Law of inertia and the primal energy in the cellular automaton universe

元胞自动机宇宙内的惯性定律和原始能源

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Abstract **- In the Cellular Automaton Universe material objects acquire the property of inertia automatically as relocating formations driven by the underlying clocking mechanism. In this way, the core effect of inertia reveals the hidden source of all motions in the physical world. The corresponding energy can be extracted by a process of recurring transformations of material configurations producing a sort of parametric amplification.**

Keywords - **Law of inertia, Parametric Amplification, Cellular Automaton Universe, Clean energy**

I. INTRODUCTION

The world faces crisis of global sustainability with complicated challenges on a scale never before seen in human history. Those include various threats to ecology, dearth of resources - primarily, energy, and serious biomedicine problems. Unfortunately, the worldview of contemporary science does not provide sufficient means to confront these urgent existential challenges for the humanity. The tremendous achievements in modern life are the results of advancements in technology rather than a breakthrough in science. Technology can thrive on incorrect science; and even more, it can provide inspirations to new theories.. Thus, the Industrial Revolution was formed by the invention of the steam engine considering heat as a caloric liquid before the discoveries of thermodynamics and the kinetic theory of matter. As Lord Kelvin said, "The steam engine has given more to science than science has given to the steam engine". Nowadays, we witness all-encompassing Information Revolution, which allows to effectively portray the organization of the physical Universe and the Life on Earth as a technological marvel of the "Internet of Things" arising in the framework of a Cellular Automaton

model [1] Beyond the 'Big Data" environment for information control as described in [2], this contraption may provide an abundant supply of energy needed for actuation (see [3,4]). The energy agitating the physical Universes comes ultimately from the clocking activities of the underlying Cellular Automaton infrastructure. In our current view, these clocking activities reveal themselves at the physical level not directly, but through the property of inertia. In this paper, we will discuss how the extraction of clean and abundant energy from the workings of the inertia in the Cellular Automaton Universe could be effactually organized.

II. THE CELLULAR AUTOMATON MODEL OF THE UNIVERSE

2.1. THE ULTIMATE DRIVE OF THE MATERIAL PROCESSES

"It is important to realize that in physics today, we have no knowledge of what energy is" [5]. In our understanding, energy is the ability to move matter. Energy appears in different forms in physical chemical, and biological processes, and is evaluated by the effects it has on matter. The conservation law states: energy cannot come from nowhere, nor disappear into nothingness; the total amount of energy in co-measurable terms remains constant. A sarcastic depiction of this law: "Energy is never created nor destroyed, it simply goes from one *formula* to another" presents an ironic truth.

Traditional physics takes the property of inertia for granted, i.e. it does not consider that realization of uniform motion is associated with a continuous consumption of energy. Actually, the uniform motion of the material formations in the Cellular Automaton Universe appears free if one neglects the impetuses

North Sea

of the Cellular Automaton clocking. However, in the general balance of the law of conservation of energy, these impetuses have to be taken into account with some corresponding conversion coefficient, similarly to Joule's balancing of heat with mechanical energy. In other words, the hidden driving force of the Cellular Automaton mechanism goes on par with all other forms of energy. Moreover, it is the fundamental cause of all motions, and thus, the innermost source of all energy in the Universe.

In fact, motion without an enduring motive power seems perplexing. Thus, Aristotle believed that objects are moved only as they were pushed, and any given motion is reduced to a certain Prime Mover. A notorious problem for this point of view was why arrows shot from a bow continued to fly. A concrete explanation for the flying arrow problem was proposed, assuming; for example, that the arrow creates behind it a vacuum, into which air rushed and applied a force to the back of the arrow. Nowadays, a similar explanation is considered for the paradoxical NASA Warp drive effect [6,7] employing hypothetical pushing from the curved space time and quantum vacuum, as proposed by M. Alcubierre. [8].

Recent NASA experiments have allegedly demonstrated a new propulsion technology; it requires no propellant and by electromagnetic radiation in a resonant cavity generates a small amount of thrust that is not attributable to any classical electromagnetic phenomenon. Thrust that was produced was apparently just above the margin of error, anywhere between 50 and 70 micronewtons, with a reported error bar between 15 and 30 micronewtons. The effect is incredible, like a famous adventure of Baron Münchausen who pulls himself out of a mire by his own hair, since it violates the principle of momentum conservation stating that the total linear momentum of an isolated system remains constant regardless of changes within the system. This follows from Newton's second and third laws.

