

Humankind does not have time to seek out the organization of the world by trial-and-error method...

S.P.Kurdyumov

## Obtaining inexhaustible clean energy by parametric resonance under nonlocality clocking

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### Abstract

From time to time socio-economic progress calls for a drastic technological innovation. Current state of affairs is marked by a menace of energy shortage, and science is out of viable options to escape this blind alley. The paper stages a novel approach to produce energy in a flow-type mode. The decisive factor for this development is an imperative requirement that behind every operational system there should be a clock of driving pulses. This circumstance is usually neglected rendering physical systems operatively deficient. Our cellular automaton model of the Universe exposes underlying holographic mechanism yielding the sophistication of quantum mechanics and biological information processing. This construction gives a unique explanation to the intractable property of nonlocality, which appears due to holographic slicing at the clock rate around  $10^{11}$  Hz. Parametric resonance at such a frequency applied to macromolecules may have their movements amplified. If entangled, macromolecules could transfer this amplification from one place to another. A bundle of macromolecules can have a substantial increase of their motility by autparametric resonance. The surmised mechanism sheds light on biochemistry activities in muscle operations. Mastering the contrived parametric resonance scheme can procure an abundance of clean plainly consumable energy.

**Keywords:** energy crisis, holographic Universe, quantum nonlocality, parametric resonance, artificial muscle, clean energy

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There is no expedient to which a man  
will not go to avoid the labor of thinking

Thomas A. Edison

## **1. Introduction: Impending Catastrophe and How to Combat It**

To maintain the production of energy at the level of growing demands of the world community is the key for the survival of human civilization. This is the greatest challenge of our time. Although the actual shortage of energy resources is still decades away, its presentiment is already stressing.

Rather eloquently the situation is presented in [1]: “The problem of energy supply is one of the most important problems for the survival of the country (may be more important than its defense). In coming decades the hydrocarbon fuel will disappear as the main source of energy. Another adequate alternative is not yet available. Current human generation, quite likely, will live to see the catastrophe of a planetary scale.” Unless, of course, an alternative is found.

The awareness of the energy crisis had been unequivocally expressed about a half century ago in the famous report [2]. Several prominent physicists had analyzed the problem with a connotation that the energy crisis could be resolved exclusively by the controlled thermo-nuclear synthesis [3,4]. Unfortunately, releasing this high-density pack of energy stumbles upon insurmountable technical difficulties [5]. On the other hand, low-density renewable sources are of limited value. In the meantime, a workable option of nuclear fission encounters its own complications [6].

The resolution of energy crisis needs a discovery of a radically new physical principle for generation of energy. Purportedly, all the actions undertaken with regard to energy economy are palliatives to buy time in waiting for this discovery. In [7] it is said: “Physicists will be key participants in the basic research needed to solve this grand challenge for humankind. If we succeed the achievement is likely to be better remembered than nuclear weapons”.

The situation, however, is pressing because the approach is unknown. As repeatedly stated by P. L. Kapitsa: “The most important and interesting scientific discoveries are those, which cannot be foreseen”. Yet certain scientific developments are anticipated in response to the urge of practical demands. As indicated in [8], the central problem of the scientific research of the future should be the study of muscle contraction: “the most surprising thing, we have to confess, is that until now scientists have not understood the essence of the muscle process”. Revealing this obscure process may result in a novel type of mechanical engine, which could lead to the abundance of clean energy.

We confront this problem using our long developed cellular automaton model of fundamental physics named CAETERIS (Cellular Automaton EThER InfraStructure). The rationale for this model can be found in [9-12]. The CAETERIS model is in sharp irreconcilable conflict with the existing worldview. In this model physical world appears as a holographic Universe imposing global clocking at the frequency of  $10^{11}$  Hz. The CAETERIS model naturally incorporates nonlocality, an unbearable property beyond the grasp for the existing worldview. The related issues are discussed in Sections 2, 3, and 4.

The possibility of extracting energy by Parametric Resonance In Motion Entanglement (PRIME) [13] is introduced in Section 5. To begin with, it is instructive to think over the immutable principle of conservation of energy: “The trouble is, it does not apply to the universe as a whole” [14]. The argumentation for the PRIME energy goes as follows:

(1) in essence, physical systems are described by algorithmic finite difference schemes (differential equations are just a convenient approximation); (2) behind any algorithmic scheme there must be an underlying driving clock (no clocking, no action); (3) physical systems may acquire impacts from such a clock by parametric resonance (the working frequency of this across-the-board clocking is about  $10^{11}$  Hz).

Finding an abundant source of clean energy is the first task for sustaining the world economy. Not of less importance and difficulty is the second task of delivering the obtained energy to mobile customers in small handy portions. The most attainable realization of such a delivery requires hydrocarbon fuel, like gasoline. With the envisioned inexhaustible supply of the PRIME energy the second task is suggested to be managed using liquid nitrogen as cryogenic “fuel” (Section 6). With the abundance of clean energy the low thermodynamic efficiency of liquid nitrogen as a “fuel” is not a problem. Yet excess of energy, even devoid of adverse environmental effects, brings concerns about overheating of the Earth as a whole. P.L. Kapitsa had vividly discussed such concerns, although he expected the excess of energy to come from the thermonuclear synthesis.

With the energy crisis human civilization approaches the critical bifurcation point in its development. The situation relentlessly necessitates a tremendous technological reorganization of the world community. This reorganization may foretell the new wave of the post-informational technological revolution in accordance with the famous theory of Kondratieff’s cycles. Interrelating economics and politics, taking into consideration such events as war, discoveries, public opinion, and climate as integral parts of the world makeover Kondratieff’s theory predicts long-term life-cycle periodicity of roughly about 50 years [15]. To a great extent, this long-term periodicity includes the factor of people longevity as soon as the triumph of a new paradigm requires generation replacement.

