

Inerton Communication: Future of Wireless

Volodymyr Krasnoholovets

Abstract — A wireless communication based not on the electromagnetic field, but on a massotension field is discussed. Currently radio communication is based on the electromagnetic field whose carriers are photons. A re-examination of quantum mechanics indicates that a particle's wave ψ -function, i.e., the matter waves, is projected to real physical space as the particle wrapped in a cloud of spatial excitations that carry fragments of mass. These fragments can be interpreted as carriers of the force of inertia and hence it is reasonable to term them 'inertons'. Inertons carry mass properties of the particle and provide for a short-range action between material objects, which is beyond the quantum mechanical formalism, though allows a detailed study in the framework of the submicroscopic mechanics developed in real space by the author. Since a receiver of inertons has already been designed, arguments are presented that a transmitter of inertons can also be designed with relative ease, which will initiate the era of inerton communication.

Keywords — photon, inerton, inerton field, inerton communication.

I. INTRODUCTION¹

It is a matter of fact that the electromagnetic field is associated with the motion of electric charges. Carriers of the electromagnetic field are photons. The oscillation of a dipole generates photon emission at the frequency of the dipole oscillation.

Studies [1] in fundamental physics, which are based on a theory of real physical space [2] [3] show that, in addition to the electromagnetic field there exists one more basic physical field which permeates the entire universe. This field relates to the motion of mass in real physical space.

The theory of physical space [1]–[3] grows out of pure mathematical studies based on set theory, topology and fractal geometry. In mathematics, a point can be substituted for a topological ball. In physical space a set of points can be substituted with a network of balls. Therefore, according to the mentioned theory, physical space should be constituted as a mathematical lattice of primary topological balls, which was named the tessellattice by Michel Bounias [2].

In the tessellattice, the cell size is set at Planck's length, $\ell_p = \sqrt{\hbar G/c^3} \approx 1.6 \times 10^{-35}$ m. Such a discreteness of physical space indicates that fractal rules have to change properties of the tessellattice locally. In particular, this means that particles are created from a cell due to fractal deformations in this cell. The particle mass is defined by the degree of volumetric fractal deformation of the cell. The charge is specified by the surface fractality of the cell and the polarity of the charge is determined by the fractal orientation, such that a positive charge has surface spikes oriented outward, while a negative charge has spikes oriented inward.

In line with this concept, a moving particle constantly interacts with counter cells in the tessellattice. This results in the appearance of a cloud of spatial excitations around the particle because after each collision a fragment of the particle's mass is released (i.e., one fractal, or wrinkle, is removed from the deformed cell). At the submicroscopic consideration, the de Broglie wavelength λ , a notion known from quantum mechanics, actually characterises a section in the lattice in which the particle mass is decomposed. This process can be visualised as a path of length λ during which the particle emits a large number of inertons [1]. During the next section λ of the particle path, the tessellattice, having elastic properties, returns the inertons back to the particle. It follows that inertons are the essence of the force of inertia because any physical movement involves their appearance.

Since inertons accompany any particle, they must be considered as carriers that provide for a short-range action in the quantum mechanical interaction of particles which is realised at a distance close to the atom's size 10^{-10} m. In such a way the particle, together with its inerton cloud is mapped to the quantum mechanical formalism as the particle's wave ψ -function. So, inertons are actually a substructure of the matter waves.

Submitted on July 1, 2022.

Published on August 5, 2022.

V. Krasnoholovets, Institute of Physics, National Academy of Sciences of Ukraine, Kyiv, Ukraine.

(e-mail: krasnoh@iop.kiev.ua)

In the framework of submicroscopic mechanics [1], which is the science behind conventional quantum mechanics, interacting particles involve the collision of their respective inertons. Due to scattering effects, free inertons are released from the system, spreading widely throughout the environment.

II. QUASI-PARTICLES OF REAL SPACE

In the tessellattice, the movement of a charged particle is accompanied by the decay of its fractal deformations, both volume and surface, but then these disintegrated fragments are returned back to the particle by the elastic tessellattice. Such a continuous procedure of emission and absorption of fractal fragments occurs along the entire path of the particle, which is caused by the constitution of real physical space, i.e., this behaviour is determined by the structure of space in the form of the tessellattice.

