of 1923) with an exposition of its principal ideas developed in earlier articles (see *Compt. rend.* 177, 507, 1923), Bohr's postscript to a 1925 article, in which he concedes the need for using the corpuscular theory of light

propagation and to a new group of ideas, the first papers by Heisenberg, Born and Jordan, and Dirac on matrix mechanics and the mechanics of q -numbers (1925), the "first report" of Schrödinger's article on wave mechanics (early 1926), Born's paper on collision theory (middle of 1926), Heisenberg's paper on the uncertainty relations (spring 1927). Most of these articles (except those of de Broglie, Bohr, and Schrödinger) appear here for the first time in Russian translation. For lack of space, we could not include other ground-breaking papers by Bohr and Schrödinger, nor papers by Einstein, Pauli, and Fermi. These, incidentally, are well known to our physicists, and were published numerous times in Russian in this journal, in individual anthologies, and in selected collected works of these authors; the reader will find references to them in the bibliography of M. A. El'yashevich's article (p. 656). All the published translations were reviewed, and the terminology unified, by M. A. El'yashevich, to whom the Editorial Board is most grateful.

The articles of that time contain epistemological statements that are sometimes formulated in inadequate terminology, and are sometimes too hasty (e.g., that the causality law is not valid), and were in their time the cause of sharp polemics. We did not deem it necessary to comment on such statements, since these questions were repeatedly discussed in the Soviet literature, and the statements themselves in no way detract from the physical significance of these articles in the formation of quantum mechanics.

The Editors.