What requires some revision is Newton's first law, the "Law of inertia", stating that every object will remain at rest or in uniform motion in a straight line unless an external force is applied to it. According to scrupulous Poincaré analysis, the notion of inertia is neither an a priori truth nor an experimental fact; it is rather a supposition that "the movements of all material molecules of the universe depend on the differential equations of the second order"[9]. Also, a crucial support for our Cellular Automaton approach gives Maxwell's consideration that: the law of inertia, would be without meaning, unless we admit the possibility of defining absolute rest and absolute velocity [10].

2.2 THE CONCEPT OF CELLULAR AUTOMATON ETHER INFRASTRUCTURE (CAETERIS)

A cellular automaton is a grid of nodes whose states are transformed in discrete steps depending on the states of the surrounding neighbors. The idea of representing the physical world with cellular automata was conceived by K. Zuse and E. Fredkin (see [11, 12] Potentials of the cellular automata for the representation of the physical world are best envisioned with the well known Conway's "Game of Life", where certain "patterns" present stable relocating configurations. Thus, it is tempting to find a Rule producing a collection of stable relocating configurations, which could be identified with the elementary constituents of matter. The cellular automaton model for the physical Universe is a high-tech resurrection of the classical concept of ether where motion of the material formations is performed by reconfigurations over the medium rather than by passing through it. Notably, such a construction avoids confrontation with the postulate of relativity and induces the property of inertia.

Realization of the cellular automaton model of the Universe involves two major concerns. First: trying to find a cellular automaton Rule that can produce the complex behavior of physical objects seems impossible. Second: it is not clear whether local transformations can account for the apparent non-locality of the Universe. Indeed, to rely on brute force search for the Rule is hopeless. But starting with the firm design requirements rather than guessing upon the desired outputs one immediately recognizes the necessity for a distributed mechanism of clocks synchronization, which has to be robust and fault-tolerant.

The indispensable design requirement for such synchronization removes any arbitrariness in the choice of the primitive Rule. The cellular automaton mechanism of Nature must contain a grid of mutually synchronizing circular counters; the system is characterized by a distribution of the phases θ $(0 < \theta < 2\pi)$ defining the states of the counters. Astoundingly, but this approach solves the problem: It turns out that the whole richness of the physical world condenses in a plain sentence: "All physical phenomena are different aspects of the high-level description of distributed processes of mutual synchronization in a network of digital clocks" [13]. The developed model was named CAETERIS (Cellular Automaton EThER InfraStructure). Workings of this model have been presented in several publications starting [14], in many various aspects they are described in [15-19]. For the purpose of our paper, we will concentrate here mostly on the synchro activities of the model producing basic material formations (Fig.1)
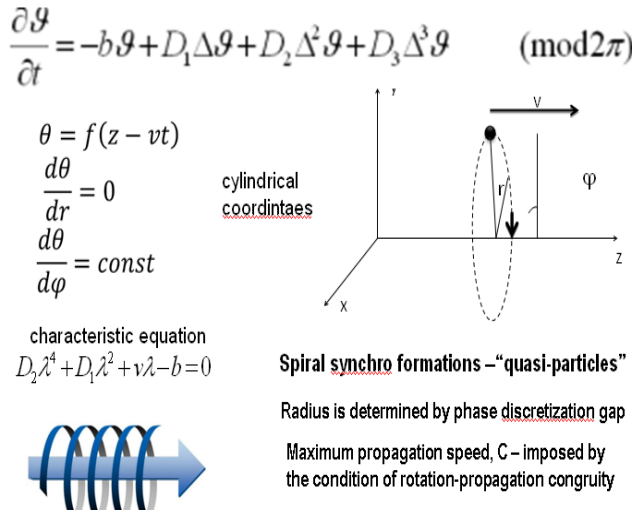
$$\frac{\partial \vartheta}{\partial t} = -b\vartheta + D_1\Delta\vartheta + D_2\Delta^2\vartheta + D_3\Delta^3\vartheta \quad (\mathrm{mod}\, 2\pi)$$

$$\theta = f(z - vt)$$
$$\frac{d\theta}{dr} = 0$$
cylindrical
coordintaes
$$\frac{d\theta}{d\varphi} = const$$

characteristic equation
$$D_2\lambda^4 + D_1\lambda^2 + v\lambda - b = 0$$

Spiral synchro formations – "quasi-particles"

Radius is determined by phase discretization gap

Maximum propagation speed, C – imposed by the condition of rotation-propagation congruity