It would be imprudent to expect that the formidable restructuring problems facing the world economy can be solved with minor adjustments to the existing practices. The concluding Section 7 summarizes basic points in relation to the potentialities of the introduced conception.

...living matter, while not eluding the ‘laws of physics’ as established up to date, is likely to involve ‘other laws of physics’ hitherto unknown, which, however, once they have been revealed, will form just as integral a part of this science as the former

E. Schrödinger

## 2. The existing worldview is deadly wrong

A worldview that does not account for the phenomenon of Life is definitely incomplete. Furthermore, if it does not explicitly incorporate an operational support to biological processes by “*other laws of physics’ hitherto unknown*” it merely stays incorrect.

The book [16] stoutly advocates making a critical distinction between the validity of a worldview of the Universe and applicability of theoretical schemes for diverse phenomena. The striking achievements in mechanics, thermodynamics, electricity, and microphysics plainly contribute to our concrete understanding of the Nature of Things. But such achievements do not necessarily corroborate the worldview of the Universe.

Nowadays, the general worldview trends towards the Information Dominant Universe. Inclination on information is aimed at problems of biological complexity, especially in relation to self-organization. Focused attention to this subject is given by the synergetics (see, particularly, [17,18]). Having started with the laser as an exemplar model, synergetics then considers nonlinear effects in physical systems as the key instrument for self-organization. Arguably, the solution of this problem needs a more potent methodological approach. Such an approach is offered by the so-called “stored-program-concept”. In this case, to cope with the complexity synergetics would acquire the enhanced aptitude of computer-controlled systems.

The “stored-program-concept” approach has been realized in our cellular automaton model of the physical Universe – CAETERIS [9-12], which portrays the material world as Internet. The information control of material objects is implemented by the paradigm of “Cloud Computing” rather than by stand-alone processing. For living systems this means extracorporeal organization of biological information processing. The Internet experience shows the decisive overall advantages of “Cloud Computing”. How can anyone in the nowadays telecommunication society imagine the organization of Life other than as zillions of Internet connected gadgets?

Genome capacity is not enough to hold the information for organism development – the required information is tens orders of magnitudes greater. Instead, the DNA presents pseudo-random keys with certain classification tags, which are used to access the outside informational infrastructure of the Universe to get the epigenetics control signals [11, 12, 19]. Ten years of genome studies [20] resulted in megatons of data: “The finished human DNA sequences in official databases now add up to a whopping 300 billion base pairs – and this is just a fraction of the total”. No wonder, practical use of these data is meager.

Investigation of biological systems must comply with “the basic law of requisite variety”, which says that achieving of appropriate selection “is absolutely dependent on the processing of at least that quantity of information. Future work must respect this law, or be marked as futile even before it has been started” [21].

Information processing functions associated with human brain constitute a problem of acute discomfort to thinkers for millennia. Said St. Augustine, V century: “The way in which minds are attached to bodies is beyond man’s understanding”, Blaise Pascal, XVII century: “Man is to himself the most wonderful object in nature; for he cannot conceive what the body is, still less what the mind is, and least of all how a body should be united to a mind”, Steven Weinberg, XX century: “How memories are stored in the brain is not likely to be affected by the discovery of the final theory”.

The contemporaneous philosophical thought tacitly admits that the considered problem cannot be incorporated into the existing knowledge; see, e.g., an article in the encyclopedia [22]: “It may well be that the relation between mind and body is an ultimate, unique, and unanalyzable one. If so, philosophical wisdom would consist in giving up the attempt to understand the relation in terms of other more familiar ones and accepting it as the anomaly it is”.

The suggested “Cloud Computing” paradigm gives an elegant constructive solution to the problem of the organization of mind where individual brains are not stand-alone computers but collective users getting shared access to portions of the holographic memory of the Universe [11, 12, 23]. A critical consideration of such an idea can be found in [24]. With the existing worldview attaining the extraordinary performance of the brain is absolutely inconceivable.

The Universe viewed as a collection of interacting corpuscles does not have the machinery necessary for the phenomenon of Life. Going on with the traditional physics in hope that biology will somehow pop up later is an ostrich policy. Digging with the existing physics paradigm downwards is inconsequential, climbing with this paradigm upwards leads to falsehood.

In the realm of microphysics, the CAETERIS model yields a collection of traveling wave solutions for “excitons” that match exactly to the whole spectrum of stationary elementary particles, no more and no less. The well-known properties of the material world follow immediately as analyzed in [9, 10, 12] (see summarization in Fig. 1 -6). The puzzlement of quantum mechanics is explained by “interactive holography” [12, 25]; this will be considered in the next section (Fig 7 and 8).

Mounting astrophysical observations bring a lot of conflicting results. So, the picture of the Universe requires frequent refurbishments with awkward *ad hoc* patches. Basic critical remarks on this subject are collected in Fig. 9. Meanwhile, the Information Dominant Universe of the CAETERIS model addresses all the troubles of modern cosmology with ease and naturalness. Of especial elegance are the neat explanations of apparently hopeless issues of “dark matter” (*mechanism of gravity employing stretching*

lines), “dark energy” (*violation of Hubble’s Law for a sequence of Big Bangs*), and the “axis-of-evil” (*eccentric position of observation*) [12, 26, 27].

