

by Alexander Frolov

Time Physics Thoughts

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Abstract

The author offers for discussion an explanation for the excess energy in cold fusion, an explanation which incorporates the concept of negative time. The mathematical basis relies on the work of Dr. N. Kozyrev (Russia), Dr. Nassikas (Greece), and Thomas Bearden (USA).

Introduction

"The Hypothesis and The Equations of The Unified Matter Field" by Dr. A. A. Nassikas [1], is a rare instance of scientific and mathematical publication devoted to fundamental questions that leads to a practical approach to space-time engineering. In some sense it is a new solution for the development of free energy and gravitation technologies. Dr. H. E. Puthoff provided an overview of the topic based on the Casimir-effect [2]. This was quite interesting, but the author's conclusion was "only in principle, yes," but the engineering (practical applications) is "a long way off." Also that the "warp drive" idea in the papers (1994-1997) of Dr. Miguel Alcubierre, Max-Planck-Institute for Gravitationsphysik, Albert-Einstein-Institute, Germany, is a fine idea, but it does not provide any technological solution. The only author who proposed practical approaches to vacuum engineering is Thomas E. Bearden. Let's see what analogies there may be between Nassikas' work and the "Gravitobiology" by T. E. Bearden to indicate the shortest practical way toward the technologies of the future.

The Engine of Space-Time

The vacuum or "space-time medium" of T. E. Bearden is described as cells of so called "gravitons." Those are "the coupled photon/anti-photon pair." Note, that it is a paired process. To make it more clean physically, we have to introduce the negative time axis for the "anti-photon-" So, the notion for the "virtual particles" that is used in many papers as the unlimited sea of free energy can be physically introduced only with the notion of "negative time," and we must take into account the "surface of time" or the "area of possible time directions." In this chonal area, the pair of photon/anti-photon seems to be a balanced situation of two processes that don't require any energy input, but it is a situation that produces both photon and anti-photon forms of energy. In other words, it is the "energy creation mechanics" itself. The law of energy conservation seems to be the law for a "direct time" and "reversed time" balanced situation only. Certainly in our reality it is possible to detect by means of some measurements only half of the process, i.e. the positive time process of the photon energy.

According to the hypothesis of Dr. A. A. Nassikas, there is no space-time without energy since "The existence or the non-existence of energy implies the existence or the non-existence of space-time, and consequently of any geometry." On this point his concept is closely connected with Bearden's "vacuum engine." Next point: by Nassikas, the energy of positive or negative electrical charge of the particle, i.e.. its potential field energy can be presented as "equivalent to its internal time." So, the sign of the charge can be defined by the "time axis direction" and the process of the electron is some opposition to the process of the positron. Bearden's photon/anti-photon pair is a similarly balanced situation. Note, the mass particle here is considered as some dynamical process [3], that is corresponding to some four-dimensional resonance condition, demonstrated in calculations for the DNA-molecule and for other natural material elements.

A practical solution was proposed by Thomas Bearden to create "the local rate of flow of time" that is "determined by the "local time-stress of vacuum potential" is to apply some non-linear materials for translation of energy between different frequencies and harmonics of electromagnetic waves. Normally, i.e. in the ordinary time-flow situation, the non-linear material produce the harmonics from a fundamental wave. But Bearden says that "in a true time-reversed situation, non-linear materials can exhibit the production of a stronger fundamental from a combination of the fundamental and its harmonics." The principle that is designated by Bearden as "Stokes' principle of time reversibility" (G.G.Stokes (Camb. Dubl, Math. J. 4. 1849, p.I) is interesting, but we have to discuss something beyond this that is connected with the potential form of energy, i.e. with Bearden's "stress of vacuum."

Dr. A. A. Nassikas and Dr. Miguel Alcubierre independently proposed to use the difference in local rate of the time flow as the source for a propulsion force. According to Nassikas, if "the space under the object attracts the object" more or less than the upper one in strength of the different relative times around the object, gravitational Propulsion can be achieved. So, all we need to take the next step from theory to technology is to find a way to change the rate of time. Is it too difficult? No, it is quite simple if we take into account some points:

- a) The notion "time" in any case is connected with some certain material system, for example, with some elementary particle or with some planetary system. The different velocity of light in different materials is a demonstration of this connection.
- b) The "space" of some curvature (of some rate of time) is a bi-directional or many-directional energy process. Electricity is one of many possible balanced situations that is described as a bi-directional or two-polarity case. For many-polarity energetic situations there is the possibility of three or more time-flow directions.
- c) There is no difference in principle between an atom and the space around that atom, according to Faraday [4]. So, the balanced chonal situation of the vacuum engine corresponds to some real properties of matter and we can work with matter to reach the changes in the balance of the vacuum engine in the area of this material object.

The vacuum is the medium of some known physical properties, for example, the dielectrical permittivity. Physically, it is connected with the velocity of spreading of the photon, and since we can work with different materials of known properties, it means we have the possibility of changing the parameters of the vacuum engine itself. One quite old example of a practical application is USA Patent number 3,187,206, granted in 1959 to Thomas T. Brown. The gradient of dielectrical permittivity is proposed and experimentally proved as the source of reactionless force. It is necessary to note that the same reactionless force is created at the border between two different dielectrical materials of the electrical capacitor, as it is described in many textbooks on the properties of dielectrical materials. The problem of taking the next step to fundamental conclusions is understanding the physical connection between the permittivity of a material, the velocity of light in the material, and the local rate of time for this area of space.

The patents by Thomas T. Brown include also asymmetrical interaction between electrodes. i.e, the topology of the electrical field. Let's note the analogy between Nassikas' idea above on "energy and geometry of space" and the invention by Brown of reactionless propulsion. The gradient of the electrical potential that is created in the natural way with distance from the electrically charged particle is a demonstration of the natural topology of space, i.e. the electrical field is created according to the law of creation of space itself. It is the reason for the analogy between the formulation for electrical and gravitational interaction. We have the possibility of changing the topology of the electrical field, for example by means of the asymmetrical dielectrical member in the capacitor of Brown. So we have the possibility of compensating the natural gradient created by the properties of space. It is the way to space-time engineering.

So, the conception by Dr. Nassikas and idea of Dr. Alcubierre are a fine theoretical basis for the technology that was discovered and proved in practice by Thomas T. Brown. Modern industry, specialized in dielectrical materials, is ready now for cheap mass production of warp drive systems. The same technology may be the basis for self rotating generators. The way is short and all we need is the commercial demand and engineering formulation of a step-by-step program.

The concept of negative time by Dr. Nassikas can be useful also in understanding the over-unity effect that is demonstrated in some cold fusion cells. The well-known Pons-Fleischmann experimental set-up includes a cathode that is over-saturated by protons when the set-up is operating. So, the local concentration of positively charged protons can be considered as a local imbalance in vacuum engine and the local rate of time in this area is different from the normal one. The processes are produced by this local change of the curvature of space are multilevel complex energy exchange, but the source of over-unity is the local concentration of positive electrically charged protons that is due to the input power source. Let's consider this point more carefully.

Any electrically charged particle can be presented as some volume of space i.e. the gravitational space by Nassikas, G-space of energy Eg, that is joined with some imaginary electromagnetic space of energy Eem. Conservation of energy is presented as:

$$dE_{em} + dE_g = 0 \qquad F.1$$

In my view, it is useful to change equation E1 to the form:

$$dE_{em} = - dE_g \qquad E2$$

In this case it is obviously that mathematically the space of Eem has an "imaginary" value, since the energy and the velocity are connected by the quadratic root of the negative number.
The over-unity output in cold fusion systems means the production of the excess heat energy. Certainly, some cold fusion systems demonstrate power output as the result of nuclear transmutation processes. But if we are considering the water to be distilled H2O in which fusion does not occur, I have to suppose only one way for excess heat production:

$$dE_{em} > 0 \text{ if } dE_g < 0 \qquad E3.$$

I must note that the idea is not a new one since the famous Russian astrophysicist N.A. Kozyrev created in 1947-1980 the "conception for active properties of the time." There is some natural physical mechanism for production of heat energy that is demonstrated by any star and it is not the thermonuclear reaction but the transformation of energy by the mechanism of Kozyrev. In that concept, the kind of energy that is used by the star for heat energy production is the "time flow." On the other hand, we can take into consideration the gravitational description of space instead of its chonal description, and the production of the heat is the transformation of Eg that we noted above.

N.Kozyrev analyzed the wide experimental astrophysical data to find the answer for the question of the common "special condition of matter" inside any star to provide the transformation of energy Eg into energy Eem. His conclusion [5] is quite simple:

$$B/n = 6 \text{ eV} \qquad F.4$$

where "B" is the density of the beam energy of the star and "n" is the density of electrons in the volume of space.

We certainly cannot create the conditions of stellar matter in the laboratory, but for a Pd-cathode in a cold fusion cell, the situation is quite similar to Kozyrev's equation F.4 and heat production can be detected as result of F.3. The difference is the application of protons instead of electrons. To calculate this we have to use the volume density of protons H+ in the material of the cathode instead of the volumetrical density of electrons "n" in star matter.

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1. "The Hypothesis and The Equations of The Unified Matter Field" by Dr A.A.Nassikas, *Infinite Energy*, March-June 1997, p. 120-124
2. "Can the vacuum be engineered for space flight applications? Overview of theory and experiments," Dr. H.E. Puthoff. *Infinite Energy*, July-November, 1997.
3. "The Concept of Mass Process," Alexander V. Frolov, *Proceedings of International Scientific Conference "New Ideas in Natural Sciences," June 1996, St. Petersburg, Russia, Published by "Pik" Ltd.. 1996.*
4. Letter from M. Faraday to R. Teilor of June 25, 1844, published in *Journal of Russian Physical Thought*, N2, 1991, p. 81.
5. N.A. Kozyrev, *Selected works, published by Leningrad State University, 1991, p.202, in Russian.*

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Publised Infinity Energy, Issue 20. 1998 p.80-81



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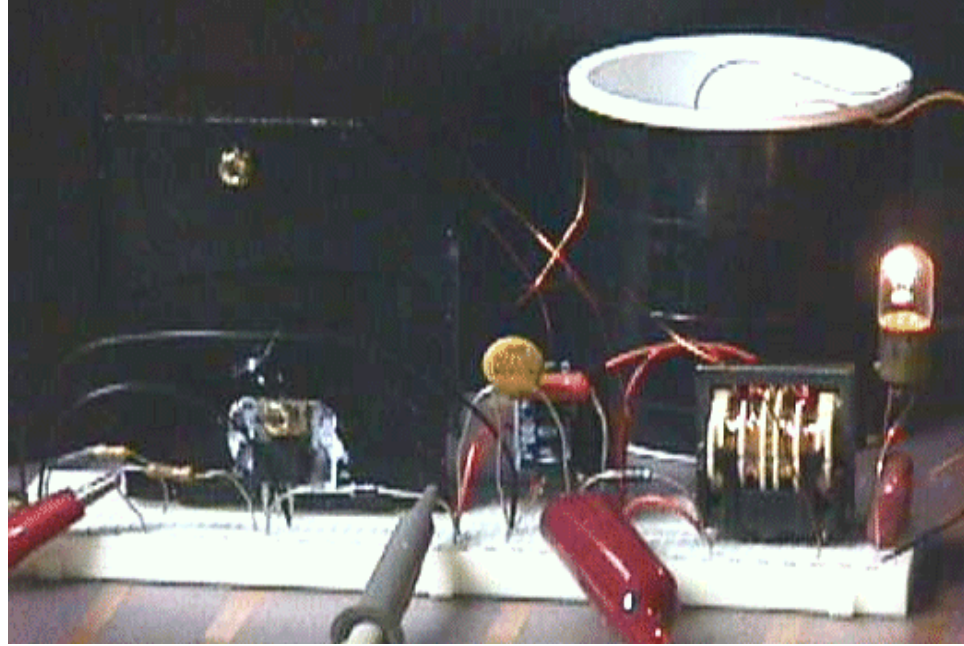


ECAT
Energy Conversion by Articulated Transfer

Dr. Ronald Stiffler

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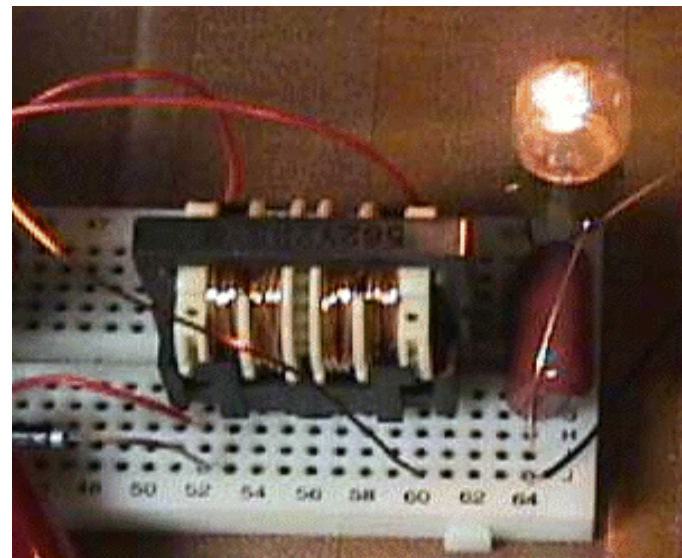
An ECAT circuit variation with a large air core coil in the background



Shown on this page are some of the first ECAT circuits I built in 1993-1994 while on the team of the Advanced Technology Group. The circuits consisted of air core coils varying in size and winding configuration. The underlying ECAT theory was to use cross phasing of various frequencies in such a way as to produce a virtual energy pump thereby providing an anomalous power gain within the circuit.