Of course, fast non-adiabatic processes, such as a momentary obstacle or scattering of a particle wrapped in its cloud of mass-charge excitations, can lead to the release of some of these quasi-particles, and then they begin independent movement in space. Moreover, it is reasonable to assume that under different physical conditions we can obtain the release of either a purely surface fractal component (that is, the charge component) or a purely volumetric component (that is, a purely mass component). In other words, from the particle's mass-charge cloud one can anticipate the emission of a pure volumetric fractal or a pure surface fractal.

Taking the foregoing into account, it is obvious that the motion of a pure surface fractal must be identified with the travelling of a photon and the motion of a pure volumetric fractal must be related to the migration of an inerton [1]. Note that the movement of both a photon and inerton occurs according to the relay principle: the excitation is hopping from cell to cell along the whole path.

A. Free Photons

Let us start by saying a few things about electromagnetic excitations, or photons. Free photons are described by Maxwell's equations, which are the Euler-Lagrange equations for the potentials φ and \vec{A} [1], [4].

$$\frac{1}{c^2} \frac{\partial^2 \varphi}{\partial t^2} - \nabla^2 \varphi = 0 \quad (1)$$

$$\frac{1}{c^2} \frac{\partial^2 \vec{A}}{\partial t^2} - \nabla^2 \vec{A} = 0 \quad (2)$$

These two equations represent a wave motion of the potentials φ and \vec{A} . In submicroscopic mechanics [1], a photon propagates by hopping from cell to cell in the tessellattice; φ describes the electric state, or the electric polarization of the surface of each cell along the whole photon path and this polarization changes following Eq. (1); \vec{A} represents the magnetic state, or the magnetic polarization, of the photon, which behaviour obeys Eq. (2). Indeed, the tension of the electric field and the induction of the magnetic field are defined as $\vec{E} = -\nabla\varphi$ and $\vec{B} = \text{rot } \vec{A}$, respectively. The scalar φ characterises the surface of the cell in which a photon is localised and this is defined by the orientation of the surface fractal spikes going inward or outward from the cell surface; \vec{A} specifies combed surface spikes on the cell in which the moving photon is located [1]. The photon wavelength λ determines the photon's spatial period in which the photon state φ changes to the state \vec{A} , then again \vec{A} to φ and so on.

B. Free Inertons

Mass is defined as the degree of volumetric fractal deformation of a cell [1]. An inerton is an elementary excitation of the tessellattice, which refers to a single volumetric fractal deformation of a cell. So, an inerton is a carrier of a fragment of mass and its wave motion implies periodic compression and rarefaction. This can be visualized as a periodic change from the fractally deformed state of a cell, the mass m , to a rarefied state at which a kind of rigidity appears, which can be called the tension $\vec{\Xi}$. Along this line of reasoning, the motion of an inerton, which is hopping from cell to cell, can be represented by a pair of the wave equations as shown below

$$\frac{1}{v^2} \frac{\partial^2 m}{\partial t^2} - \nabla^2 m = 0 \quad (3)$$

$$\frac{1}{v^2} \frac{\partial^2 \vec{\Xi}}{\partial t^2} - \nabla^2 \vec{\Xi} = 0 \quad (4)$$

Here, v is the speed of inertons. For a free inerton the speed v has to exceed the speed of light c (because in condensed media, longitudinal waves always have a higher speed of sound than transverse waves, see, e.g., Ref. 5). The inerton wavelength λ determines the inerton's spatial period in which the inerton state m changes to the state \vec{m} , then again \vec{m} to m and so on.

Inertons can also travel like cluster-like formations of several or many excitations that have merged together, and in that case v can be reduced; such condensation of inertons can be related to the Bose-Einstein condensation phenomenon presented in real space. Recent experimental studies of other researchers [6], [7] have shown that some unknown previously massive particles were coming from the Sun to Earth and from Venus to Earth; the speed of those particles was estimated to be around 2,000 km/s. In the author's terms those massive particles have to be identified as clusters, or wavelets of inertons.

Inertons widely manifest themselves on Earth and have been measured by the author and colleagues in experiments performed in condensed matter, plasma, nuclear physics and astrophysics [1]. Their presence has also been measured in experiments conducted by many other researchers who emphasized the action of an unusual field but didn't identify them as inertons at the time. Various terms have been used to describe this or a similar field and the appropriate particles, most notably: tachyons [8], microleptons [9], torsion fields [10], axions [11], spirinos [7] and so on (e.g., see a very recent article about a null electromagnetic wave [12]).