Modern cosmology is built on the foundation of Einstein’s theory of general relativity. Considered as the most beautiful theory of physics, general relativity presents a wit reaction to the embarrassing question: why velocities are relative while accelerations are absolute. To save the concept of relativity for uniform and non-uniform motions Einstein introduced the curved spacetime dynamics: positioning of the material bodies sets up a curved spacetime, while this curvature instigates bodies’ motion. The doctrine of relativity is preserved because although the motions of material bodies are described with respect to the spacetime, nevertheless, in a sense, they refer only to each other.

Aside from doubting the philosophical premises and challenging the mathematical technicalities (see, particularly, [28]) the concept of general relativity does not raise objections as an abstract model. It is aesthetically pleasing and constrainedly feasible for a physical design. But Nature had not selected this operationally inept option: it appears that *modus operandi* of general relativity does not withstand major experimental testing. This theory is inflexible and leaves little room for adjustment. According to Einstein [29]: “The chief attraction of the theory lies in its logical completeness. If a single one of the conclusions drawn from it proves wrong, it must be given up; to modify it without destroying the whole structure seems to be impossible”.

The crucial experiment for general relativity constitutes testing its distinctive mechanism - impacts through ripples of the spacetime, the so-called gravitational waves. There are great expectations that “the ability to listen to gravitational waves would also open up a completely new window for astronomers to observe the universe” as with ordinary material emissions of light quanta, radio signals, X-rays etc.

A big LIGO project (Laser Interferometer Gravitational-wave Observatory) has been launched about a decade ago. However, long and excruciating searches fail to detect gravitational waves. It looks like there is nothing to observe. The LIGO project is now upgrading its detectors to be completed in 2014. Says LIGO director Jay Marx: “[With the upgrade], either we’ll see a signal or Einstein’s general theory of relativity will be wrong” [30].

The most influential disagreement between our model and the conventional cosmology lies in the characterization of the Cosmic Microwave Background (CMB). In our view, the CMB has nothing to do with the relict radiation leftover from the Big Bang. Instead, it is the noise from the writing operations in the holographic memory of the Universe. These operations are performed at the clock rate of about  $10^{11}$  Hz. As discussed below, this frequency plays a decisive role in the organization of all quantum and biological processes, including the motility of living system. Hence, this frequency also shapes the performance of the surmised mechanical construction (see Fig. 10).

Scarce is the truth, but the supply was  
always in the excess of the demand

### 3. Nonlocality from interactive holography

The most drastic challenge of quantum theory is the so-called “quantum nonlocality” showed by the Einstein-Podolsky-Rosen (EPR) paradox. The nonlocality undermines the very essence of our perception of the physical world. As said in [31]: “It is difficult not to suppose that the influence of very distant bodies is quite negligible”. The idea of nonlocality cannot be accepted by most people, in practice they strive to minimize its exposure and downplay its connotation. A. Einstein could not admit the possibility of the EPR effect alleging that quantum theory – as soon as it predicts such an effect – is incomplete; in his view, <if quantum nonlocality> “is correct, it signifies the end of physics as a science”.

Common proclamation that quantum mechanics irrationality is intrinsic to Nature reflects a despair from a lack of constructive success. In our model, quantum behavior gets a rational explanation as a result of interactive holography [12, 25]. The holographic mechanism of the physical Universe appears from the distributed mutual synchronization of the CAETERIS model. The intrinsic periodicity of this underlying process spots the origin of the wave activities - the root of quantum mechanics (see Fig. 7 and 8).

In contrast to classical mechanics where objects are presented by coordinate triplets: (x, y, z) quantum mechanics objects are described as four-components vectors  $|\psi\rangle$ : (x, y, z,  $\theta$ ). It is the holographic reference beam that imposes the additional phase coordinate,  $\theta$ .

Micro objects are driven by the clock cycles that consist of interleaved synchronized-desynchronized stages. The symbiosis of these two stages turns out the notorious wave-particle duality. Quantum objects evolve as “superposition” of potentialities until probabilistically reduced to one of the characteristic states of a “measurement” apparatus producing an illusion of instrumentally created reality. The puzzlement of quantum measurements originates from the multipart clock cycle: the potentialities of quantum objects are forced to periodically materialize at recurring transitions from synchronization to desynchronization.

The momentous feature of quantum systems is nonseparability. This feature comes out from the holistic nature of the holographic operations. Conventional description of physical systems by interacting particles is only a scanty approximation of processing by holographic slices. In addition to direct interactions by “message passing” our model introduces interactions through “common memory”.

The most spectacular outcome of the developed holistic picture of the Universe is the unique explanation of quantum nonlocality (see Fig. 7). Nonlocality comes from the influences of holographic slices as a whole, so actual positioning of separated elements is less significant. This holistic process does not fit into the framework of conventional physics as long as it cannot be considered as an extension of direct interactions.



The more data we collect regarding muscle the less we understand its functions. Here we have approached a chasm going through the whole medicine and biology

A. Szent-György

#### **4. Biochemistry control and actuation**

The validity of solid-state physics, chemistry, material science, and the like, is straightforwardly determined by the properties of the elementary material constituents. The situation with biochemistry is somehow different. Apparently, it contains something beyond the direct interactions of the molecular structures.

The inscrutability of macromolecule properties had been foretold by P.L. Kapitsa [8]: “We know that most of the phenomena are described by existing laws of physics, but I think that one of the main properties of the living matter – *to reproduce itself* – may appear as a result of some forces of Nature, which are yet unknown and unexplainable by identified laws of interactions between elementary particles. We do not have any data to disallow sufficiently long sequences of atoms with certain rules of arrangement to attain a new property corresponding to the property of self-reproduction in living matter. In singular atoms and simple molecules this property may go unnoticeable.”