From 1993 through the first half of 1996, hundreds of coils and winding designs were tried. For the most part the work was empirical in its beginning stages, little substantiated science was available from which to base my work.

A poly-phasing transformer with its special core design and inductive cancellation is shown next to the load lamp on the right



Various researchers in the so-called Free Energy¹ area have focused on various configurations of pulse capture circuits where the back EMF of an inductor was thought in some way to capture energy from the ether and add it back into the circuit, thereby presenting gain. As with any free-minded group the Fee Energy folks seemed totally against ever duplicating in detail a particular circuit offering by me, and for whatever reason used modified designs or components hoping there magic was just as powerful as the original experimenter. This resulted in many Internet published attempts at duplicating one or more of the ECAT circuits and of course leading to total failure by those trying.

One design that was an off shoot of the initial ECAT research (although never acknowledged as such) was the TEP² or the 'Time Energy Pump'. The TEP design was in its own right a good look into the possibility of using solid state devices in a closed loop, yet it fell short of sustained usable excess energy.

Another researcher that worked with TEP designs can be found at CTG Labs³.

There is one so-called acid test proposed by those wishing to suppress certain research, using applied terms such as 'Over Unity', a condition where $(\text{Output/Input or } (\text{COP}^4) > 1)$. This proclaimed test states that such a device must self-run, producing an unlimited source of power without any external input energy. This proposed test is totally a diversion from the truth and is proposed as a way for energy utilities, suppliers and regulators to hide or otherwise discredit valid research in this area.

Let me try to explain in somewhat simple terms what the last paragraph is really about and why I can show that the so-called acid test is invalid. You need to form a mental picture of two areas separated by an infinite wall and a large door between the two areas. On the other side of the door is endless potential energy in the form of a high-speed wind. On your side you have a wind generator just waiting for a wind to begin providing you with electricity. All that is needed is to open the door and allow the wind to drive your wind generator and you have an endless supply of electricity. So far it seems simple enough, just push the door open, get the generator working and use some of the produced electricity in a device to keep the door open. It won't work this way and I hope I can present a clear picture of just why it will not.

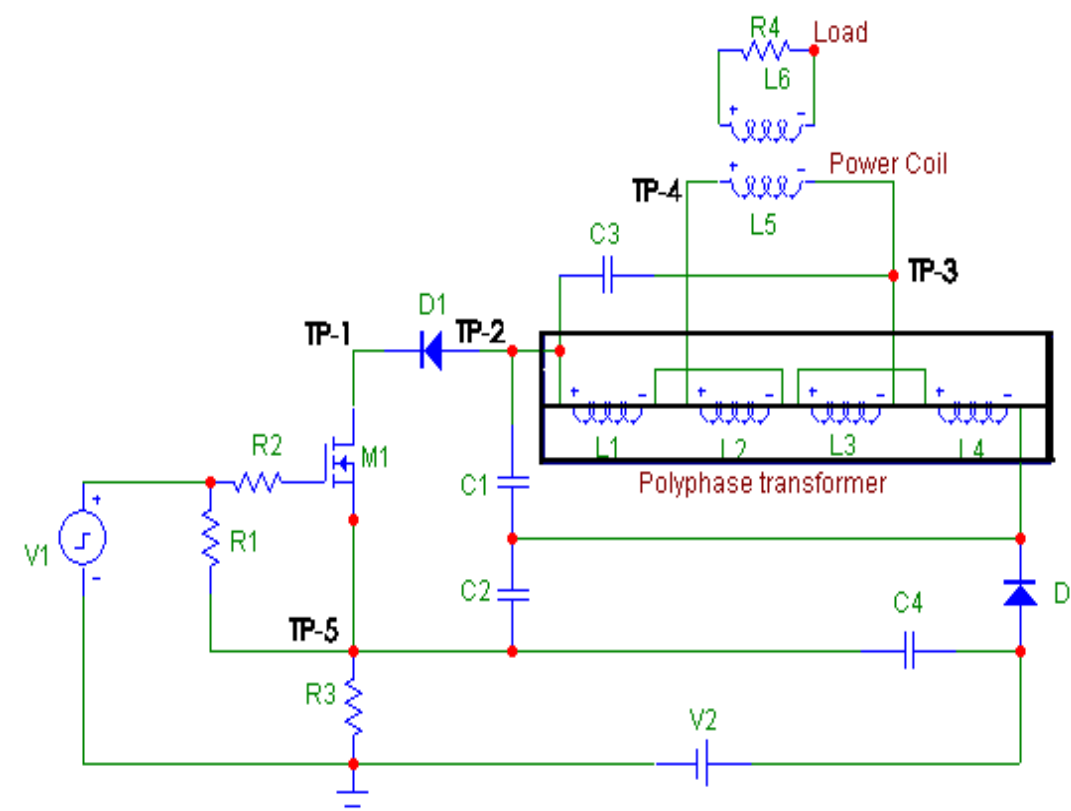
ECAT depends on what I call 'Poly-Phasing', the capturing external (virtual) energy during a critical phase of the trigger pulse.

The following picture is of the large air core power coil with inner load coil. A neon bulb held within the power coil will indicate a high voltage electric field. If one were to replace the power coil and the load coil with similar transformer configuration on a conventional core, this ECAT design would not show the effect of external energy capture.



So what is Polyphasing? Another example is in order, assume you are standing on a crowded street corner in New York City, where the ambient noise would be defining, yet you would be able to hear and identify individual sounds at different sound levels (pressures) and frequencies. The sound you hear is a mix of all audible sounds around you, some weak, some normal and some extreme in loudness. If you could in some way selectively pick certain sounds and properly phase them, you could arrive at a sound pressure greater than any one of the individual sounds. This is ECAT, it coheres the energy around it in such a way that it can be absorbed by its air core coil, resulting in an overall increase in kinetic energy.

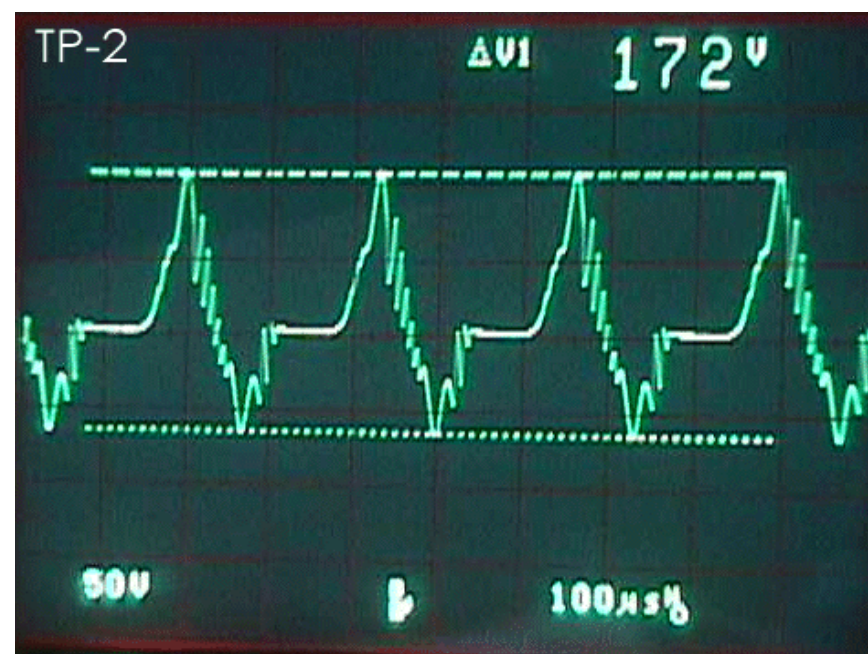
The basic ECAT circuit with the polyphasing transformer which is the center point this ECAT design



This ECAT design is operated at a respectable frequency of 4.3Khz, the trigger frequency and resulting sub frequency on which the power harmonics are developed. The polyphasing transformer is of a Theta core design and is made from a material that saturates at a desired saturation point. The space between the power coil and the load coil is the area from which the additional energy is absorbed.

This ECAT circuit is initialized with a 12V DC supply, either battery or some form of converter. The driver pulse 50% duty cycle supplied from a conventional generator or solid state multi-vibrator and drives a single MOSFET transistor.

The test points are indicated in the upper left corner of each image



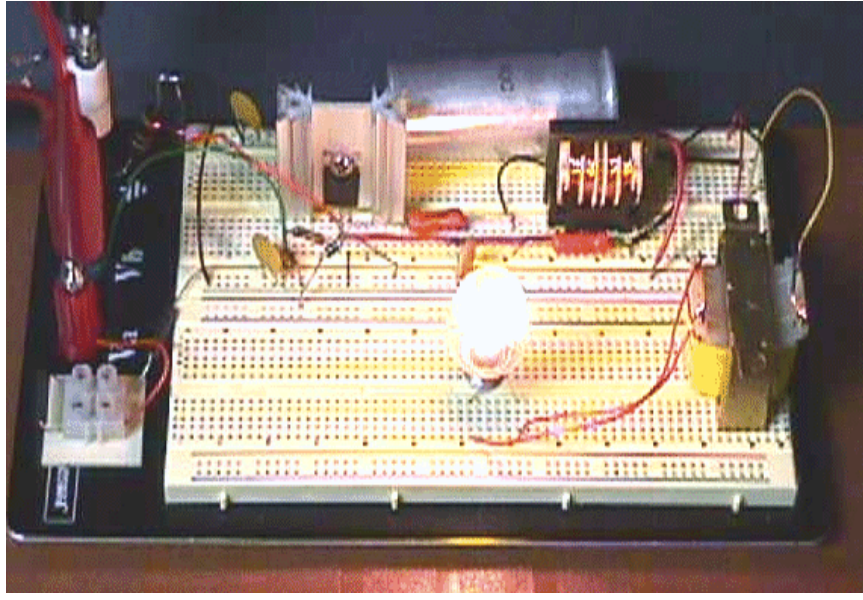
Conventional electronic engineering considers spurious phenomenon an unwanted artifact and uses various methods of filtration and feedback to cancel and remove such phenomenon. By today's standards this ECAT circuit is considered to be a very poorly designed switching circuit.

In my initial ECAT work, when transformers were changed from air core to core material (ferrite's or metallic) the potential for seeing anomalous power gains disappeared, until the following design was developed.

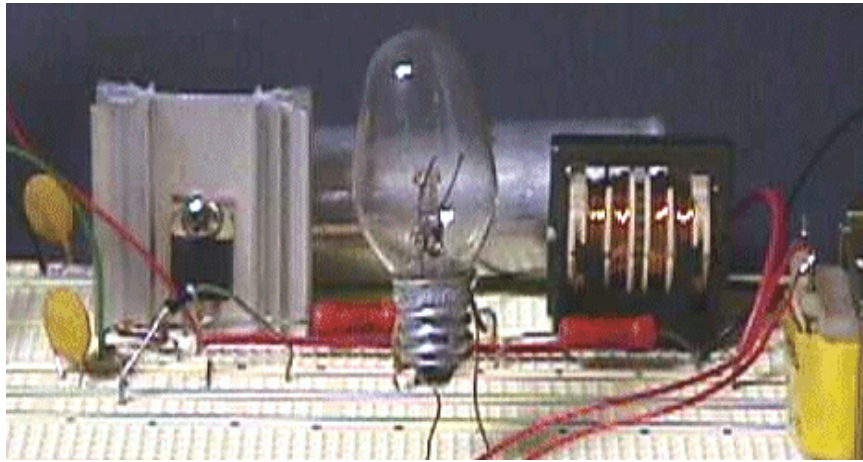
After considerable work with the new ECAT design a workable unit was designed that drives a 120V @12W lamp bulb. The matching transformer used to interface to the 120 volt bulb is a standard 60hz design and suffers considerable loss when running under the high frequency of ECAT. This transformer loss will be eliminated with a proper high frequency design, but currently the 60Hz form wastes some 6 watts of the total input power of 8.25 watts.

This ECAT variation has an input power of 8.25 watts and supplies 12 watts to the light bulb as shown and suffers a loss in the conversion transformer of some 6 watts. Therefore the total power produced by this ECAT is 18.11 watts for an input of 8.25 watts. The power gain is therefore $18.11 / 8.25 = 2.194$

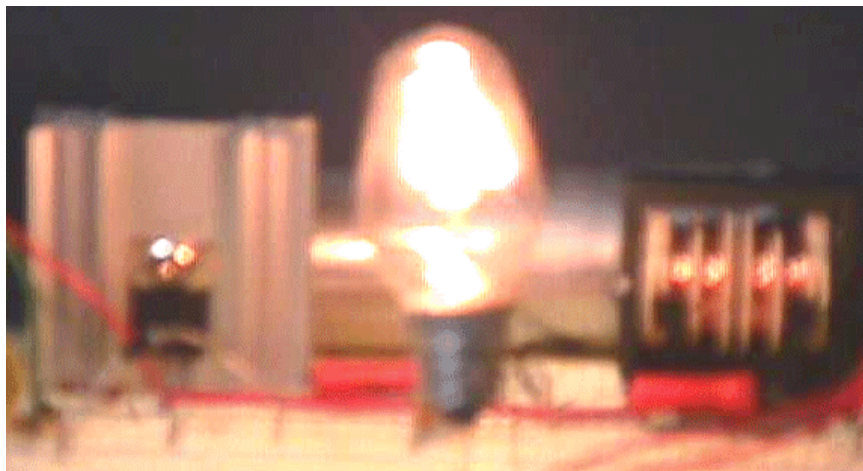
The following picture show this ECAT in operation.



