

TO THE DECADE OF PUBLISHING THE BOOKS "MECHANISMS OF ELECTROMAGNETIC AND GRAVITATIONAL FIELDS"

B. Mironov

Technical University of Moldova, 168, bd. Stefan cel Mare, Chisinau, Md-2004, Moldova

bettin.mironov@mib.utm.md

On November 7, 2017, 10 years have passed since the publication in the United States of America of our book "Mechanisms of Electromagnetic and Gravitational Fields" [1]. The book touches on fundamental areas of physics, and in a brief annotation to the book it was impossible to cover all the aspects outlined in this monograph, so we would like to recall the main points and conclusions set forth in it.

The first chapter of the book is a brief review of the history of the evolution of physics issues related to the notion of vacuum or aether. The thesis that the vacuum is an empty space seemed to be final. It was adopted at the beginning of the 20th century on the basis of the following considerations: vacuum could not be detected in Michelson-Morley experiments; the idea of having a carrier medium for electromagnetic waves contradicts the special theory of relativity; It is impossible to create a model of an medium in which transverse waves such as electromagnetic waves propagate without the presence of longitudinal waves.

However, there are a number of facts that do not allow to consider the vacuum absolutely empty, these facts are listed at the end of the first chapter. Among them: the so-called paradox of a rotating bucket with water, the fact of a curvature of the continuum in the general theory of relativity; Dirac's idea of a vacuum consisting of electron-positron pairs; the existence of "dark matter", which is the source of energy, and many others. The main reason for the failure in the search for a vacuum as a medium possessing certain properties is that the instruments by which the experiments were spent were considered heterogeneous with respect to the explored medium. Our book is devoted to research within the framework of the model, which suppose, that all the phenomena surrounding us represent waves in an ideal medium and apart from them there is nothing else. We call this environment, following the tradition, a continuum.

The second and third chapters of the book are devoted to the consecutive development of methods that allow the use of waves as tools for studying wave objects. The concept of a wave coordinate system was introduced, in which the time and length etalons are the period and length of a standing wave. None of these wave systems has any advantage over the rest of the reference system. It is proved that in all wave coordinate systems the propagation velocity of traveling waves is the same, therefore, the Lorentz transformations are natural for such coordinate systems. This means that if both light and all elementary particles are waves in the same medium, then the existence of a carrier medium does not contradict the special theory of relativity.

Chapter 4 is devoted to the study of the interaction of waves in the continuum. In particular, in the interaction between a standing wave and a traveling wave, there is an effect called the Compton effect.

Chapter 5 explains how in the proposed wave model appears what is called the electric and magnetic fields. It turned out that if only the waves in the medium are used as instruments, then it is impossible to measure the velocity of the medium and its density. It is possible to measure only the derivatives of these parameters with respect to time and coordinates. On the basis of the results obtained, in Chapter 6 we deduce the famous two Maxwell equations. It turns out that these equations do not relate the velocity and pressure in the medium, as is the case in classical hydrodynamics or the mechanics of continuous media, but they relate the derivatives with respect to time and coordinates. This fact is the cause of the "strange" behavior of electromagnetic waves in comparison with acoustic waves in mechanical mediums. In Chapter 7, the motion of wave-objects with acceleration and the concept of their mass are investigated.

That is, if we follow our model, then in both cases we are dealing with the acceleration of the body relative to the continuum. Acceleration of the continuum in the case of the gravitational field appears because the particles represents spherical waves, and in spherical waves the vibrational velocity increases towards the center, hence the resulting acceleration of the continuum, that is, the derivative with respect to the spatial coordinate will also be directed toward the center. In the same chapter, by two methods, is made an estimate of the continuum density, if the proposed model is valid. Obtained value of density is of the order of 10^{28} kilograms per cubic meter!

[1] Mironov B. Mechanisms of Electromagnetic and Gravitational Fields. Virtualbookworm US. (2007.) ISBN 978-1-60264-105-1.