In our model, the differences in the behavior of small particles and macromolecules are determined by the amount of the feedback they get from the holographic storage of the Universe. Small particles get their feedbacks from the writing process immediately by the returning conjugate holographic beam. This creates an interactive holography environment for quantum mechanics behavior.

The macromolecule feedbacks are richer. The key point is that the highly developed structure of the macromolecules provides access patterns to the holographic storage. That's the meaning of macromolecules structure determined as an “aperiodic” crystal [32]. The feedback signals for macromolecules in addition to the immediate writing inputs also incorporate the reactions of the past memory. The behavior of macromolecules is governed by quantum mechanics only to a certain extent. The significant part of macromolecules behavior is determined by the control from the bulk of the information infrastructure holographic memory.

Thus, biochemistry effects cannot be completely described in terms of classical chemistry; they are better explained in terms of what is called "quantum biology" [33]. The full-fledged information feedbacks from holographic memory of “quantum biology” are much more sophisticated than the restricted information feedbacks used in ordinary “quantum mechanics”. The apparent difference between the dead and living matter is due to various extensities of control available to small particles and macromolecules.

Functioning of biological systems needs two types of inflows: control signals and actuation impetuses. Previous considerations of the CAETERIS model had concentrated on the former; in this work we inquire into the machinery of the latter.

The way the control signals acquired by macromolecules are transformed into purposeful actions is by and large uncertain. How exactly the energy-providing reactions are coupled to the mechanical process is not known. The leading hypothesis is that burning the sugar inside an organism in one way or another provides the motive power to the muscle.

According to [32], the purpose of feeding is not the acquisition of energy but the intake of “negative entropy”. The essential thing in metabolism is freeing from all the entropy that an organism cannot help producing while alive. The amount of energy obtained with the food does not seem enough for the work the organisms perform. For example, some beetles would need daily intake of food twice their own mass.

The main point of the given paper is that the motion in biochemical activities is supposed to originate from the external clock driving the holographic memory. The ability to produce motion from external clock drive is determined by impacts of the pushing pulses; this can constitute the so-called “hot-clocking” effect [34].

The holographic memory of the physical Universe operates at the clock cycle at  $10^{11}$  Hz. This frequency has a discernible operational significance for the Nature of things revealing the chasm between the dead and living matter [11, 12, 19, 25, 26, 27]. For quantum mechanics, the  $10^{11}$  Hz frequency is a watershed between quantum and classical physics. In biology, the  $10^{11}$  Hz frequency appears as a mysterious triggering factor for some minor but noticeable wide-range events (see [35]).

The impetuses incoming from the underlying infrastructure may be buffered for a while as “chemical energy” in substances, like ATP, or these impetuses may be applied directly. Recent findings [36] might corroborate the latter possibility: “mouth-rinsing and then spitting out a carbohydrate solution immediately improved performance at sprinting and cycling – even though it takes at least 10 minutes for carbohydrates to be digested and utilized by muscles”.

The new paradigm of muscle motility besides intended application to the production of energy may be also be instrumental in examining certain medical conditions associated with muscle ailments.

In the surmised mechanism biochemical activities effectively intermingle information and energy processes. The functionality of this mechanism can be compared to that of a computer USB port, which sustains information flow and electrical power.

Energy is never created or destroyed; it simply goes from one formula to another

## 5. The PRIME energy (Parametric Resonance In Motion Entanglement)

**5.1** A recent paper [37] (see Fig. 11) has stirred up a lot excitement regarding a possible nonlocality effect of “energy teleportation”. Among the various surprises inherent to nonlocality there have been observed the entanglement of motion patterns [38]. The effect is the following: given two separated entangled particles, movements of one of them will be instantaneously repeated by another. So, where the other particle gets its ability to move leading to the idea of “energy teleportation”?

Being transferred from one site to another instantaneously by “proxy”, the teleportation impact does necessarily have to strictly preserve the balance of energy. A possibility for generating energy in the context of nonlocality through “hot-clocking” effects has been considered in [39,40]. The introduced scheme exploits the technique of parametric resonance; the effect is called Parametric Resonance In Motion Entanglement (PRIME) (see Fig. 12) [13].

Parametric resonance is a phenomenon of exciting oscillations by changing structural characteristics of a system [41,42]. In contrast to forced oscillations, which are explicitly imposed from the outside, parametric excitations appear from the inside by means of time varying modifications of a system’s parameter. A classical example of parametric oscillation is playing on a swing: children quickly reach large amplitudes by appropriate ups and downs.

Contemplate a general parametric oscillator equation:

$$d^2x/dt^2 + \beta(t) \cdot dx/dt + \omega^2(t) \cdot x = 0 \quad (1)$$

If at the Right-Hand-Side we have a periodic function of  $t$  instead of 0, the system would undergo forced oscillations. Otherwise, for the initial condition  $x = 0$  the system will stay at rest. However, this unstable state of rest being somehow disturbed and the parameters in (1) varying periodically with time, the system undergoes parametric oscillations. Typically, the parameters vary with a frequency twice the natural frequency of the system; without a compensating energy-loss mechanism due to the damping factor  $\beta$  the oscillation amplitude grows exponentially.

It may seem that the suggested extraction of PRIME energy contradicts the most cherished physical notion of the conservation of energy.