The next photo shows ECAT and its 12 watt high bulb before power is applied.

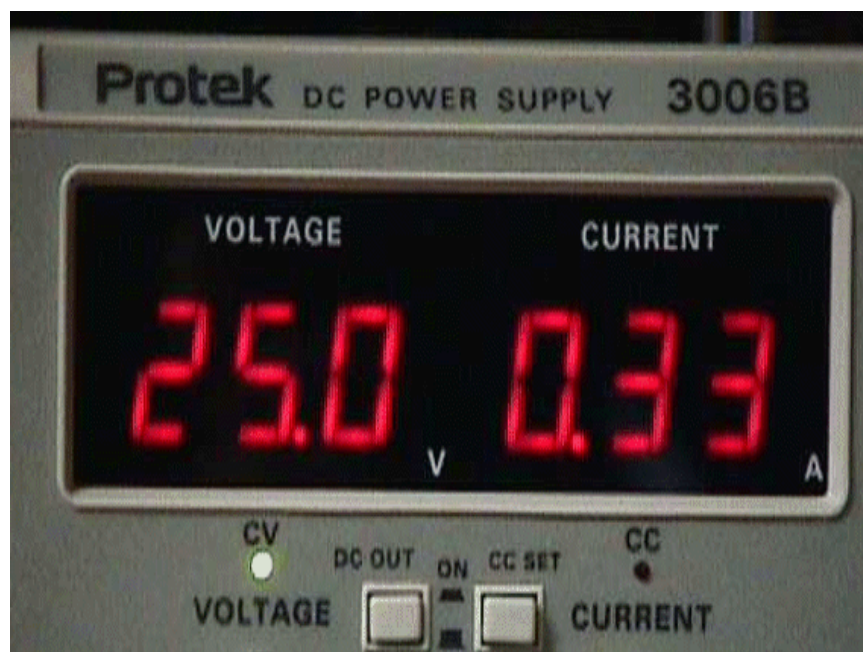


The next photo is another closeup of ECAT driving the 12 watt lamp.

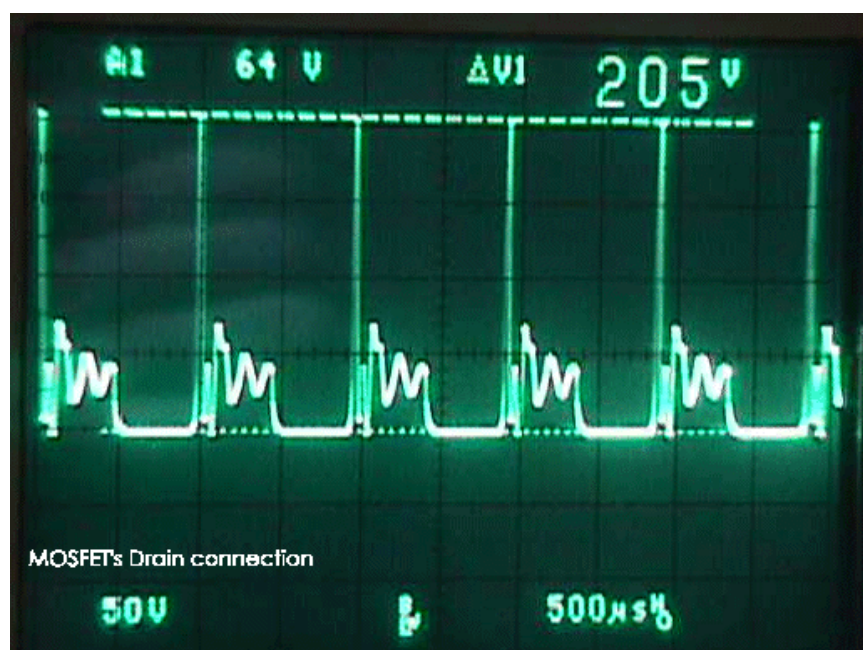


In the preceding photo, notice the strange light at the bottom of the bulbs filament. This light is from high voltage arcing at the base of the bulb.

The input power rails are stabilized with both 0.01uf ceramic capacitors along the rails and one very large 2kuf capacitor to insure the voltage does not contain low ripple or high frequency components.



Considerable design information was obtained during tests arriving at this point in ECAT history. The following scope photos show what is seen at the switching MOSFET drain during the OFF cycle of the pulsed operation. As can be seen, the excess energy capture occurs during the OFF period of the MOSFET.



In earlier ECAT designs (top of page) one can see that a large heat sink was used on the MOSFET driver, while in this design one can see that the heat sink has been drastically reduced in size and is only required should the load be disconnected from the circuit. During a load condition the quiescent current is only 90ma, yet if the load is mismatched, the current can go well over 1amp and the MOSFET begins to heat. Under normal operation the MOSFET and its heat sink is cool (not cold like the transformer) but cool.

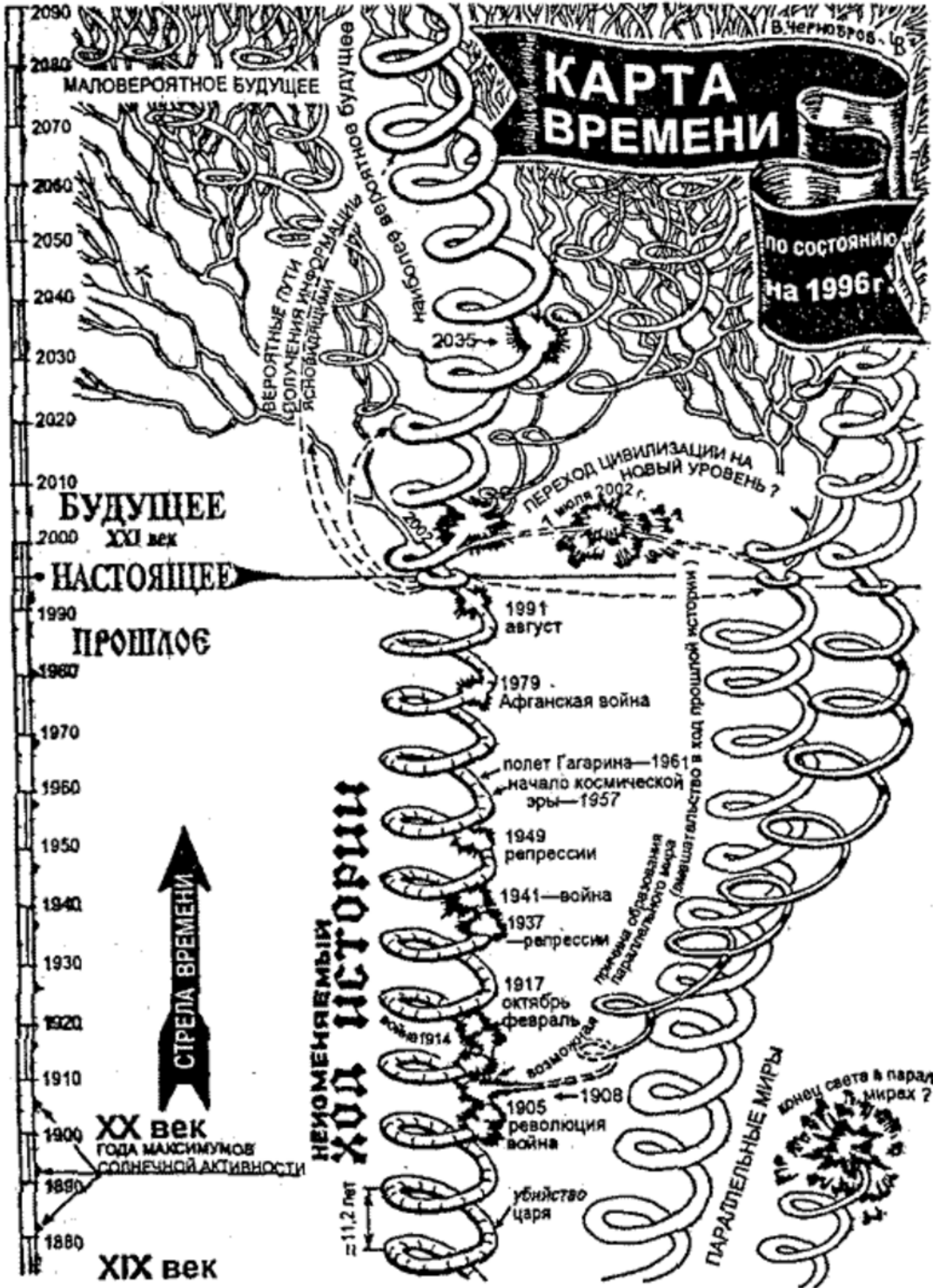
With addition of an HF matching transformer the following scope photo is what is seen on the secondary of this matching transformer. As can be seen the secondary voltage is quite high and the pulse shape is more uniform than with the older 60Hz transformer.



REFERENCES

- (1) Free Energy groups are prevalent on the Internet and one very active and indicative group can be found at <http://www.overunity.com>
- (2) TEP or 'Time Energy Pump' by J.L. Naudin can be viewed at this researchers web site, <http://jnaudin.free.fr/html/scalwidx.htm>
- (3) CTG Labs³ TEP research can be found at http://www.ctglabs.com/time_energy_pump_project.htm
- (4) COP stands for Coefficient of Performance.
- (5)

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Time Machines

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Paul J. Nahin *American Institute of Physics* p408 £?? Distributed in UK by OUP; ISBN 0883189356

by John Gribbin

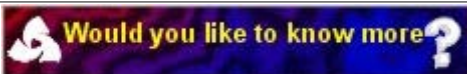
TIME TRAVEL has become, if not respectable, then certainly fashionable in some quarters of the physics world over the past decade or so. Much of the blame can be laid at the door of the astronomer Carl Sagan, who was writing a science fiction novel in the summer of 1985, and asked the relativist Kip Thorne, of CalTech, to come up with some plausible sounding scientific mumbo-jumbo to "explain" the literary device of a wormhole through space which could enable his characters to travel between the stars. Encouraged to look at the equations of the general theory of relativity in a new light, Thorne and his colleagues first found that there is nothing in those equations to prevent the existence of such wormholes, and then realised that any tunnel through space is also, potentially, a tunnel through time. The laws of physics do not forbid time travel.

This realisation had two consequences. When Sagan's novel, Contact, appeared in 1986 it contained a passage that read like pure Sf hokum, but which was (although few readers realised it at the time) a serious science factual description of a spacetime wormhole. And as Thorne and his colleagues began to publish scientific papers about time machines and time travel, the spreading ripples have stimulated a cottage industry of similar studies.

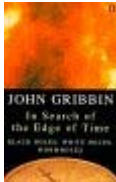
Curiously, this anecdote does not feature in Paul Nahin's otherwise remarkably comprehensive account of the fact and fiction of time travel. Nahin is a professor of electrical engineering at the University of New Hampshire, and the author of several published science fiction stories, some dealing with the puzzles and paradoxes of time travel. He tells us how he discovered, and "devoured" science fiction stories at the age of ten, and this book is clearly a labour of love. The approach is scholarly, with 36 pages of footnotes, nine technical (but not overly mathematical) appendices, and a no-holds-barred bibliography. Nahin's style is distinctly more sober than the material he deals with, but what he lacks in sparkle he certainly makes up for in comprehensiveness.

The approach, in line with the author's background, is from the fiction and towards the fact. Old favourites, such as H. G. Wells and Frank Tipler, make their expected appearances, as do less familiar time travel fictions from the nineteenth century (comfortably predating Albert Einstein's theories) and more obscure scientists and philosophers. And, of course, the familiar time travel paradoxes get a thorough airing.

There are, though, two major weaknesses in Nahin's treatment of the science. The lesser is his discussion of black holes, which is weak and sometimes a little confused. Much more importantly, though, he fails to appreciate how the "many worlds" interpretation of quantum mechanics allows a time traveller to go back in time and alter the past without producing problems such as the notorious grandfather paradox. In the conventional version of the paradox, a traveller goes back and murders his grandfather as a young boy, so the traveller could never have been born, so grandfather never died -- and so on. But in the many worlds version (championed today by David Deutsch, of the University of Oxford), the act of killing grandad creates a new reality, so that when the traveller then goes forward in time he is no longer in his own world, but in the universe "next door". This explains, for example, some of the more subtle touches in the "Back to the Future" trilogy of movies, which Nahin comments on while missing their point entirely. But although the book is flawed, it is still welcome. It does not lend itself to being read from front to back like a novel, but is ideal to dip in to and hop around in, like a time traveller dipping in to history. It is also a first class reference book for anyone interested in the Sf side of time travel, and one that will be welcomed by the fans -- at least, they will welcome it when and if it becomes available in paperback at a sensible price.