Practical applications based on the understanding of inertons have already been developed. One particular example is the intensification of transesterification reactions during the manufacturing of biodiesel [13]; an appropriate technology of the manufacture of biodiesel in a flow mode based on the application of an inerton field, which is used as a field catalyst, has been successfully exploited in Singapore by a company named Alpha Biofuels Pte. Ltd. for about 12 years. A German company named AWAS International GmbH. (in the village of Wilnsdorf) has used our Rudra-2 devices to control the operation of their original equipment for water purification in swimming pools for four years. Furthermore, inerton signals have been used for long-distance medical treatment of patients in the process of information therapy [14]. Inertons also play the role of an information field in biological systems [15].

Fig. 1 and 2 show devices designed by our R&D team for measuring inerton signals.



Fig. 1. Rudra (2011) and Rudra-2 (2018) devices for measuring inerton signals. The appropriate software allows us to decode the received signals and build a spectrum in a range from several Hertz to 100 kHz.

The corresponding block diagram of the Rudra device is shown in Fig. 2.

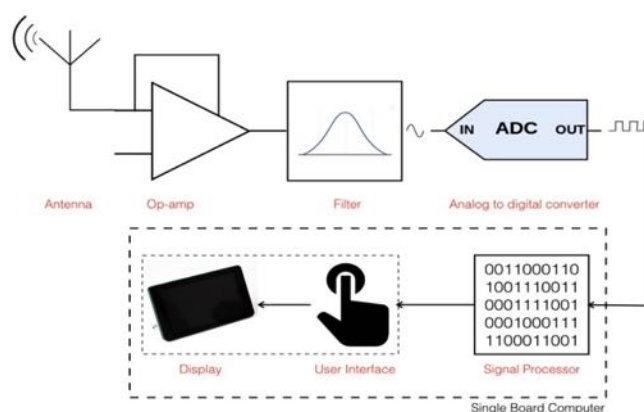


Fig. 2. Block diagram of the Rudra device.

III. DISCUSSION

Thus, as follows from the submicroscopic concept of physics [1], there are only two basic physical fields that can be present in micro- and macroscopic physical systems. Namely, an *electromagnetic field* (or a photon field) and *massotension field* (or an inerton field). In the first field, the electric state periodically changes to the magnetic state. In the second field, the mass state (the compression) is periodically changed to the tension state (the stretching). The appearance of these two fields is a direct consequence of the structure of real physical space composed of primary topological balls, which exist in the form of the tessellattice. Since such a lattice is essentially a substrate, it is obvious that two types of waves can propagate in it: transverse (which are electromagnetic waves) and longitudinal (which are massotension waves). The first ones are characterised by carriers known as *photons*, and the second ones are specified by carriers named *inertons* in my works.

It is the massotension field, or inerton field, that shapes a gravitational field of the system studied, which obeys Newton's gravitational law; this occurs due to the formation of a standing spherical inerton wave of the system as a whole [1], [16]. So, the phenomenon of gravity is the result of averaging of fundamental standing inerton waves of two interacting objects, which manifests itself as a potential force, that is, the Newtonian gravitational attraction.

A power flow of inertons, which are carriers of mass, can play the role of a propulsion antigravitational force.

Inertons are everywhere! A number of measurements of natural and artificial inerton signals caused by physical processes in the Sun, the Earth's atmosphere, crust and mantle, and also generated by various electronic devices, in various surrounding processes and mechanisms, were made using the Rudra devices. The corresponding results have already been published [1] and they show that it is possible to establish a new branch of astrophysics, namely inerton astronomy. Each cosmic object generates its own inertons, including the Sun, which would warrant the establishment of an inerton observatory to study cosmic objects through the inerton rays they emit.

For instance, a trend analysis conducted using the Rudra device (Fig. 1) for about 40 minutes from the moment of dawn in a Kyiv suburb is presented in Fig. 3. It shows the increasing intensity of the inerton flow along the east-west latitude with the approaching sunrise.