The concept of energy comes from classical mechanics as one of the first integrals where it is possible to separate two parts determined by the values of velocities and coordinates; the former is called kinetic energy, the later is called potential energy. The sum of these parts remaining constant, it appears that one kind of energy transforms into another. As the kinetic energy vanishes away it turns out to produce “heat” in proportion to the

magnitude of the kinetic energy. Thus, a sum of mechanical energy and a certain measure of heat conserves. But, “if the system is not regarded as completely isolated, it is probable that the rigorously exact expression of its internal energy will depend upon the state of the external bodies” [31].

Consider a remark by R. Feynman [43]: “It is important to realize that in physics today, we have no knowledge of what energy *is*. We do not have a picture that energy comes in little blobs of a definite amount. It is not that way. However, there are formulas for calculating some numerical quantity, and when we add it all together it gives ... — always the same number. It is an abstract thing in that it does not tell us the mechanism or the *reasons* for the various formulas.” So, rather than talking about energy it could be more precise to talk about “the ability to produce motion” - a kind of “motility”. Commonly, it is convenient to stick to the habitual terminology of energy.

For the suggested PRIME scheme, the question regarding conservation of energy can be plainly referred to the situation of non-completely isolated systems. Transmitting energy from one location to another is like transferring money by wire. What is transmitted is a control information signal, and the substance is taken locally from the exterior. In nonlocal Universe an individual physical system cannot be considered in isolation from the underlying infrastructure, so there is no reason why the balance of energy in this system is to be preserved.

**5.2** The scheme of generation of energy by parametric resonance as presented in Fig. 12 operates straightforwardly. Given two entangled macromolecule objects: A and B, an object A undergoes irradiation at a Super High Frequency that is about twice the clock rate of the holographic mechanism of the Universe, which is around  $10^{11}$  Hz. As a result, the oscillation amplitude of the object B would increase. Energy obtained this way can be transferred over long distances.

For producing energy in a specific locale the scheme in Fig. 12 should be readjusted to autoperametric resonance. The concept of autoperametric resonance has important engineering applications [44]. With this concept, a macromolecule can be treated as a collection of coupled conformationally vibrating components under the influence of regular oscillations of the global clock at frequency  $10^{11}$  Hz. Random fluctuations of each vibration are amplified by parametric resonance in a way analogous to the parametric excitation of a swing. In toto, the fluctuations of macromolecules at the atomic level are transformed into a resolute large-scale motion. This transformation under the autoperametric resonance is deemed to be the pivot in workings of the muscle. The energy for muscle operations does not have to be accumulated in large quantities - it is supplied incessantly. The process of raising random macromolecule excitations from atomic level energies to the purposeful bulk level motions has at its disposition up to a billion cycles. Presumably, this amount of operational cycles could be sufficient to yield appropriate parametrical resonance reactions in fractions of a second.

**5.3** Let us take a look at the phenomenon of parametric resonance in physical systems from a more general philosophical standpoint.

It is overwhelmingly believed that the laws of Nature are expressed in the language of differential equations. Yet Nature is composed of discrete entities, and its continuous portrayal by differential equations is just a compact approximation convenient for analytical treatment. So, representation of physical systems by discrete algorithmic structures, in a sense, is more adequate.

At the first sight, championing the advantages of finite differences vs. differential equations looks strange, superficial, and trivial, to say the least. The situation, however, is more interesting and has far-reaching consequences.

In anticipation of our algorithmic deliberations, some people might properly infer that our suggestion relates to explicit but not to implicit computational schemes.

So, what kind of message sends realization of physical systems by algorithmic finite differences rather than by analytical differential equations?

The point is that dynamical capabilities of a system are not to be taken for granted. The description by differential equations does not incorporate a clearly defined operational procedure as an algorithmic structure of finite differences. According to the driving clock principle an operational procedure needs a sequence of pushing ticks. This – the ultimate expression of determinism - has been laid in the foundation of our cellular automaton model of the Universe. Failure to appreciate the necessity of pushing ticks renders many physical and biological constructions inoperative.

Parametric resonance provides a supplementary motility thanks to the outside clocking mechanism. Namely, changing certain parameters of a system in accordance with resonance conditions allows extracting energy from the underlying pushing ticks.

The idea of a global rhythm that permeates the whole Universe and regulates all the things of Nature dates back to the ancient Greek philosophy. In view of the insistent flow of time this idea had been upheld by Heraclitus of Ephesus, as exemplified in his famous aphorism “Panta Rhei” – “everything flows”.

The sensation of the flow of time is of great importance for all aspects of human existence: everyday life, culture, science, and technology [45]. Nowadays, especial attention attracts the renowned ideas by N.A. Kozyrev, whose dynamic picture of the world includes a curious potentiality for generating energy from the flow of time. “This entity is difficult not only for intuitive or logical perception but also for a verbal description since a proper complex of concepts and images for dealing with the new ideas is yet to be developed” [46].

Parametric resonance under the driving clock of the Universe may be interpreted as an effect of the “Active Flow of Time”. The surmised scheme of extraction energy from the nonlocality clocking of the physical world substantiates various otherwise purely theoretical suppositions regarding the “active properties” of time.

Most precious things in the world are free

## 6. Cryogenic “fuel”

The energy supply problem consists of two technically different but organizationally related parts: (1) finding an abundant source of clean energy and (2) delivering energy to customers in small manageable portions.

Presumably, the total power offered by PRIME method could meet all human demands; as said in [8], “the amount of mechanical energy produced by muscles of all animals is so far several times greater than the energy of all human-made thermal engines”. PRIME generators would be rather employed in a network of electrical substations than in a gigantic centralized unit. And PRIME aggregates can be sparingly packed in 3D volume.