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SPACE

Einstein said that three dimensional space may be curved and could be closed into a sphere or a torus. It would likely have a radius of curvature of approximately: $R_E = GM_U/c^2 = 6.4 \times 10^{26}$ cm, where G is the constant of gravity and M_U is the mass of the universe.

In 1926 two scientists Theodore Kaluza and Oskar Klein suggested that electromagnetic theory could be explained if space had a fourth dimension composed of a multitude of compacted space bubbles whose radii of curvature approximate the Planck length: $d = \sqrt{(\hbar G/c^3)} = 1.61 \times 10^{-33}$ cm. A Kaluza-Klein compacted space bubble is represented by Planck's constant of action \hbar . Which is the unit of angular momentum, $\hbar = mcy$, where mc is the electron momentum and y is the Compton wavelength of an electron.

Planck= \hbar action represents one rotation cycle of an electron. Each such cycle of action is thought to produce a compact space bubble that is emitted from an electron to translate through three-space at less than c . Such action bubbles have a slight mass so that an acceleration or deceleration of the bubble flow, represents an electrostatic force. Motion of the source electrons and hence the flow produces an orthogonal magnetic field. An acceleration or oscillation of the charge source generates an electromagnetic field that moves at c .

Eugene and I agree with this and go a bit further. We assume that the four fundamental forces: the electromagnetic and gravitational forces plus the strong and weak nuclear forces can each be represented by a compacted space dimension. This makes physical space seven dimensional.

We further assume that these compacted spaces (sometimes called Calabi-Yau space) make physical space into a super fluid ether.

We also assume that the ether fluid produces two independent flows. One which we call charge space is a manifestation of the electrostatic and strong force compacted dimensions. We call these compacted bubbles geoids. They are probably two dimensional toruses (doughnut shaped surfaces).

Charge space geoids flow out of positive charge spinning one way and out of negative charge spinning the other. The flows start out at near velocity c inside the particle expand out through the particle and decelerate generating an all prevailing electrostatic force field. This field is the charge space (ether). Whenever the flows get together they cancel creating an attraction between opposite charges.

We call the other ether flow gravity space. It may exists as very tiny three dimensional blobs which are the compacted space bubbles from gravity and the weak nuclear force. The size of these blobs could approximate the gravitational radius of an electron: $s = Gm/c^2 = 6.75 \times 10^{-56}$ cm, where the m , in this case, is the mass of an electron. We suspect these tiny geons are Higgs particles, with a mass something like 10^{-191} grams.

The assumption that space is composed of compacted space bubbles with a slight mass accords with quantum mechanics; because, empty space is commonly thought to generate quantum fluctuations that give it a small energy or mass.

The mass of space could generate a positive cosmological constant (repulsion) that, like Einstein suggested in his 1916 general theory, could balance the attraction of gravity, and keep the radius of 3-space curvature constant. (See Steven Weinbergs, "Dreams of a Final Theory", page 224, Random House, 1992).

It is not usually recognized that the observed redshift of light from distant sources could be due to the collapse of the time dimensions, of space-time, as well as it can be from the generally assumed expansion of 3-space. (see Figures 7&8 from our book the Kalen Universe, on our web site the, "kalenuniverse.com").

If the reader wishes to follow our concept of space flows in more detail, he can check out the summary link or the link to chapter 6 of our book in the above web site.

He would see how and why gravity space geons appear instantly out of wormholes between matter and antimatter galaxies; this causes an outer space repulsion (Einstein's cosmological constant) between opposite types of matter. This repulsion separates the universe into equal parts of matter and antimatter, and helps explain the missing mass dark matter problem for cosmologists.

In brief: gravity space geons in outer space converge and accelerate. The acceleration produces gravity and the convergence produces mass particles. At the center of each particle the flow at velocity c produces a black wormhole, through which we postulate that the geons instantly transfer to a mirror image of the particle. This image occurs at another place in space-time which we call the shadow world. However, space and time does not exist in the wormhole between the particle and its mirror image. Hence these images are simply a continuance of the real world particles in an unseen shadow world.

The fast moving geons at the center of the shadow world image particles expand outward and decelerate producing a weak nuclear force in the particle. The weak force is similar to the electromagnetic force and helps produce particle decays. The deceleration reduces the G flow to zero near the particle surface. We postulate the zero motion generates a wormhole that allows the stoped geons to transfer instantly out through macro space to an interface between matter and antimatter galaxies.

Again, the geon flows start in outer space at zero velocity then converge and accelerate down toward fermion particles. The acceleration creates gravity and the convergence gives inertial mass to the shadow world particles. Geons spinning one way converge toward matter while those spinning the other converge toward antimatter.

TIME

What is time? Time is mysterious and hard to define. In this paper we will limit our discussion to physical time, because psychological time seems even more mysterious.

Dirk Brower of MIT (who consulted with Kalen when he worked at the Naval Research Laboratory) characterized time as the great undefined variable of physics.

We have also heard time defined as that which is measured by a clock. A clock measures some steady motion, or change, such as the evolution or decay of a physical quantity; like mass, energy, pressure, entropy and etc. The change of the quantity could be in space as position, size or shape.

Einstein suggested that a light beam bouncing back and forth between two mirrors would be a perfect clock. A light beam is a perfectly steady motion.

Motion usually implies the translation of mass particles through space, but if the motion is a light beam no mass is involved. Light is just an oscillatory motion of space. **So a unit of time for this motion would be a unit of space.** Likewise, if as we say, mass can be defined as the convergence of space toward a wormhole in space, then again **a unit of motion or time is a unit of space.** This may seem a bit vague so we will give one more example.

We propose that: all motion is wave motion.

In order to explain this concept, we first refer to the basic postulate #2 of the KALEN UNIVERSE: That a condition of zero time opens a wormhole, which is an instantaneous path to another location in space-time (see the link to chapter 3 (Postulates) of our book in the **kalenuniverse.com** web site).

In relativity theory, zero time occurs at the velocity c of light. We assume in our #2 postulate that zero time also occurs at zero velocity (no motion no time).

Electromagnetic waves move at c and have zero time along the line of motion. However, orthogonal to the line of motion, the electric and magnetic fields move (oscillate) at less than c . When, however, a magnetic or electric field goes through a maximum there is a moment of zero motion. This occurs for any sine wave motion. Wormholes can occur at these wave peaks.

Electromagnetic waves expand spherically as retarded waves from a charge source. Under Maxwell= \hbar equations normal (retarded) waves are received after they are emitted. Whereas, his advanced waves have negative time and, we predict, they converge through wormholes and are received at the same time as they start. You see that, when a wave front reaches a target charge (electron) it triggers a wormhole all along the wave front. The retarded wave collapses instantly through the wormhole (as an advanced wave) onto the target charge. One can often plot this expansion and collapse as a straight line from the source to the target. You see a photon does not move as a particle along a line but rather moves as a wave function from source to target.

The two hole experiment of quantum mechanics shows that not only do bosons (photons) travel as waves but so do fermion particles such as electrons. See our article Quantum Weirdness. This paper along with Questionable Cosmological Assumptions, are good background articles to read along with the present paper.

Inertial particles (fermions) contain both charge and mass. They are both electromagnetic and gravitational, so are composed of both electromagnetic and gravity waves.

Eugene and I postulate that these tiny gravity waves are a sub harmonic of electromagnetic waves, but are much, much weaker, smaller and more complex. A mathematical theory of such tiny gravity waves has not been written.

Our suggestion is a new action constant k which we call the kalen. The constant $k = mcd$ where mc is the electron momentum and d is the Planck length: $d = \sqrt{(\hbar G/c^3)} = 1.61 \times 10^{-33}$ cm, where \hbar is the Planck unit of angular momentum and G is the constant of gravity. This k unit should give a sub harmonic of quantum theory for gravity waves. This would reduce the indeterminacy of quantum theory and explain Einstein= \hbar hidden variables.

However, a mathematical beginning for a theory of gravity waves (through the M theory of super strings) is on the horizon. Incidentally, in string theory all the particles are generated by (composed of) vibrations of tiny strings of space or of membranes or blobs such as our geoids or geons.

Any mass such as the earth is composed of quantum particles (fermions) which are just complex wave packet particles, that move as waves much like photons move. They just make more starts and stops and so travel slower than photons. Fermion particles do not need a target to move to. They just reproduce themselves in time as they move along.

Our all motion is wave motion idea, with its instantly collapsing advanced waves and multiple micro starts and stops, may seem far out, but is actually quite simple. When it is compared to the concept of the various boson messenger particles of quantum mechanics.

Boson messenger particles can be better visualized as flow properties of space. That is, a force field between two objects is easily visualized as due to the appearance or disappearance of space between the objects.

If all motion is wave motion and time is motion then again, **the unit of time should be a unit of waves (space).**

In the first section of this article (SPACE) we proposed two compacted units of space. One which we call geoids for charge (electromagnetic) space. The other we call geons for gravity space. The geoids are unit electromagnetic cycles (from one electron) given by Planck= \hbar constant of action (angular momentum): $\hbar = mcy$ where y is the Compton wavelength; of an electron. A geon is a unit gravity cycle from one electron given by kalen= \hbar constant of action $k = mcd$ and, as we said, d is the Planck length.

If the basic increments of space and time are the same, then geoids and geons are also basic units of time.

However, time dimensions are not quite the same as space dimensions.

In general relativity the time dimension or dimensions are orthogonal to the space dimensions. This is indicated mathematically by multiplying the time dimensions by $\sqrt{-1}$. Multiplying by -1 gives a 180° rotation and multiplying by $\sqrt{-1}$ gives a 90° rotation.

Both: space and time are compounded from the basic units of action: the geoids \hbar and the geons k . Gene and I assume that \hbar and k are the ultimate units of existence and are more basic than length, time or mass, even though, \hbar and k appear to have the math dimensions of ML^2/T . Consequently, trying to measure the length, time or mass of quantum particles in terms of \hbar and k leads to Heisenberg= \hbar uncertainty principle. Even though the discovery of a sub gravity quantum realm, say through use of the Kalen constant k , could largely remove indeterminacy from quantum mechanics, a certain amount of uncertainty would remain. We like to think that it allows intelligent beings a certain amount of leeway in choosing their lives.

One ordinarily thinks of the evolution of space as due to the time dimension. In spite of this, I have tried to show that space and time are on an equal basis as far as change and evolution are concerned.

The big bang theory assumes that space-time is expanding spherically from a point singularity. This gives a beginning to time some 10 to 20 billion years ago. An amazing amount of work has been done on this theory. It gives a creditable evolution of matter from a very hot start to the present very cold 3 degree background temperature. But it has run into serious problems with observation, due, we believe, to certain long ingrained questionable assumptions. See our link to Questionable Cosmological Assumptions.

For one thing, we assume that space-time is not spherical but rather is an oscillating torus, that expands and contracts between two fixed limits set by a fixed radius of curvature of 3-space. In order for this doughnut metric to evolve as we suggest, time must also be three dimensional. This makes space-time six dimensional; or rather ten dimensional when one considers the four compacted force dimensions.

This geometry is complicated but easier to picture than ten dimensional string theory. See Figures 7 and 8 in our figures link, a page of the **kalenuniverse.com** web site.

If the time and space dimensions are much the same, why is three-space so obvious while the time dimensions are hidden?

One reason is that most of the space flows (motions) along the time dimensions are instantaneous through wormholes

In order to see how this comes about, the reader should understand our concept of the Shadow World.

The idea of a shadow world has been around for a long time. String theorists predict that all the particles have a mirror image partner that is too heavy to detect. Also their $E_8 \times E_8$ super symmetry seems to predict an invisible duplicate Shadow World.

Actually Einstein= \hbar idea of particles being wormhole bridges between two 3D slices of space-time is closer to our idea of a shadow world (See Einstein= \hbar quote in the link to Quantum Weirdness in the **kalen** web site). We think of gravity space as being an ether like super fluid that converges upon matter producing a black wormhole at the center of any mass particle. These wormholes are instantaneous connections between any real world particle and its shadow world counterpart.

Now, because distance and time do not exist inside of a wormhole; a real world particle and its shadow world antimatter counterpart can be thought of as one particle.

Space flows generate the real world, then flow through mass and charge wormholes to create the next slice of space-time which is the shadow world. Thus, time is essentially the instantaneous flow of space through mass to the next observable slice of space-time which we call the shadow world.

In order to visualize this better, we will omit one dimension and think of space-time as three dimensional. Consider a three dimensional object such as a human body. A slice through the body would be a two dimensional picture. One can think of the whole body as a series of these pictures. Visualize each picture slice as a moving picture frame. Imagine a two dimensional observer who could see these pictures projected sequentially in time. He could combine and see them as a 3D object: The human body. The third dimension would be time to this 2D observer.

We see that time can be the sequential observation of our real world of three-space along the next higher dimension which we call time. We call the next slice of space-time the shadow world.

We also see how the time dimensions can be hidden in wormholes, and the shadow world hidden behind wormholes

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Is Time Travel Possible?

by John and Mary Gribbin

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In one of the wildest developments in serious science for decades, researchers from California to Moscow have recently been investigating the possibility of time travel. They are not, as yet, building TARDIS lookalikes in their laboratories; but they have realised that according to the equations of Albert Einstein's general theory of relativity (the best theory of time and space we have), there is nothing in the laws of physics to prevent time travel. It may be extremely difficult to put into practice; but it is not impossible.

