EXACT SOLUTIONS FOR HIGH-INTENSITY COSMIC GAMMA-RAY BURSTS AND PULSES IN ARTIFICIAL INTELLIGENCE NEURAL NETWORKS

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Exact solutions of the equations of cosmic hydrodynamics for high-intensity gamma–ray bursts in the form of isolated soliton waves [1, 2] and for Maxwell's electrodynamics equations modeling pulse propagation in artificial intelligence neural networks [3, 4] are presented. The two problems mentioned in the title of the report, which at first glance are completely different, represent deeply interrelated tasks of experimental and technical physics for the propagation of nonlinear and linear electrodynamic pulses in the first case. Unfortunately, these two tasks cannot be considered fully solved at the moment. In this regard, careful formulation of such tasks and especially the search for accurate accurate solutions for them are certainly of great scientific and practical importance.

A single common foundation that provides the possibility of a theoretical solution to the formulated physical problems is the presence in nature of field material carriers for gamma-ray bursts, energy pulses, electromagnetic waves, and in general for any force fields that are experimentally recorded today. Thus, the first problem of the propagation of powerful gamma-ray bursts reaching the Earth [5, 6] is directly related to the properties of the Metagalactic space [7]. Here, the carrier is the materialized classical ether, today called the physical vacuum or dark matter (TM). The first part of our report comprehensively proves this fact on the basis of continuum mechanics, its conservation laws and corresponding exact solutions [2, 4, 7].

The second part of the report is based on the outstanding experimental achievements of the 21st century. Typical examples include, in particular, the survey of a superluminal photon (fig. 1) [8] and the diagnosis of the structure of the outer shell of a gold ion (fig. 2) [9].

An important experimental result for our study is the presence of TM in our Universe in the amount of 96% of the total amount of matter. The dynamics of matter and force fields is considered on the basis of the laws of conservation of mass, momentum and energy. With this approach, there is no fundamental difference between long-range and short-range fields. The discrepancy between Maxwell's electrodynamics and the representation of the classical electron as an atom of electricity also disappears. The natural conclusion is the unified nature of interactions.

The analysis begins with a linearized formulation of problems in mechanics (acoustics, elasticity theory, hydrodynamics, and electrodynamics), and then generalizes to nonlinear cases. The main position of the work uses the "displacement currents" introduced by Maxwell and the associated electrodynamic fields. Repeating his methodological approach, the analogy with classical hydrodynamics is widely used in the

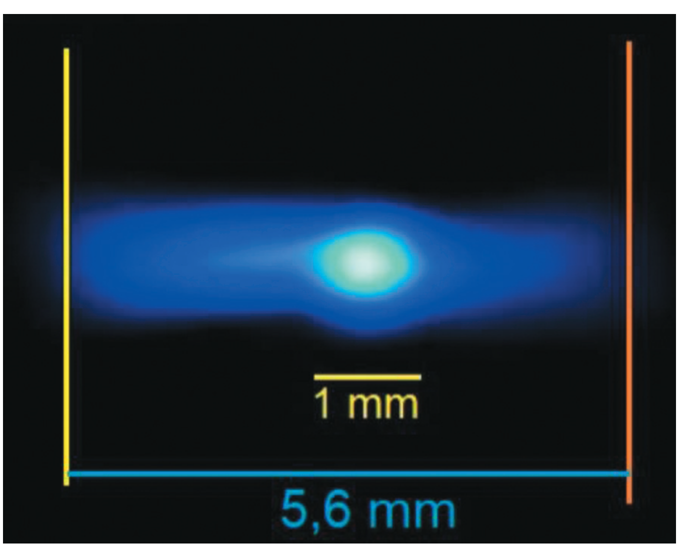

Fig. 1.

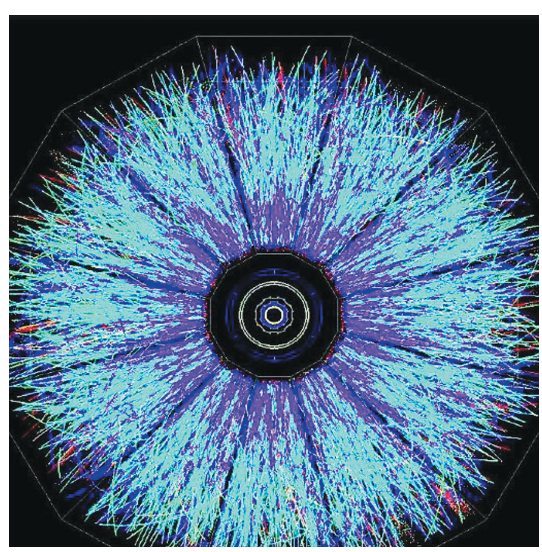

Fig. 2.

work. However, unlike Maxwell's equations, which describe only transverse waves, the general case of longitudinal-transverse waves is analyzed below. The magnetic field appears only when the transverse displacement current changes over time. The gravitational field is justified as a special case of electrodynamic interaction. In this case, the Faraday lines of force can be interpreted as connections that implement close-range interaction through the medium of a "physical vacuum".

Important aspects of the work are the application of the Prandtl boundary layer methodology and Debye screening radii. In particular, the initial equations are the Navier-Stokes equations of motion for a compressible gas

$$\rho\frac{\mathrm{d}\vec{V}}{\mathrm{d}t} = -grad\, p + \eta\Delta\vec{V} + \left(\frac{\eta}{3}+\zeta\right) grad\, div\vec{V}$$

and the equation of continuity.

$$\frac{\mathrm{d}\rho}{\mathrm{d}t} + \rho\, div\vec{V} = 0.$$

From these equations we obtain a system of equations of the 1st order [4] (an extended system of Maxwell's equations for longitudinal-transverse waves).

Further, the article consistently analyzes the mechanical nature of light and heat, gravity, weak and strong interactions.

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