Obtaining PRIME energy does not, however, solve the second part of the problem - how, for example, the available energy can be delivered to autonomous vehicles. At this time, the most convenient realization of such a delivery is through the distribution of gasoline.

The amount of power that could be extracted by an ordinary PRIME apparatus may be estimated, taking the situation literally, as several HP (horse power). Thus, in some cases, the mechanical motion from PRIME apparatuses may be inconvenient for direct utilization for propulsion of transportation vehicles. Under these circumstances, PRIME outputs can be exploited by conversion into cryogenic “fuel” – liquid nitrogen.

Liquid Nitrogen (LN) is available anywhere in unlimited quantities. The LN technology is very well developed requiring ordinary low-cost materials and resources. It is simple, robust, safe, and absolutely environmentally friendly in many respects.

Provided an abundance of clean PRIME energy the thermodynamics inefficiency of LN as a cryogenic “fuel” – only about 10% of energy invested in its production can be recovered – is a secondary issue. If we evaluate the amount of energy needed to bring gasoline into a workable state (just for the sake illustration, consider that it is necessary to spend one gallon of gasoline to make another gallon available) the inefficiency of liquid nitrogen would not look so severe. With the proliferation of PRIME energy LN could become a cheap disposable commodity, which will be virtually free and ubiquitous as running water.

The idea of using LN for propelling vehicles instead of gasoline has been considered for a long time. Prototypes of LN cars have been built and their feasibility has been demonstrated (see [47 - 50]). A light LN car can without difficulty get a driving range of up to 200 miles, about twice of a typical electric car. Heavy trucks can extend mileage for autonomous travel by carrying liquid nitrogen in a trailer tank.

The LN technology offers many obvious advantages. Widening its applications in many social and industrial spheres would be more than welcome.

We give advice, but we cannot give the wisdom to profit by it  
Francois De La Rochefoucauld

## **7. Executive summary**

- 7.1**
- The work presents a novel method for generating inexhaustible clean energy by extracting it from a clocking mechanism of the holographic Universe with the effect of parametric resonance.
  - The surmised possibility for generation of energy called PRIME (Parametric Resonance In Motion Entanglement) is based on our model of the physical world that yields a unique explanation to the unbelievable property of Universe's nonlocality, which is beyond the grasp of the conventional thinking.
- 7.2**
- The physical Universe is organized as an Internet.
  - Biological memory is placed extracorporeally and operates in accordance with the "Cloud Computing" paradigm.
  - The outside infrastructure provides living systems with the flow of information control signals and the flow of energy for their actuation.
  - The functionality of the PRIME apparatus is supposed to mimic that of a biological muscle
  - Figuratively speaking, the Universe is considered as a gigantic quantum computer where its PRIME energy is extracted through a USB port, a channel for information combined with an outlet for energy.
- 7.3**
- Expectedly, the PRIME energy could deliver electricity to cover all the demands of human society.
  - Further, PRIME energy could be used to produce an abundance of liquid nitrogen as an effective cryogenic "fuel" for the needs of transportation.
  - The suggested technology requires ordinary construction materials, and the production cost of the electricity and cryogenic "fuel" should be very low.
- 7.4**
- The development of the presented technique for generation of PRIME energy should go hand in hand with the experimental investigation of quantum computing. Both enterprises are in the same conceptual framework.
  - The explorations of the suggested concept could be launched in two directions:
    - (1) determining interactions of the applied super high frequency, around  $10^{11}$  Hz, with the "teleportation" events;
    - (2) examining various polymers in connection to muscle composition to find out the excitation conditions for autoperametric resonance.

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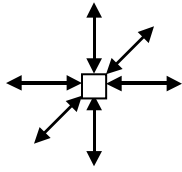
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Local geometry - **3D lattice**

Global geometry - **Hypersurface of 4D sphere**

**Transformational rule** - distributed fault-tolerant synchronization

**Equation** for the phase of circular counters :  $\mathcal{G}$

$$\frac{\partial \mathcal{G}}{\partial t} = -b\mathcal{G} + D_1 \Delta \mathcal{G} + D_2 \Delta^2 \mathcal{G} + D_3 \Delta^3 \mathcal{G} \quad (\text{mod } 2\pi)$$

**Complementary conditions:** *discretization of phase changes and arbitration protocol*  
 (speed of light limitation) (time irreversibility)