It sounds like science fiction, but it is taken so seriously by relativists that some of them have proposed that there must be a law of nature to prevent time travel and thereby prevent paradoxes arising, even though nobody has any idea how such a law would operate. The classic paradox, of course, occurs when a person travels back in time and does something to prevent their own birth -- killing their granny as a baby, in the more gruesome example, or simply making sure their parents never get together, as in Back to the Future. It goes against commonsense, say the sceptics, so there must be a law against it. This is more or less the same argument that was used to prove that space travel is impossible.

So what do Einstein's equations tell us, if pushed to the limit? As you might expect, the possibility of time travel involves those most extreme objects, black holes. And since Einstein's theory is a theory of space and time, it should be no surprise that black holes offer, in principle, a way to travel through space, as well as through time. A simple black hole won't do, though. If such a black hole formed out of a lump of non-rotating material, it would simply sit in space, swallowing up anything that came near it. At the heart of such a black hole there is a point known as a singularity, where space and time cease to exist, and matter is crushed to infinite density. Thirty years ago, Roger Penrose (now of Oxford University) proved that anything which falls into such a black hole must be drawn into the singularity by its gravitational pull, and also crushed out of existence.

But, also in the 1960s, the New Zealand mathematician Roy Kerr found that things are different if the black hole is rotating. A singularity still forms, but in the form of a ring, like the mint with a hole. In principle, it would be possible to dive into such a black hole and through the ring, to emerge in another place and another time. This "Kerr solution" was the first mathematical example of a time machine, but at the time nobody took it seriously. At the time, hardly anybody took the idea of black holes seriously, and interest in the Kerr solution only really developed in the 1970s, after astronmers discovered what seem to be real black holes, both in our own Milky Way Galaxy and in the hearts of other galaxies.

This led to a rash of popular publications claiming, to the annoyance of many relativists, that time travel might be possible. In the 1980s, though, Kip Thorne, of CalTech (one of the world's leading experts in the general theory of relativity), and his colleagues set out to prove once and for all that such nonsense wasn't really allowed by Einstein's equations. They studied the situation from all sides, but were forced to the unwelcome conclusion that there really was nothing in the equations to prevent time travel, provided (and it is a big proviso) you have the technology to manipulate black holes. As well as the Kerr solution, there are other kinds of black hole time machine allowed, including setups graphically described as "wormholes", in which a black hole at one place and time is connected to a black hole in another place and time (or the same place at a different time) through a "throat". Thorne has described some of these possibilities in a recent book, Black Holes and Time Warps (Picador), which is packed with information but far from being an easy read. Now, Michio Kaku, a professor of physics in New York, has come up with a more accessible variation on the theme with his book Hyperspace (Oxford UP), which (unlike Thorne's book) at least includes some discussion of the contribution of researchers such as Robert Heinlein to the study of time travel. The Big Bang, string theory, black holes and baby universes all get a mention here; but it is the chapter on how to build a time machine that makes the most fascinating reading.

"Most scientists, who have not seriously studied Einstein's equations," says Kaku, "dismiss time travel as poppycock". And he then goes on to spell out why the few scientists who have seriously studied Einstein's equations are less dismissive. Our favourite page is the one filled by a diagram which shows the strange family tree of an individual who manages to be both his/her own father and his/her own mother, based on the Heinlein story "All you zombies --". And Kaku's description of a time machine is something fans of Dr Who and H.G. Wells would be happy with:

[It] consists of two chambers, each containing two parallel metal plates. The intense electric fields created between each pair of plates (larger than anything possible with today's technology) rips the fabric of space-time, creating a hole in space that links the two chambers.

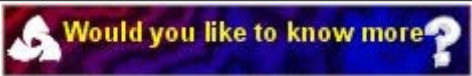
Taking advantage of Einstein's special theory of relativity, which says that time runs slow for a moving object, one of the chambers is then taken on a long, fast journey and brought back: Time would pass at different rates at the two ends of the wormhole, [and] anyone falling into one end of the wormhole would be instantly hurled into the past or the future [as they emerge from the other end].

And all this, it is worth spelling out, has been published by serious scientists in respectable journals such as Physical Review Letters (you don't believe us? check out volume 61, page 1446). Although, as you may have noticed, the technology required is awesome, involving taking what amounts to a black hole on a trip through space at a sizeable fraction of the speed of light. We never said it was going to be easy! So how do you get around the paradoxes? The scientists have an answer to that, too. It's obvious, when you think about it; all you have to do is add in a judicious contribution from quantum theory to the time travelling allowed by relativity theory. As long as you are an expert in both theories, you can find a way to avoid the paradoxes.

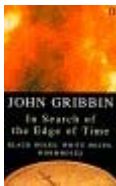
It works like this. According to one interpretation of quantum physics (there are several interpretations, and nobody knows which one, if any, is "right"), every time a quantum object, such as an electron, is faced with a choice, the world divides to allow it to take every possibility on offer. In the simplest example, the electron may be faced with a wall containing two holes, so that it must go through one hole or the other. The Universe splits so that in one version of reality -- one set of relative dimensions -- it goes through the hole on the left, while in the other it goes through the hole on the right. Pushed to its limits, this interpretation says that the Universe is split into infinitely many copies of itself, variations on a basic theme, in which all possible outcomes of all possible "experiments" must happen somewhere in the "multiverse". So there is, for example, a Universe in which the Labour Party has been in power for 15 years, and is now under threat from a resurgent Tory Party led by vibrant young John Major.

How does this resolve the paradoxes? Like this. Suppose someone did go back in time to murder their granny when she was a little girl. On this multiverse picture, they have slid back to a bifurcation point in history. After killing granny, they move forward in time, but up a different branch of the multiverse. In this branch of reality, they were never born; but there is no paradox, because in he universe next door granny is alive and well, so the murderer is born, and goes back in time to commit the foul deed!

Once again, it sounds like science fiction, and once again science fiction writers have indeed been here before. But this idea of parallel universes and alternative histories as a solution to the time travel paradoxes is also now being taken seriously by some (admittedly, not many) researchers, including David Deutsch, in Oxford. Their research deals with both time, and relative dimensions in space. You could make a nice acronym for that -- TARDIS, perhaps?



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Time Travel on Agenda

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CLAIMS that time travel is impossible in principle have been shown to be in error by an Israeli researcher. Amos Ori, of the Technion-Israel Institute of Technology, in Haifa, has found a flaw in the argument put forward recently by Stephen Hawking, of Cambridge University, claiming to rule out any possibility of time travel.

This is the latest twist in a story that began in the late 1980s, when Kip Thorne and colleagues at the California Institute of Technology suggested that although there might be considerable practical difficulties in constructing a time machine, there is nothing in the laws of physics as understood at present to forbid this. Other researchers tried to find flaws in the arguments of the CalTech team, and pointed in particular to problems in satisfying a requirement known as the "weak energy condition", which says that any real observer should always measure energy distributions that are positive. This rules out some kinds of theoretical time machines, which involve travelling through black holes held open by negative energy stuff.

There are also problems with time machines that involve so-called singularities, points where space and time are crushed out of existence and the laws of physics break down. But Ori has found mathematical descriptions, within the framework of the general theory of relativity, of spacetimes which loop back upon themselves in time, but in which no singularity appears early enough to interfere with the time travel, and the weak energy condition is satisfied (Physical Review Letters, vol 71 p 2517).

"At present," he says, "one should not completely rule out the possibility of constructing a time machine from materials with positive energy densities."



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Bohm's Quantum Alternative 1/2

This theory, ignored for most of the past four decades, challenges the probabilistic, subjectivist picture of reality implicit in the standard formulation of quantum mechanics

by David Z Albert

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(Part 1 of 2)

The study of the behavior of subatomic particles in this century is supposed to have established at least three exceedingly curious facts about the physical world. First, pure chance governs the innermost workings of nature. Second, although material objects always occupy space, situations exist in which they occupy no particular region of space. Third and perhaps most surprising, the fundamental laws that govern the behaviors of "ordinary" physical objects somehow radically fail to apply to objects that happen to be functioning as "measuring instruments" or "observers." That at any rate is what the founders of quantum mechanics decided; that is what has since become the more or less official dogma of theoretical physics; and that is what it says, to this day, in all the standard textbooks on that subject.

But it is now emerging that those conclusions were settled on somewhat too quickly. As a matter of fact, a radically different, fully worked-out theory exists that accounts for all known behaviors of subatomic particles. In this theory, chance plays no role at all, and every material object invariably does occupy some particular region of space. Moreover, this theory takes the form of a single set of basic physical laws that apply in exactly the same way to every physical object that exists.

That theory is principally the work of the late David J. Bohm of Birkbeck College, London. Although his formulation has existed in the scientific literature for more than 40 years, it has until quite recently been mostly ignored. Throughout that period, the thinking about such matters has been dominated by the standard dogma, usually referred to as the Copenhagen interpretation of quantum mechanics because it can more or less be traced back to the Danish physicist Niels Bohr and his circle.

I will begin this article with an outline of the main arguments for the standard dogma. I will then indicate briefly how Bohm's theory manages to get around some of those arguments. Finally, I will say a little about how and where Bohm's theory fits into contemporary speculation about the foundations of quantum mechanics.

Perhaps the simplest way of formulating the arguments for the standard dogma is in the context of certain experiments with electrons. The experiments all involve measurements of two components of what are usually called the spins of electrons. For simplicity's sake, I will refer to them as the horizontal spin and the vertical spin.

It happens to be an empirical fact (as far as we know) that the horizontal spins of electrons can assume only one of two possible values. The same applies for vertical spins. I will call the values of the horizontal spin right and left and those of the vertical spin up and down.

Physicists can measure the horizontal and vertical spins of electrons easily and accurately with currently available technologies. Spin-measuring devices typically work by altering the direction of motion of the electron fed into the device based on the value of its measured spin component. In this way, the value of that spin component can be determined later by a simple measurement of the electron's position. I will refer to these measuring devices as horizontal and vertical boxes.

Another empirical fact about electrons is that as a rule there are no correlations between their horizontal spin values and their vertical spin values. For example, of any large collection of right-spinning electrons fed into the entry aperture of a vertical box, precisely half (statistically speaking) will emerge through the "up" aperture and half through the "down" aperture. The same applies for left-spinning electrons fed into the entry aperture of a vertical box and for up- and down-spinning electrons fed into horizontal boxes.

Another experimental truth about electrons, and an extremely important one for our purposes, is that a measurement of the horizontal spin of an electron can disrupt the value of its vertical spin, and vice versa, in what appears to be a completely uncontrollable way. If, for example, one carries out measurements of the vertical spins of any large collection of electrons in-between two measurements of their horizontal spins, what always happens is that the vertical spin measurement changes the horizontal spin values of half of the electrons that pass through it, leaving those of the other half unchanged.

No one has ever been able to design a measurement of vertical spin that avoids such disruptions. Moreover, no one has ever been able to identify any physical properties of the individual electrons in such collections that determine which of them get their horizontal spins changed in the course of having their vertical spins measured and which do not.

What the official doctrine has to say about these matters is that in principle there can be no such thing as a vertical spin measurement that has anything other than precisely that effect on horizontal spin values. Furthermore, the standard doctrine dictates that it is a matter of absolutely pure chance which electrons get their horizontal spins changed by measurements of their vertical spins and which do not; the laws governing those changes simply fail to be deterministic. And these conclusions certainly seem innocent and reasonable given the experimental data.

If measuring one type of spin indeed always uncontrollably disrupts the value of the other, then there can be no way of ascertaining the values of both the horizontal and vertical spins of any particular electron at any particular moment. This phenomenon is an example of the uncertainty principle: certain pairs of measurable physical properties, such as position and momentum or, in our case, horizontal and vertical spin, are said to be incommensurable with each other. Measurements of one will always uncontrollably disrupt the other. Many other known examples of incompatible pairs of physical properties exist as well.

So much for indeterminism. But there are still more puzzling features of subatomic particles. Displaying them will require a more complicated experiment. Imagine a box that measures the vertical spins of electrons. Up-spinning electrons emerge from the box along a route labeled up; down-spinning electrons exit along a route labeled down. We can then arrange a pair of "reflecting walls" to make the two paths cross at some other point. These surfaces can be designed so as not to alter the spin properties of electrons in any way. At the point where the two paths intersect, we place a "black box" that merges the paths back into one, again without altering spin values.

Suppose we feed a large collection of right-spinning electrons, one at a time, into the vertical box. The electrons travel along the paths to the black box. Then as they emerge from the exit of the black box, we measure their horizontal spins. What sorts of results should we expect? Our previous experience informs us that statistically half of such electrons will turn out to be up-spinning and will take the up route through the apparatus. The other half will turn out to be down-spinning and take the down route. Consider the same horizontal spin statistics. Putting all these expectations together, it follows that for any large set of right-spinning electrons fed into this apparatus, half should be found at the end to be right-spinning and half to be left-spinning.

These conclusions seem absolutely cut-and-dried. But a funny thing happens when you actually try this experiment. Exactly 100 percent of the right-spinning electrons initially fed into this apparatus (one at a time, mind you) come out right-spinning at the end.

It is no exaggeration to describe this result as one of the strangest in modern physics. Perhaps modifying the experiment somewhat will clarify matters. Suppose that we rig up a small, movable, electron-stopping wall that can be slid at will in and out of, say, the up route. When the wall is out, we have precisely our earlier apparatus. But when the wall is in, all electrons moving along the up route are stopped, and only those moving along the down route get through to the black box.