Fig.1 Traveling wave helicoidal solutions

The given equation of synchronization includes a non-linearity factor - a restriction from below on the spatial derivative determined by the realization of fault-tolerance. The collection of helicoidal traveling wave solutions exactly correspond to the spectrum of the stable elementary particles of matter (Fig. 2.)
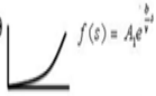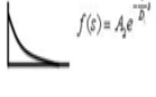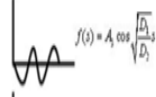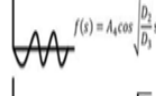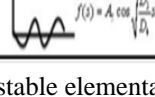

Fig.2 Spectrum of stable elementary particles

Both fundamental solutions of increasing exponent, for the proton: **exp(b/v)·s)** and decreasing exponent; for the electron: **exp((-v/D₁)·s):**depend on the **v**elocity **v** in the same way. Namely with the increase of **v,** both functions along the generatrix - **s** become smaller; this implies that protons and electrons reactions to the presumed manipulations for energy extractions will be coordinated.

As to the neutron (Fig, 3), it is a composite semi-stable particle with half-life of about 15 min.. The generatrix function of the neutron presents a linear combination of the indicated fundamental exponential solutions for the electron and the proton connected with a sinusoidal segment of neutrino. These components are weakly hold jointly at generatrix. The neutron together with other less stable composite particles is presented in Fig.3**.**
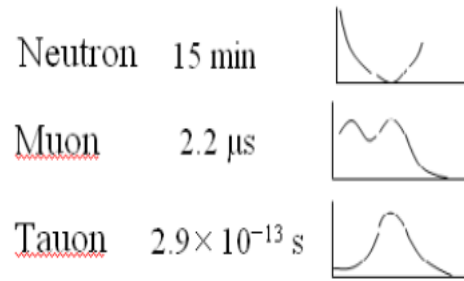

Fig.3. Semi-stable composite particles

The neutron decays as its geneartrix splits into joined components: **n = p⁺ + e⁻ + v.** Neutron is a proton trailed by neutrino and electron, it has a greater mass than proton In a similar way can be described the radioactive decays by weak interactions of less stable particles - muons and taons. Muon is an electron trailed by neutrino, it has properties similar to those of electrons, but its mass is much greater; taon is an electron trailed by neutrino and proton, it has higher instability and some hadronic features due to the influence of a rear increasing exponent.

The helicoidal synchro formations of the CAETERIS model actually exhibit the basic properties of the fundamental physical phenomena. Besides the discussed law of inertia those include: an upper bound on the propagation speed – the speed of light, antimatter as dual solutions having an opposite sense of rotation, slight asymmetry between matter and antimatter - the enigmatic prevalence of matter, which arises from the necessity for an arbitration protocol, and much more.

Besides traveling wave helicoidal "synchro formations" creating the basic componentry of the material world the CAETERIS model includes an operational background of very fast spreading diffusional solutions. The origin of these solutions is associated with the paradox of instantaneous impact in parabolic equations. This paradox shows that representation of spreading diffusion by

parabolic equations is a mathematical idealization, behind which there should be some very fast propagating wave mechanism. The pop-up instantaneous impact produces gravitation with amplification in cosmological scale [20]. This could resolve the conundrum of dark matter, see article [21], worrying "How long can we keep on looking for dark matter?"

The opinion that "the action-at-the-distance" is inadmissible from the philosophical standpoint is flawed. There is absolutely nothing outlandish in having a system with two types of processes developing in substantially different time scales. In fact, it is a typical situation for relatively slow material systems under drastically faster information control. The appearing effects of "nonlocality" are decisively involved in the organization of the Holographic Universe. . This holographic mechanism reveals itself in the strangeness of quantum mechanics behavior, and in the intricacy of biological information processing [2,17].

2.3 EXTRACTING "INERTIA" ENERGY FROM CELLULAR ATOMATON ACTIVITIES

As long as Cellular Automaton mechanism produces freely propagating material formations as exemplified in Fig. 1 and 2 no deviations from the law of inertia, and hence no mahifestation of force, appears at the level of the physical world. Therefore, to enjoy the Cellular Automaton energy it is necessary to diverge material formations from the indicated traveling wave conditions. In a simplest way this can be achieved by deflecting the axis of a helicoidal kernel from the propagation direction. (Fig. 4)
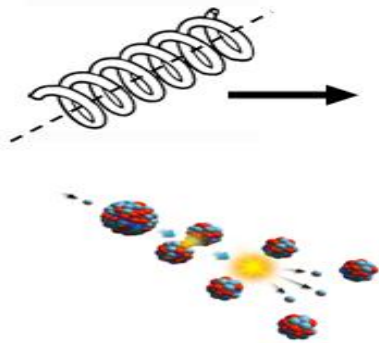