**Dimensionless parameters** (artifacts of the design):  $\alpha = 1/137$  and  $\varepsilon \sim 10^{40}$

**Two global periodic cycles:** matter formation and diffusional wave trains  
 (Big Bangs) (Holographic Memory)

**Two types of solutions:** "slow" spiral solitons and "fast" diffusion spread

Fig. 1 Construction and analysis of the CAETERIS model

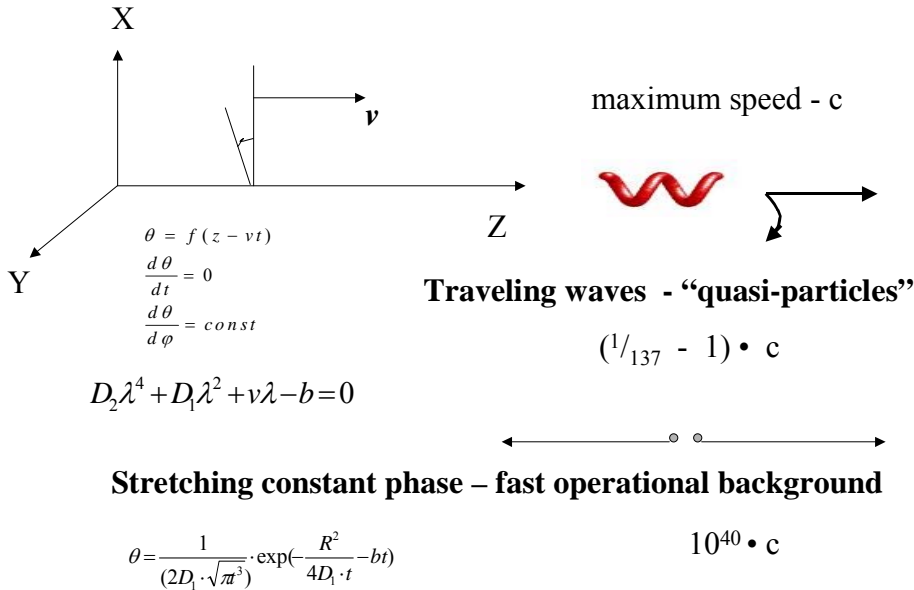


Fig. 2 Two types of solutions







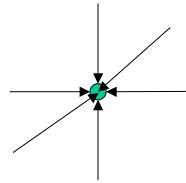
Type of kernel	PHASE DEPENDENCES	PROPAGATION	
		intermittent $V < C$	continual $V = C$
Real exponents <i>increasing</i>	$\theta$  $f(s) = A_1 e^{\frac{h}{v}s}$	Proton	Electro- Magnetic Field
<i>decreasing</i>	 $f(s) = A_2 e^{-\frac{v}{h}s}$	Electron	
<i>combination</i>	 $f(s) = A_1 e^{\frac{h}{v}s} + A_2 e^{-\frac{v}{h}s}$	Neutron	Photon
Imaginary exponents	$\theta$  $f(s) = A_3 \cos \sqrt{\frac{D_1}{D_2}} s$		Neutrinos <i>electron</i>
	 $f(s) = A_3 \cos \sqrt{\frac{D_1}{D_2}} s$		<i>tauon</i>
	 $f(s) = A_3 \cos \sqrt{\frac{D_3}{D_4}} s$		<i>muon</i>

Fig. 3 Spectrum of elementary particles

1. "Excitons" - helicoidal traveling waves - exactly correspond to the spectrum of stable elementary particles --- no more, no less
2. Law of inertia --- traveling waves synchro formations get their uniform motion for "free" from the cellular automaton mechanism
3. The upper bound on the speed of material formations --- the **speed of light  $c$**  --- comes from phase congruence requirements  
The same requirements establish standards of **length** and **time**.
4. Anti-matter - dual solutions having an opposite sense of rotation
5. Matter appears **ex nihilo** --- mutual transformations of elementary particles are intrinsic to synchro formations

Fig. 4 Interpretation of microphysics - 1

6. Slight asymmetry in favor of **matter vs. antimatter** arises from the arbitration protocol on our side of the Universe.  
On the opposite side of the Universe the antimatter prevails

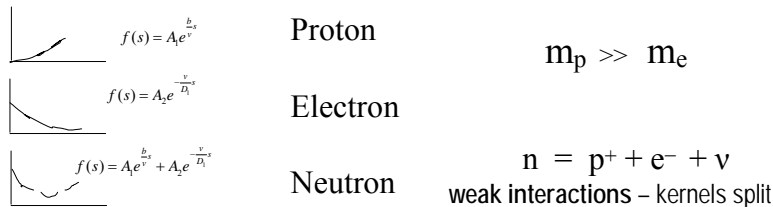


How to process input signals  
if they arrive simultaneously?  
--- Built-in arbitration protocol

7. **CP (Charge-Parity) violation** and ultimate irreversibility of Time.  
It is not possible to reverse cellular automaton events as the output signal depends on the order of input signals processing.  
This order is determined by the succession of signals arrival and/or by the arbitration protocol. Those cannot be distinguished.

Fig. 5 Interpretation of microphysics - 2

8. **Mass** – disturbance measure of synchro activity: angle of attack and non-monotonicity



How could neutron be heavier than proton?

- $E = mc^2$  --- breaking synchronization patterns: **strong interactions**
  - **Quarks** do not exist – what is observed are partons appearing from time varying states of the kernels with increasing exponent – nucleons  
Decreasing exponents do not produce this effect --- no internal structure
11. **Spin** --- frontal rotational impact from kernels, **independent of mass**
12. **Electrical Charge** --- intermittent issuing of fore synchro discs of the kernel  
*electrical force* --- frontal hit by the discs  
*magnetic force* --- edge hit by the discs  
*electrostatic force* --- instantaneous action-at-the distance