What should we expect to happen when we slide the wall in? To begin with, the overall output of electrons at the exit of the black box ought to drop by 50 percent, because one path is blocked. What about the horizontal spin statistics of the remaining 50 percent? When the wall was out, 100 percent of the right-spinning electrons initially fed in ended up as right-spinning electrons. That is, all those electrons ended up as right-spinning whether they took the up or the down route. Thus, because the presence or absence of the wall on the up route cannot affect electrons on the down route, the remaining 50 percent should all be right-spinning.

As you may have guessed, what actually happens in the experiment runs contrary to our expectations. The output is down by 50 percent, as predicted. But the remaining 50 percent are not all right-spinning. Half are right-spinning, and half are left-spinning. And the same thing happens if we insert a wall in the down path instead. (Readers familiar with quantum mechanics may recognize that this experiment is a logically streamlined version of the famous double-slit experiment.)

How can one understand the discrepancy between the results of these experiments and our expectations about them? Consider an electron that passes through the apparatus when the wall is out. Consider the possibilities as to which route it could have taken. Could it have taken the down route? Apparently not, because electrons taking that route (as the experiment with the wall in reveals) are known to have horizontal spin statistics of 50-50, whereas an electron passing through our apparatus without the wall is known with certainty to be right-spinning at the apparatus exit. Can it have taken the up path, then? No, for the same reasons.

Could it somehow have taken both routes? No: suppose that when a certain electron is passing through this apparatus, we stop the experiment and look to see where it is. It turns out that half the time we find it on the up path and locate nothing at all on the down path, and half the time we find it on the down path and see nothing at all on the up path. Could it have taken neither route? Certainly not. If we wall up both routes, nothing gets through at all.

Something breathtakingly deep, it would seem, has got to give. And indeed, something does--at least according to what has become one of the central tenets of theoretical physics over the past half-century (it is the second of the three official dogmas to which I alluded in the opening paragraph, the one about the indefiniteness of position). That doctrine stipulates that these experiments leave us no alternative but to deny that the very question of which route such an electron takes through such a contraption makes any sense. Asking what route such an electron takes is supposed to be like asking about, say, the political convictions of a tuna sandwich or about the marital status of the number 5. The idea is that asking such questions amounts to a misapplication of language, to what philosophers call a category mistake.

Hence, what physics textbooks typically declare about such electrons is emphatically not that the particles take either the up route or the down route or both routes or neither route through the apparatus. Rather there is simply not any fact about which route they take--not merely no known fact, but no fact at all. They are in what the textbooks term a superposition of taking the up route and the down route through the apparatus.

Notwithstanding the profound violence these ideas do to our intuitive picture of the world, to the very notion of what it is to be material, to be a particle, a compact set of rules has been cooked up that has proved extraordinarily successful at predicting all the observed behaviors of electrons under these circumstances. Moreover, these rules--known of course as quantum mechanics--have proved extraordinarily successful at predicting all the observed behaviors of all physical systems under all circumstances. Indeed, quantum mechanics has functioned for more than 70 years as the framework within which virtually the entirety of theoretical physics is carried out.

The mathematical object with which quantum mechanics represents the states of physical systems is referred to as the wave function. In the simple case of a single-particle system of the kind I have been discussing, the quantum-mechanical wave function takes the form of a straightforward function of position. The wave function of a particle located in some region A, for example, will have the value zero everywhere in space except in A and will have a nonzero value in A. Similarly, the wave function of a particle located in some region B will have the value zero everywhere in space except in B and will have a nonzero value in B. And the wave function of a particle in a superposition of being in region A and in region B--the wave function, for example, of an initially right-spinning electron that has just passed through a vertical box--will have nonzero values in both of those regions and a zero value everywhere else.

And it is a cardinal rule of quantum mechanics (a rule that Bohm's theory will explicitly break) that representing physical objects by a wave function represents them completely. It states that absolutely everything there is to be said about any given physical system at any given instant can be read from its wave function.

What the laws of physics are about--indeed, all that the laws of physics could be about, all that there is for the laws of physics to be about, according to quantum mechanics--is how the wave functions of physical systems evolve in time. The textbook version of quantum mechanics refers to two categories of such laws. And what is particularly peculiar about this formulation is that one of those categories applies when the physical systems in question are not being directly observed, and the other applies when they are.

The laws in the first category are usually written down in the form of linear differential "equations of motion." They are designed to entail, for example, that an initially right-spinning electron fed into a vertical box will emerge from that box in a superposition of traveling along the up route and traveling along the down route. Moreover, all available experimental evidence suggests that those laws govern the evolutions of the wave functions of every single isolated microscopic physical system under all circumstances. So, because microscopic systems are the constituents of everything that exists, there would on the face of it seem to be good reason to suppose that those linear differential equations are the true equations of motion of the entire physical universe.

Yet that conclusion cannot possibly be quite right if wave functions are indeed complete descriptions of physical systems, as quantum mechanics maintains. To begin with, the laws expressed by those equations are completely deterministic, whereas an element of pure chance seems to play a role in the outcomes, for example, of experiments with the spin boxes.

Consider the outcome of a measurement of the position of an electron that is initially in a superposition of being in region A and being in region B. Straightforward calculations reveal that the linear differential equations of motion offer a definite prediction about the end of such a measuring process. Those equations, however, do not predict that the measuring device would either indicate that the electron was found in A or that the electron was found in B (which is what happens when you actually make measurements like that). Rather those equations say the measuring device would with certainty end up in a superposition of indicating that the electron was found in A and indicating that the electron was found in B. To put it slightly differently, those equations predict that the measuring device would end up in a physical state in which there is simply no fact about what it is indicating. It hardly needs mentioning that such superpositions (whatever they are, precisely) do not correctly describe how things end up when you actually make such a measurement.

As a result, according to the official reasoning, the first category of laws needs to be supplemented with a second, which will be explicitly probabilistic. It demands, for example, that if the position of an electron that is initially in a superposition of being in region A and region B were to be measured, there would be a 50 percent chance of finding that electron in region A and a 50 percent chance of finding it in region B. In other words, if the position of the electron were measured, there would be a 50 percent chance that the electron's wave function will be altered in the course of the measurement to one whose value is zero everywhere other than in region A and a 50 percent chance that its wave function will be altered to one whose value is zero everywhere except in region B. (This alteration is sometimes called a "collapse" of the wave function.)

How does one distinguish those conditions in which the first category of laws applies from those in which the second category does? All the founders of quantum mechanics had to say was that it has something to do with the distinction between a "measurement" and an "ordinary physical process," or between what observes and what is observed, or between subject and object. [Continued in "[Bohm's Alternative to Quantum Mechanics \(2 of 2\)](#)."]

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by David Z Albert

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(Part 2 of 2)

For some time, many physicists and philosophers have viewed this state of affairs as profoundly unsatisfactory. It has seemed absurd that the best existing formulation of the most fundamental laws of nature should depend on such imprecise and elusive distinctions. The challenge of either eliminating or repairing that imprecision has emerged over the past 30 years as the central task of the foundations of quantum mechanics. It has gone by a number of names: the problem of Schrodinger's cat, for example, or of Wigner's friend, or of quantum state-reduction. I will refer to it by its most common contemporary name: the measurement problem.

One particularly striking solution to the measurement problem was invented by the American-born physicist David J. Bohm. The French physicist Louis de Broglie had devised a related scheme some years earlier, but de Broglie's formulation was much less general and powerful than was Bohm's. More recently, the late physicist John Bell recast Bohm's original theory into a very simple and compelling form.

Notwithstanding all the evidence to the contrary presented above, Bohm's theory presumes that particles are the sorts of things that are invariably located in one or another particular place. In addition, Bohm's theory is a great deal clearer than is the Copenhagen interpretation about what the world is made of. In Bohm's account, wave functions are not merely mathematical objects but physical ones, physical things. Bohm treats them somewhat like classical force fields, such as gravitational and magnetic fields. What wave functions do in Bohm's theory (just as classical force fields do) is to in effect push the particles around, to guide them, as it were, along their proper courses.

The laws that govern the evolutions of those wave functions in time are stipulated to be precisely the standard linear differential quantum-mechanical equations of motion--but this time with no exceptions whatever. There are other laws in Bohm's theory as well that dictate how those wave functions push their respective particles around. All those laws are fully deterministic. Therefore, the positions of all the particles in the world at any time, and the world's complete quantum-mechanical wave function at that time, can be calculated with certainty from the positions of all the particles in the world and the world's complete quantum-mechanical wave function at any earlier time.

Any incapacity to carry out those calculations, any uncertainty in the results of those calculations, is necessarily in this theory an epistemic uncertainty. It is a matter of ignorance and not a matter of the operations of any irreducible element of chance in the fundamental laws of the world. Nevertheless, this theory entails that some such ignorance exists for us, as a matter of principle. The laws of motion of Bohm's theory literally force this kind of ignorance on us. And this ignorance turns out to be precisely enough, and of precisely the right kind, to reproduce the familiar statistical predictions of quantum mechanics. That happens by means of a kind of averaging over what one does not know, which is exactly the kind of averaging that goes on in classical statistical mechanics.

The theory describes a real, concrete and deterministic process--a process that can be followed out in exact mathematical detail--whereby the act of measurement unavoidably gets in the way of what is being measured. In other words, Bohm's theory entails that this ignorance--although it is merely ignorance of perfectly definite facts about the world--cannot be eliminated without a violation of physical law (without, that is, a violation of one or the other of the two laws of motion, from which everything else about Bohm's theory follows).

Bohm's theory can fully account for the outcomes of the experiments with the two-path contraption--the experiments that seemed to imply that electrons can be in states in which there fails to be any fact about where they are. In the case of an initially right-spinning electron fed into the apparatus, Bohm's theory entails that the electron will take either the up or the down route, period. Which of those two routes it takes will be fully determined by the particle's initial conditions, more specifically by its initial wave function. Of course, certain details of those conditions will prove impossible, as a matter of law, to ascertain by measurement. But the crucial point here is that whichever route the electron happens to take, its wave function will split up and take both. It will do so in accordance with the linear differential equations of motion.

So, in the event that the electron in question takes, say, the up route, it will nonetheless be reunited at the black box with the part of its wave function that took the down route. How the down-route part of the wave function ends up pushing the electron around once the two are reunited will depend on the physical conditions encountered along the down path. To put it a bit more suggestively, once the two parts of the electron's wave function are reunited, the part that took the route that the electron itself did not take can "inform" the electron of what things were like along the way. For example, if a wall is inserted in the down route, the down component of the wave function will be missing at the exit of the black box. This absence in itself can constitute decisive information. Thus, the motion that such an electron executes, even if it took the up path through the apparatus, can depend quite dramatically on whether or not such a wall was inserted.

Moreover, Bohm's theory entails that the "empty" part of the wave function--the part that travels along the route the electron itself does not take--is completely undetectable. One of the consequences of the second equation in the box below is that only the part of any given particle's wave function that is currently occupied by the particle itself can have any effect on the motions of other particles. So the empty part of the wave function--notwithstanding the fact that it is really, physically, there--is completely incapable of leaving any observable trace of itself on detectors or anything else.

Hence, Bohm's theory accounts for all the unfathomable-looking behaviors of electrons discussed earlier every bit as well as the standard interpretation does. Moreover, and this point is important, it is free of any of the metaphysical perplexities associated with quantum-mechanical superposition.

As to the measurement problem, it can be persuasively argued that Bohm's theory can suffer from nothing of the kind. Bohm's theory holds that the linear differential equations of motion truly and completely describe the evolution of the wave function of the entire universe--measuring devices, observers and all. But it also stipulates that there are invariably definite matters of fact about the positions of particles and, consequently, about the positions of pointers on measuring devices and about the positions of ink molecules in laboratory notebooks and about the positions of ions in the brains of human observers and thus, presumably, about the outcomes of experiments.

Despite all the rather spectacular advantages of Bohm's theory, an almost universal refusal even to consider it, and an almost universal allegiance to the standard formulation of quantum mechanics, has persisted in physics, astonishingly, throughout most of the past 40 years. Many researchers have perennially dismissed Bohm's theory on the grounds that it granted a privileged mathematical role to the positions of particles. The complaint was that this assignment would ruin the symmetry between position and momentum, which had been implicit in the mathematics of quantum theory up until then--as if ruining that symmetry somehow amounted to a more serious affront to scientific reason than the radical undermining, in the Copenhagen formulation, of the very idea of an objective physical reality. Others dismissed Bohm's theory because it made no empirical predictions (no obvious ones, that is) that differed from those of the standard interpretation--as if the fact that those two formulations had much in common on that score somehow transparently favored one of them over the other. Still others cited "proofs" in the literature--the most famous of which was devised by the American mathematician John von Neumann, and all of which were wrong--that no deterministic replacement for quantum mechanics of the kind that Bohm had already accomplished was even possible.

Fortunately, those discussions are mostly in the past now. Although the Copenhagen interpretation probably remains the guiding dogma of the average working physicist, serious students of the foundations of quantum mechanics rarely defend the standard formulation anymore. A number of interesting new proposals now exist for solving the measurement problem. (There are, for example, attempts at resuscitating in a more precise language the idea of a collapse of the wave function, which I mentioned earlier.) It is against those, against other proposals yet to be invented and, of course, against the experimental facts that Bohm's theory will ultimately have to be judged. The jury on all that is still very much out.