Fig.4. Extracting "inertia" energy by distortions of canonical formations for uniform motion: from slight deflections of a given direction to major disarrangements in atomic fission

To reinstate canonical solutions the cellular automaton mechanism has to employ supplementary activities. At the level of the physical world reinstallations of a distorted material object to a required pattern appear as a result of an action of a force, i.e. as utilization of some energy. Presumably, the observed NASA Warp Drive effect could occur in such circumstances as soon as the utilized electromagnetic radiation scatters atoms directions. Cellular Automaton transformations turning them back to a proper way would be felt as a small thrust. Similarly, independent material bodies due to random atomic fluctuations may also experience some miniscule spontaneous pushes questioning the exactness of the law of inertia.

For a massive extraction of the primal Cellular Automaton energy the applied transformations of matter have to be radical. The Fig.4 illustration presents a palpable example of the atomic energy when the transformations of the involved matter are substantial: one big nucleus fissions into many different fragments - two smaller nuclei and additional particles to maintain the process. Thus, to return these deeply disfigured fragments to canonical Cellular Automaton matter would take a lot of efforts resulting in the release of vast energy. In case of extremely violent particle collisions the created debris may not always be reconfigurable back to viable material formations, and such situation may show up a defiance to basic conservation principles.

An intermediate situation presents the unusual "excess heat" effect associated with the mechanism of Low Energy Nuclear Reactions (LENR). This widely considered mechanism raises a number of concerns since it confronts the established body of knowledge in nuclear physics. In our view; LENR devices get their energy from the Cellular Automaton inertia through relatively milder material reconfigurations. These reconfigurations may just involve splitting the generatrix function; as shown in Fig.3; this is associated with radioactive decays due to weak interactions. According to our interpretation, of the "excess heat" effect, its outputs are sensitive to the direction of inertial propagation, i.e. to the changes of the absolute positioning of the apparatus. This circumstance can be used to withstand the serious problem of LENR instability.

III. CONCLUSION

Apart from the exotic idea of the Cellular Automata, the presented interpretation of inertia leads to a new conceptual scheme for the interpretation of classical mechanics. Material objects are uniformly propagating formations whose relative interactions are described with respect to the frame of reference where the motion by inertia occurs. In the Cellular Automaton Universe, the hidden energy of inertia comes out as a real physical energy when canonical cellular automaton formations of material objects are disrupted.. The clocking efforts trying to return the distorted material formations to a canonical form are perceived as a force applied to the material object. According to considered Poincaré deliberations upon inertia [9], such a process should be described by second order differential equations elucidating Newton's Second Law of Motion:: $\mathbf{F} = \mathbf{m} \bullet (\mathbf{d^2x/dt^2}) = \mathbf{m*a}$, along with the additive characterization of

the mass expounding its seemingly careless 'circular' definition as a product of density by volume. In a non-inertial frame of reference the cellular automaton compulsion to uniform motion may be interpreted as a "fictitious"' force, like in Coriolis effect. In our interpretation, the Foucault pendulum extracts its rotational energy from the Cellular Automaton mechanism, not from the impacts of the Earth, as becomes apparent in the idealized case of a frictionless pivot. Variations of atom alignments in macromolecule structures can be used to accumulate the Cellular Automaton energy in the form of chemical energy for muscles operations.

Consideration of the Cellular Automaton mechanical implications can be extended to electromagnetism. It is a well-recognized physical fact that energy from an electric power station to a customer is not transferred through electric lines, but rather enters the customer wires from outside according to the Poynting vector of the electromagnetic field. The absolute orientation of the wire with respect to the Cellular Automaton propagation may affect the electrical resistivity. This may produce an anisotroy in the exploding wires phenomenon. In stationary situations the suspected anisotropy in electrical wires may be revealed if a miniscule heating from inertia energy could cause a noticeable impact on the resistivity, e.g. for high purity superconductors in the intermediate state. Thus, in [22] there was observed a hysteresis bump on a transition from normal to superonductive state, so for a different orientation of the sample attracting to it less heat energy from the inertia relocations, this bump may be diminished.

This inertia energy is readily available everywhere on Earth. The presented theory elucidates many paradoxical situations in Nature when a source of operational energy is difficult to identify (see [4]), in particular, for biology (motility}, meteorology (turbulence), and geophysics (ball lightning). Besides its academic significance, the given theory is of obvious practical value for all energy production technologies, primarily for the explanation of LENR, specifically addressing its complication with instability.

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