Fig. 6 Interpretation of microphysics - 3

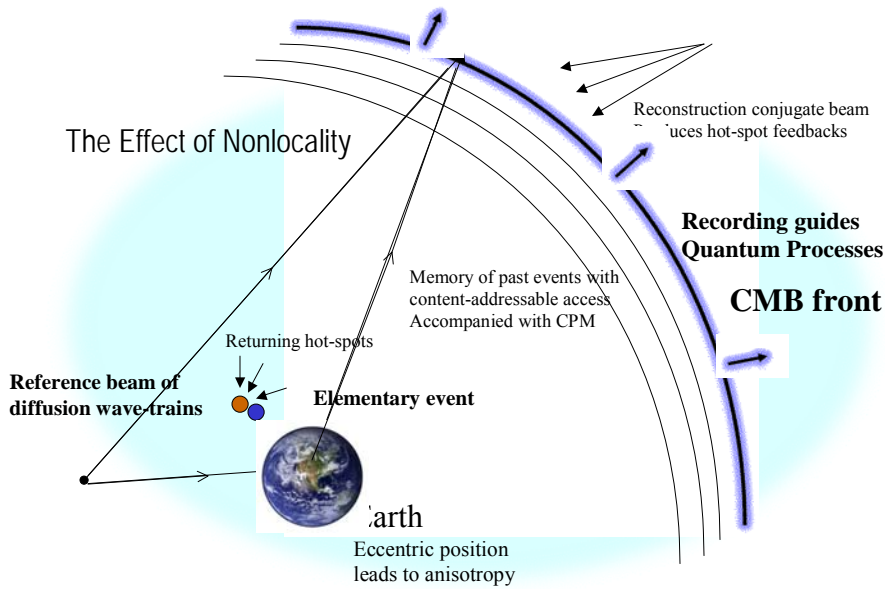


Fig. 7 Interactive Holography Elucidation of Quantum Mechanics

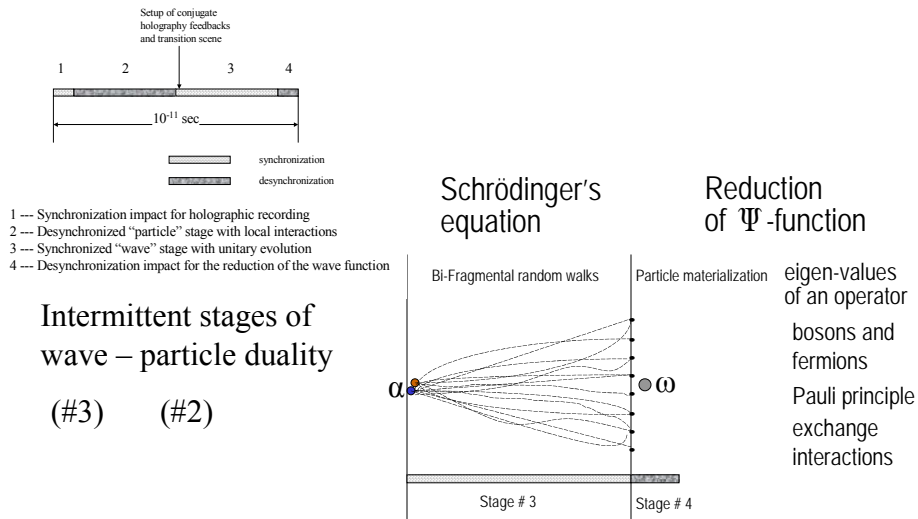


Fig. 8 The anatomy of quantum transitions



1. Big Bang preceding inflation --- exponential expansion in  $10^{-34}$  sec
2. Age crisis --- Universe appears younger than older stars
3. "Dark energy" --- vacuum energy, factor of  $10^{120}$  discrepancy
4. "Dark matter" --- departure from Newton's Law
5. "Great attractor" --- something mysterious is pulling the galaxies, peculiar motions - deviation from uniform expansion
6. Blueshifted galaxies --- a small spot, peculiar motion
7. Faraway cosmos --- early galaxies, gamma ray bursts, quasars
8. Galaxy distribution --- non-uniformity and voids
9. Anisotropy of CMB --- "Axis of Evil" --- «IMPOSSIBLE»

Every new discovery in astrophysics entails *ad hoc* patches  
 It would be more logical if some unexpected effects do not exist  
 System cannot sustain further repairs, needs replacement

Fig. 9 "Epicycles" of modern cosmology

Universe has two dimensionless parameters:  $\alpha = 1/137$  and  $\varepsilon = 10^{-40}$   
 Accordingly, there are two periodic processes in the Universe



**Cycles of matter formation**  
 Redshifts anomalies in periodic Big Bangs  
 vs. accelerating galaxies --- "dark energy"

**Cycles of diffusion wave trains**  
 Multiplexed synch-desynch stages  
 Holographic processing

**The CMB black body radiation spectrum --- 2.72<sup>0</sup> K**  
**Wien's displacement law → major frequency 10<sup>11</sup> Hz**

Fig. 10 New paradigm: periodic events vs. a single Big Bang

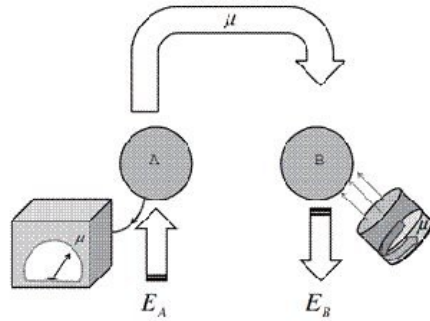


Fig. 11 Scheme of “energy teleportation” by Masahiro Hotta

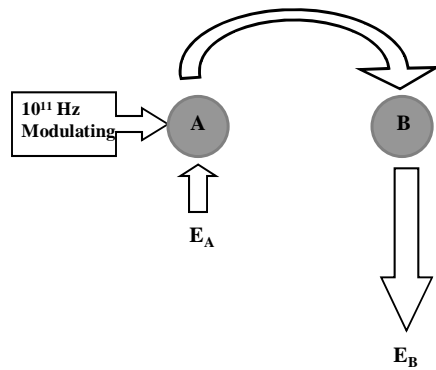


Fig. 12 Generation of energy by the PRIME scheme  
(Parametric Resonance In Motion Entanglement)