Bohm's theory is the only serious proposal around just now that is fully deterministic. It is also the only one that matter how far apart regions A and B may happen to be. The influence is also completely independent of the conditions existing in the space between A and B [see "Faster than Light?" by Raymond Y. Chiao, Paul G. Kwiat and Aephraim M. Steinberg; SCIENTIFIC AMERICAN, August 1993].

But nonlocality may be something we need to learn to live with, something that may simply turn out to be a fact of nature. The standard formulation of quantum mechanics is also nonlocal and so are most of the recently proposed solutions to the measurement problem. Indeed, according to a famous argument of Bell's, any theory that can reproduce those statistical predictions of quantum mechanics already known to be correct and that satisfies a few extremely reasonable assumptions about the physical nature of the world must necessarily be nonlocal. The only schemes that have been imagined for denying those assumptions and so avoid nonlocality are the "many worlds" and "many minds" interpretations of quantum mechanics. They suggest that in some sense all possible experimental outcomes, and not simply one or another of those outcomes, actually occur. And they are (maybe) too bizarre to be taken seriously.

Workers have raised various other concerns as well. What is the exact philosophical status of the probabilities in Bohm's theory? Does guaranteeing that every particle in the world invariably has a determinate position really amount to ensuring that every imaginable measurement has a determinate outcome and that everything that we intuitively take to be determinate is really determinate? Those questions continue to be the subject of active debate and investigation.

Finally, and most important, I must stress that all of what has been said in this article applies, at least for the moment, only to nonrelativistic physical systems. That is, it pertains just to systems whose energies are not very high, that are not moving close to the speed of light and that are not exposed to intense gravitational fields. The development of a Bohmian replacement for relativistic quantum field theory is still under way, and the ultimate success of that enterprise is by no means guaranteed. If such a replacement were somehow found to be impossible, then Bohm's theory would have to be abandoned, and that would be that.

But as it happens, most other proposals for solving the measurement problem are in a similar predicament. The exceptions, once again, are the many-worlds and many-minds interpretations, whose relativistic generalizations are quite straightforward but whose metaphysical claims are difficult to believe. Much of the future course of the foundations of quantum mechanics will hinge on how attempts at relativization come out.

In the meantime, the news is that a great deal more than has previously been acknowledged about the foundations of our picture of the physical world turns out to be radically unsettled. In particular, the possibilities that the laws of physics are fully deterministic and that what they describe are the motions of particles (or some analogue of those motions in relativistic quantum field theory) are both, finally and definitively, back on the table.

Creator of a Brave, New Quantum World

David Joseph Bohm was born in 1917 in Wilkes-Barre, Pa. After studying physics at Pennsylvania State College, he pursued graduate studies at the University of California at Berkeley. There, during World War II, he investigated the scattering of nuclear particles under the supervision of J. Robert Oppenheimer. After receiving his degree from Berkeley, Bohm became an assistant professor at Princeton University in 1946.

It was during those years that Bohm wrote his now classic defense of the Copenhagen interpretation, "Quantum Theory." At the same time, however, Bohm's doubts about the adequacy of that interpretation were becoming more acute. His own alternative emerged in published form shortly thereafter, in 1952.

By then, Princeton had forced him from its faculty. During the McCarthy era, Bohm had been called before the House Un-American Activities Committee in connection with completely unsubstantiated allegations that he and some former colleagues at the radiation laboratory at Berkeley were communist sympathizers. (During World War II, Oppenheimer began turning in to the Federal Bureau of Investigation names of friends and acquaintances who he thought might be communist agents. Bohm apparently was one of the accused.) A passionate believer in liberty, Bohm refused to testify as a matter of principle. As a result, the committee found him to be in contempt of Congress.

The incident proved disastrous to Bohm's professional career in the U.S. Princeton refused to renew his contract and told him not to set foot on the campus. Unable to find employment at any other university, Bohm left the country in 1951 to take a position at the University of Sao Paulo in Brazil. There he was asked by U.S. officials to give up his passport, effectively stripping him of his American citizenship.

After teaching in Brazil, Bohm went to the Technion in Israel and to Bristol University in England. Although he was later cleared of the contempt charges and was eventually allowed to travel back to the U.S., Bohm settled permanently at Birkbeck College, London, in 1961.

In addition to his interpretation of quantum mechanics, he contributed to mainstream physics, working on plasmas, metals and liquid helium. In 1959 he and his student Yakir Aharonov discovered what is now known as the Aharonov-Bohm effect. They showed that quantum mechanics predicts that the motions of charged particles can be influenced by the presence of magnetic fields even if those particles never enter the regions to which those fields are confined. Subsequent experiments have amply confirmed the effect [see "Quantum Interference and the Aharonov-Bohm Effect," by Yoseph Imry and Richard A. Webb; SCIENTIFIC AMERICAN, April 1989].

Later in life Bohm became interested in broader philosophical questions. He developed a picture of the universe as an interconnectedness of all things, a notion he called "implicate order." He wrote several books on physics, philosophy and the nature of consciousness. He was in the middle of a collaborative effort on another quantum mechanics book when he died of a heart attack in October 1992. Friends and colleagues remember Bohm not only as brilliant and daring but also as extraordinarily honest, gentle and generous.

DAVID Z ALBERT has done scientific and philosophical work on various aspects of the foundations of quantum mechanics, with special emphasis on the quantum measurement problem. Recently he has also been thinking about the relation between that problem and the direction of time. In 1981 he received his Ph.D. in theoretical physics from the Rockefeller University. Before taking his current position as professor of philosophy at Columbia University, he served on the faculty of the physics department at the University of South Carolina at Columbia and was a postdoctoral fellow at Tel Aviv University. His book "Quantum Mechanics and Experience" was published last year by Harvard University Press.

FURTHER READING

A SUGGESTED INTERPRETATION OF THE QUANTUM THEORY IN TERMS OF "HIDDEN" VARIABLES, *I and II. David Bohm in "Quantum Theory and Measurement." Edited by J. A. Wheeler and W. H. Zurek. Princeton University Press, 1983.*

ON THE IMPOSSIBLE PILOT WAVE. *In "Speakable and Unspeakable in Quantum Mechanics," by John S. Bell. Cambridge University Press, 1987.*

BOHM'S THEORY. *In "Quantum Mechanics and Experience," by David Z Albert. Harvard University Press, 1992.*

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SUMARRY:

Time travel: The mystery of 1,000 years. Technically Time Travel already exists. For instance, take the stars you look at every night. They are a number of light years away, correct? YES! So, take the star Proxima Centuri, 4.5 light years away. Let X equal the number of years you are looking back in time, and let D equal how many light years a star is away. With this, the equation X=D.

I have my own computation for time travel, but first there are two components that make up this theory. In my first two years of research, I read a lot of books on Einstein and Relativity: $E=MC^2$. $E=MC^2$ is a large part of my calculation, as well as Asimov's theory 2π times the square root of mass divided by kinetic energy. After spending the third and fourth year of my research I composed the equation:

$$Y \pm ((p\ddot{O}M/K) + ((-M \cdot 9.8 + U) + U)K) = T$$
 (m=mass, and k=speed u=momentum W = force against you Y=present year T=year of arrival)

The point of this equation shows where you will end up in time. Anyway, in the 5th year of my research I found a theory that agrees with the Time Stream, and Big Bang-Big Crash theories. First:

Schreckenberger's Law: For every jump through time there is an equal action in the future and an opposite action/reaction sequence in the past. For example, take a quarter. If you go to the future, you'll find the same quarter from the time you came from (present), and you'll have the same one you brought to the future. The present will have become the past, causing the coin to disappear from the past to the time in which you are.

If you go to the past, the future from the present remains unchanged, but the past to the present (now future) is effected by the coin's presence (action sequence).

What is the different between action and reaction sequence: An action sequence is when you add, a reaction is when you subtract or repel.

This is a sum up of 5 years of research on the subject of time travel. I give credit to Einstein and Isaac Asimov for basing my theory. Within the next 30 years I hope to build this portal through time. It may come sooner than you think.

The equation $Y \pm ((p\ddot{O}M/K) + M + U) + U)K = T$ also has a discriminant. This is called the **Timimetric Discriminant Factor**. It is: $((p\ddot{O} > M/K) + ((-M \cdot 9.8 + U) + U)K)$ Suppose M=150, K=5, and U=750; the result is about 169. The number that results would be labeled X clicks or in this case 169 clicks. Clicks are the yearly terms used to measure the time stream velocity of the jump. If the Timimetric Discriminant Factor is positive the jump is possible, if it is negative the jump is impossible, and if it is zero, it is still considered possible, but calculations have to be exact. This rule will be called the **Timimetric Property. (The short form of click is Clx)**

THESIS:

In the first year of study I used various resources to study Einstein's famous Relativity. $E=MC^2$ means that the energy output equals the objects mass multiplied by the speed of light squared. This played an important role in my first equation: $((2pk) + (2.44e12 \cdot k) + (c^2k))k$; of course, this equation soon evolved after I studied Asimov's 2p Theory. This is $(2p\ddot{O}M/K)/2$. This soon changed $2pk$ to $p\ddot{O}M/K$ These two scientists' theories were the foundations for my research. Newton, as well, contributed. His Law of Motion: For every action there is an equal and opposite reaction set the standard for Schreckenberger's Law: Equal Action in the future, opposite action/reaction sequence in the past. It took me into my third year to come up with the PFP Effect, a rare, and almost unbelievable statement that says our actions are predestined. Even if we came to a decision that involved several choices, those choices are previously mapped out by time itself. The only way you can find this theory to be true is if you step outside from the 'normal' boundaries.

The fourth year of my research was definitely focused around one thing, mathematical equations. In the last few months my equation jumped from something like completing the square to the Quadratic Formula. A new effect that I termed, the **Grandma Effect** is something to be considered. If I were to go back into time and marry your dad's mom, before his dad did, then theoretically speaking your dad wouldn't exist and neither would you. Everyone would forget your existence. The choices you made would be eliminated and the time stream would once again give people a destined path.

Jumping into past is more dangerous than jumping into the future. If you go to the past then you can mess a lot of people up. That, however, hasn't happened because we have no recollection of it. So, until someone warps our memory in the past, we can continue to live on the destined track.

My last theory to be discovered is the **PFP Effect**: It is sort of like the PFP, except it means that someone from the future altered the past, the time stream compensated by altering everything from that point on. We'd have no idea of this change, because we'd believe the change was already in existence. Then another time traveler finds the mistake of the altering of the past and fixes it, setting the present and the future in its previous track. In other words something in the future alters the past and future, but then it is reversed. Now if the PFP Effect is true, we'll believe that time was still predestined through all of this chaos because we will be unaware of the changes made.

Out of all of this I find Schreckenberger's Law and the Grandma Effect to be true PFP and PFP work together, however, I wouldn't count on a young person understanding what that means. The reason why any alterations made in the past won't disprove the PFP is because to us the changes made would be the way life was for hundreds or even thousands of years. I shall continue my research and someday I hope to visit many historical areas. The question is not where but when.

Here's is the first section of my Timimetric Periodic Table. Mass is in kilograms and Speed is measured in Km/h. There are many more velocities that are listed in the full version, but it is 3 pages so I transferred it to a spread sheet. Remember clicks are the units used to measure the yearly velocity of a time stream jump.

Mass	Speed	Click Rate
0	0	0
1	1	-4.6584
2	2	-20.0584
3	3	-31
4	4	-25
5	5	8.1415
6	6	82.3415
150	5	167.2072
7	7	208.9415
8	8	399.9415
9	9	667.3415
10	10	1023.1415
11	11	1479
12	12	2047
13	13	2740
14	14	3570
15	15	4548
16	16	5686
17	17	6996
18	18	8497
19	19	10185

I'd like to offer you, the reader, a proposition. Study these theories, try to confirm or disprove them. Email me at USX1@juno.com with questions or comments. Even if these theories don't work, a failure still advances science. Thanks, and have a nice day.



For questions or additional information contact
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INTRODUCTION

TIME....it has always fascinated the whole world throughout ages. If we think of time as a phenomenon and consider that it always happens then well we are thinking short. We are not looking at the wonders that will happen if we are able to control time. A century or two ago no-one would have imagined that we could defeat Nature anytime but as we all are witness to the technological developments and also the medicines that are being developed have virtually dominated Nature. Here we should be wise enough to know that we are not trying to stop the functioning of Nature, but we are trying to configure the Nature for its optimal use. In the same way, just like Nature if we are able to control Time then it would be just like mending Time for its optimal use. Here we should note that we are in no position to stop Time from working, but we can definitely control Time. Time is relative...and all the terms of Time-Travel are w.r.t. you and the rest of the universe.

Albert Einstein has proved mathematically that speed of light is fundamental. His theory of relativity is partly based on the basic assumption that the only term that is constant throughout the universe is the speed of Light. And everything including time is relative and not constant. So, he said Time-Travel is quite possible.

He also proved these two formulae :

$$M = \frac{m \cdot C}{\sqrt{C^2 - v^2}} \qquad T = \frac{t \cdot C}{\sqrt{C^2 - v^2}}$$

where, M=mass of body moving at 'V' speed.
T=time for the person moving at 'V' Velocity.
t,m=time and mass of stationary body.