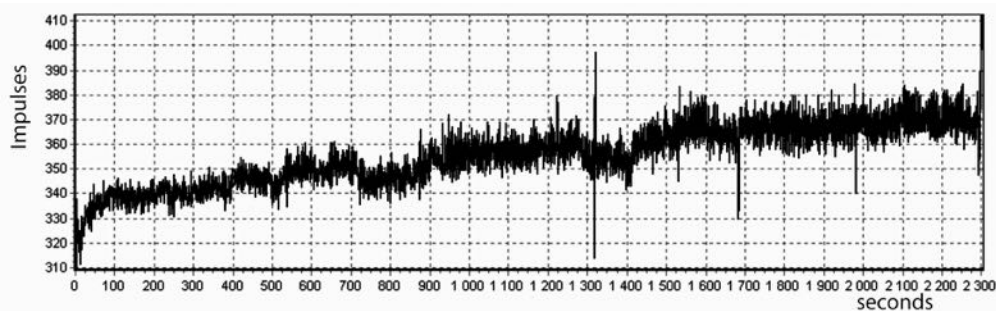


Fig. 3. Trend analysis obtained with the use of the inerton spectroscopic device, i.e., Rudra (measured in a dark windowless room on the outskirts of Kyiv, Ukraine).

Measurements of inerton signals performed by our team have allowed us to understand the major principles of interaction between an inerton field and matter as well as the main features that must be satisfied by the antenna of an inerton receiver. It has also been revealed that inerton signals allow modulation. Single inertons and inerton wavelets, which were recorded at frequencies from a few Hertz to 100 kHz, allow us to conclude that inertons can also be generated artificially using a transmitter.

What areas of application may be most interesting? These include the search for other civilizations in space, satellite communication, as well as mobile communications. For example, currently, the number of mobile phone towers in the UK is approaching 1.5 million with a total power consumption of 3 to 5 GW. But in the case of inerton communication we may anticipate that the density of towers can be much smaller, and the amount of energy consumed has decreased significantly compared to the specified value; this is due to the fact that inertons have high permeability and, therefore, the weak attenuation of the radiated inerton waves. Finally, we can expect that signals that consist of free single inertons would have a propagation speed higher than the speed of light c . Moreover, electromagnetic wireless technologies (4G, 5G) are considered harmful to human health and the environment [17]–[19] and hence an alternative communication method could be very useful and relevant.

Electronics used for inerton-based communication systems will in most aspects be very similar to conventional electronics typically used for electromagnetic-based systems, although there will be some nuances, as can be expected. The information that will pass through the massotension channel cannot be listened to by means of typical electronic circuitry used for electromagnetic communication.

IV. CONCLUSION

Our current efforts are directed towards the design of an inerton signal transmitter-receiver system. Such a system could be a prototype of a future inerton wireless communication system. Inerton communication can be an additional channel of communication to the present electromagnetic one. Previous work indicates that inerton communication could have a number of advantages compared to electromagnetic communication. Notably, inerton signals do not decay as quickly as electromagnetic signals (photon signals) because inertons can easily pass through materials with electric and magnetic polarization and inertons can have a higher signal speed. Relatively weak interaction of inertons with the environment will make it possible to create designs of transmitters with lower energy consumption. Therefore, we can assume that the massotension communication will be more energy efficient than electromagnetic communication.

In the presence of relatively modest funds, there are no fundamental obstacles towards the development of inerton communication technology. Finally, my colleagues and I invite scientific institutions and companies, as well as private investors interested in the development of inerton communication and inerton physics in general, to cooperate.

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V. Krasnoholovets was born in Kyiv, Ukraine, and lives there permanently – he graduated from a mathematical school and studied at the Taras Shevchenko Kyiv National University. He currently works as a senior researcher at the Department of Theoretical Physics, Institute of Physics of the National Academy of Sciences. The title of PhD. was defended in the area of solid state physics.

The field of scientific interests is quite wide: condensed matter physics, general physics, foundations of physics, nuclear physics, particle physics, gravitation, astrophysics, applied physics, biophysics, medical physics, and social consciousness. Main results were presented in two books and an article: *Structure of Space and the Submicroscopic Deterministic Concept of Physics*, Toronto • New York • New Delhi: Apple Academic Press, 2017; “Derivation of gravity from first submicroscopic principles”, in *The Origin of Gravity from First Principles*, V. Krasnoholovets, Ed. New York: Nova Science Publishers, 2021, pp. 281–332; “Information field and its carriers in biological systems”.

NeuroQuantology, vol. 20, no. 4, 179-201 (2022).

No memberships in professional societies; no awards. Nevertheless, the theoretical and experimental achievements in the study of the physics of inertons have already been embodied in a couple of technologies, which are in use in Singapore and Germany.