So, it is quite obvious from the above two formulae that as the speed at which any object is traveling increases its mass also increases and for that body the time slows down. Then what happens when V = C, well when V=C then denominator become zero and Time becomes infinite. The physical conclusion that can be derived is that at the speed of light the time-loops come to a Halt. And so at speed of light we can Time-Travel.
You will understand this better after reading this example:

Imagine yourself traveling at half the speed of light. So, according to the formula of time given above ...the denominator of the above equation changes and so value of time at 'V' speed increases than the value of time at zero speed. Well, what do I mean by "value" of time. Value of time means the amount of time. So, when you are traveling at half the speed of light for you, your clock shows correctly ...ie.60sec=1min. But, that one minute of yours may be one or more than one hour for the person who is at zero speed. Well, it means you have traveled through "Time".

MY VIEWS

Well, as we know the formulae proved by Einstein it is obvious that the Time loops come to a halt and we can travel through Time if we are traveling at speed of light. But our body's mass also reaches to infinity at that high speed.

Here the RED ring like structure is time and the rod shown is our world and the Time is moving continuously (neglect the window).

It can be imagined that the time as an infinite cycle of collection of events and these events are PAST, PRESENT & FUTURE. Which events are Past, Present & Future are relative to a particular person and the when this frame of reference changes we can say that we that person has traveled through Time. These events are occurring in cyclic order which can be imagined with the help of figure shown above. And these cycles are moving at particular speed and this speed is equal to the speed of light. When we travel at the speed of light then with respect to these Time-loops, we come to a halt [relative to those red Time rings] and now at speed of light we are free to travel through the Time or through the collection of events. When at speed of light we can surely travel through various events.BUT...nothing would be happening at that time for everything moves with Time and now Time itself has stopped. So, the events would stop happening and it would be a stage where all objects will be in stand-still position!

And when we travel at speed more than that of light we can travel towards past. The cylinder shown above is only for one Dimension and such cylinder are present for various other Dimensions and so we can say there exist more than one universe. This is the basis of the theory of Parallel universe.

Now the question remains is that "What is present between those Cylindrical Time-Dimensions?"

And "What if we (by some means) are able to make ourselves free from the Time-Loop?"

Well, there is nothing present between these Time-Dimensions. And if we are able to make ourselves free from these Time-Loops then we can travel not-only through our Past, Present & Future but also through various other Dimensions. And that would be the beginning of the phase in which we actually be aliens in "Other World"!

But, it is practically impossible for anyone to travel at the speed of light. So, we can definitely draw an obvious conclusion that for traveling through Time or in other words to travel at the speed of light, there should be some kind of process through which we can convert our material body into energy (electromagnetic waves) so that these waves can travel through time. And the reverse process would bring back the person who would have traveled through time. Also, we know that every living organism has its peculiar DNA and that the DNA structure is having its own unique pattern of genes. Now, we know that any two material particles are having some potential difference between them. So, every two genes would be having some potential difference whose value is unique for those two genes. So, a unique pattern of voltages (of very small value) can be developed for each living animal. And when we convert those potential differences into a band of electromagnetic waves.....with the frequencies of each wave corresponds to the particular voltage ...so we can generate a unique pattern (band) of electromagnetic waves which will be unique to each living animal. And these waves can be sent through Time. And replica of Electromagnetic waves pattern can be generated.

So, we can send a person (wave pattern) through Time and that person can exist simultaneously at different places.

This particular way of possibility is solely my idea....and I accept there may be some flaws with this theory but I know this is one of the ways in which a particular living organism's replica can be sent through Time barrier. I would love to receive feed back from you people on this.



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Why Time Travel is Possible

by John Gribbin

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Physicists have found the law of nature which prevents time travel paradoxes, and thereby permits time travel. It turns out to be the same law that makes sure light travels in straight lines, and which underpins the most straightforward version of quantum theory, developed half a century ago by Richard Feynman.

Relativists have been trying to come to terms with time travel for the past seven years, since Kip Thorne and his colleagues at Caltech discovered -- much to their surprise -- that there is nothing in the laws of physics (specifically, the general theory of relativity) to forbid it. Among several different ways in which the laws allow a time machine to exist, the one that has been most intensively studied mathematically is the "wormhole". This is like a tunnel through space and time, connecting different regions of the Universe -- different spaces and different times. The two "mouths" of the wormhole could be next to each other in space, but separated in time, so that it could literally be used as a time tunnel.

Building such a device would be very difficult -- it would involve manipulating black holes, each with many times the mass of our Sun. But they could conceivably occur naturally, either on this scale or on a microscopic scale.

The worry for physicists is that this raises the possibility of paradoxes, familiar to science fiction fans. For example, a time traveller could go back in time and accidentally (or even deliberately) cause the death of her granny, so that neither the time traveller's mother nor herself was ever born. People are hard to describe mathematically, but the equivalent paradox in the relativists' calculations involves a billiard ball that goes in to one mouth of a wormhole, emerges in the past from the other mouth, and collides with its other self on the way in to the first mouth, so that it is knocked out of the way and never enters the time tunnel at all. But, of course, there are many possible "self consistent" journeys through the tunnel, in which the two versions of the billiard ball never disturb one another.

If time travel really is possible -- and after seven years' intensive study all the evidence says that it is -- there must, it seems, be a law of nature to prevent such paradoxes arising, while permitting the self-consistent journeys through time. Igor Novikov, who holds joint posts at the P. N. Lebedev Institute, in Moscow, and at NORDITA (the Nordic Institute for Theoretical Physics), in Copenhagen, first pointed out the need for a "Principle of Self-consistency" of this kind in 1989 (Soviet Physics JETP, vol 68 p 439). Now, working with a large group of colleagues in Denmark, Canada, Russia and Switzerland, he has found the physical basis for this principle.

It involves something known as the Principle of least action (or Principle of minimal action), and has been known, in one form or another, since the early seventeenth century. It describes the trajectories of things, such as the path of a light ray from A to B, or the flight of a ball tossed through an upper story window. And, it now seems, the trajectory of a billiard ball through a time tunnel. Action, in this sense, is a measure both of the energy involved in traversing the path and the time taken. For light (which is always a special case), this boils down to time alone, so that the principle of least action becomes the principle of least time, which is why light travels in straight lines.

You can see how the principle works when light from a source in air enters a block of glass, where it travels at a slower speed than in air. In order to get from the source A outside the glass to a point B inside the glass in the shortest possible time, the light has to travel in one straight line up to the edge of the glass, then turn through a certain angle and travel in another straight line (at the slower speed) on to point B. Travelling by any other route would take longer.

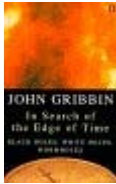
The action is a property of the whole path, and somehow the light (or "nature") always knows how to choose the cheapest or simplest path to its goal. In a similar fashion, the principle of least action can be used to describe the entire curved path of the ball thrown through a window, once the time taken for the journey is specified. Although the ball can be thrown at different speeds on different trajectories (higher and slower, or flatter and faster) and still go through the window, only trajectories which satisfy the Principle of least action are possible. Novikov and his colleagues have applied the same principle to the "trajectories" of billiard balls around time loops, both with and without the kind of "self collision" that leads to paradoxes. In a mathematical tour de force, they have shown that in both cases only self-consistent solutions to the equations satisfy the principle of least action -- or in their own words, "the whole set of classical trajectories which are globally self-consistent can be directly and simply recovered by imposing the principle of minimal action" (NORDITA Preprint, number 95/49A).

The word "classical" in this connection means that they have not yet tried to include the rules of quantum theory in their calculations. But there is no reason to think that this would alter their conclusions. Feynman, who was entranced by the principle of least action, formulated quantum physics entirely on the basis of it, using what is known as the "sum over histories" or "path integral" formulation, because, like a light ray seemingly sniffing out the best path from A to B, it takes account of all possible trajectories in selecting the most efficient.

So self-consistency is a consequence of the Principle of least action, and nature can be seen to abhor a time travel paradox. Which removes the last objection of physicists to time travel in principle -- and leaves it up to the engineers to get on with the job of building a time machine.

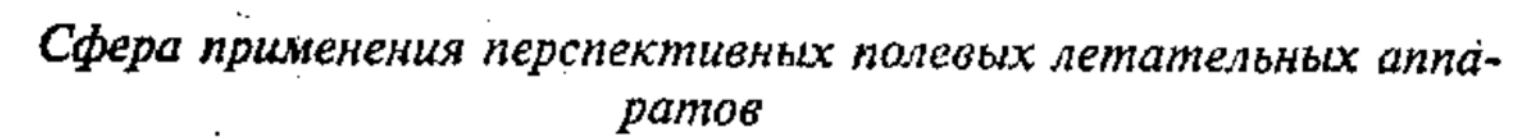


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Chernobrov's Time Machine

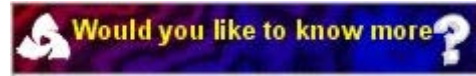
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Chernobrov's Time Machine. A Prospective Space Transportation System

Vadim Chernobrov is way out there. An energetic Russian with an Abe Lincoln beard and a polyester three-piece suit, Chernobrov cut his teeth in UFO research as an employee of the "spacecraft department" of Moscow's Aviation Institute. At one stage Chernobrov decided to branch into time travel. Not surprisingly, he had problems getting state funding. With his meager savings he built a time machine himself. To avoid ridicule, Chernobrov and his team didn't actually call it a time machine. They preferred "Prospective Space Transportation System." The system is small: slightly larger than a basketball, in fact, and covered, apparently, in "electromagnetic skins."

The orb has a top panel that could lift up, revealing a tangle of wires and several small clocks. One wire pokes out, connecting the device to an electrical transformer. Chernobrov claims the Prospective Space Transportation System could control time rates. In his tests he claims to show that for every 3,600 seconds outside of the system that only 3,560 seconds would pass inside -- 40 seconds slower. The electromagnetic fields, he said, altered the passage of time.



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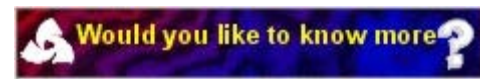
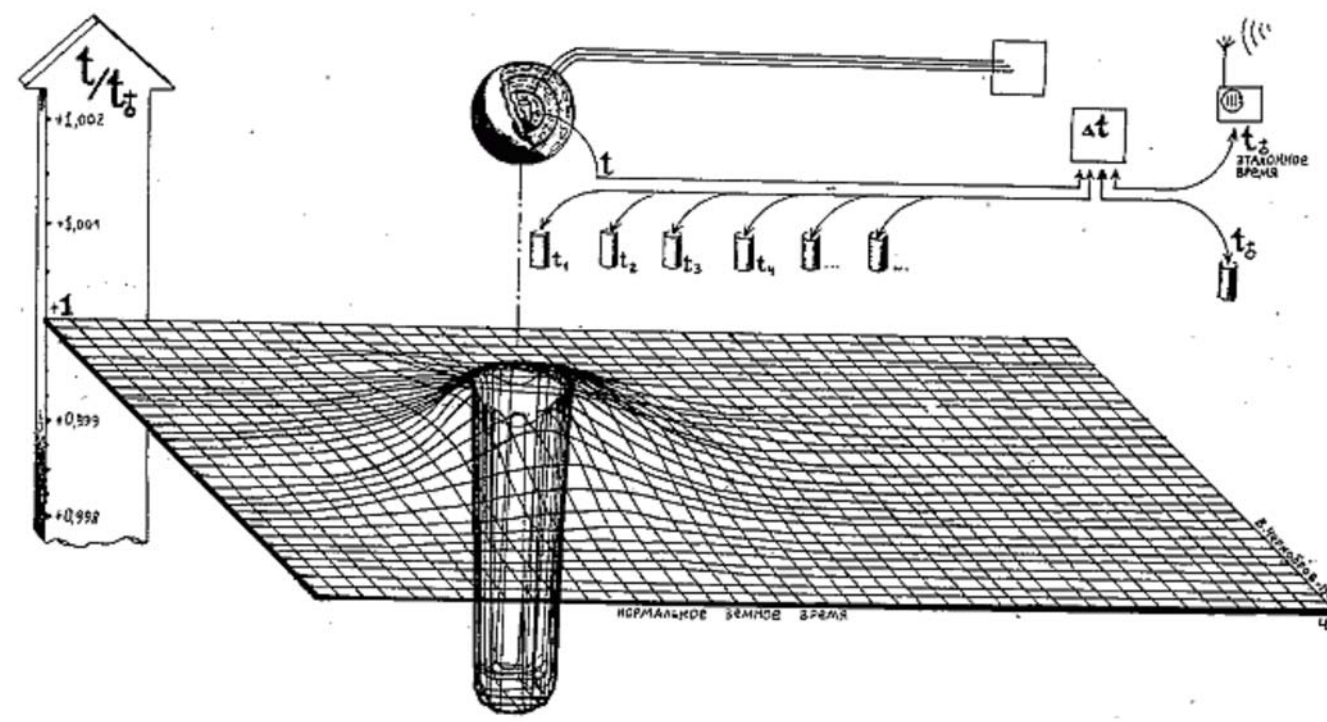
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Chernobrov Time Well

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Spatial Energy Research

Stiffler Scientific

Dr. Ronald Stiffler



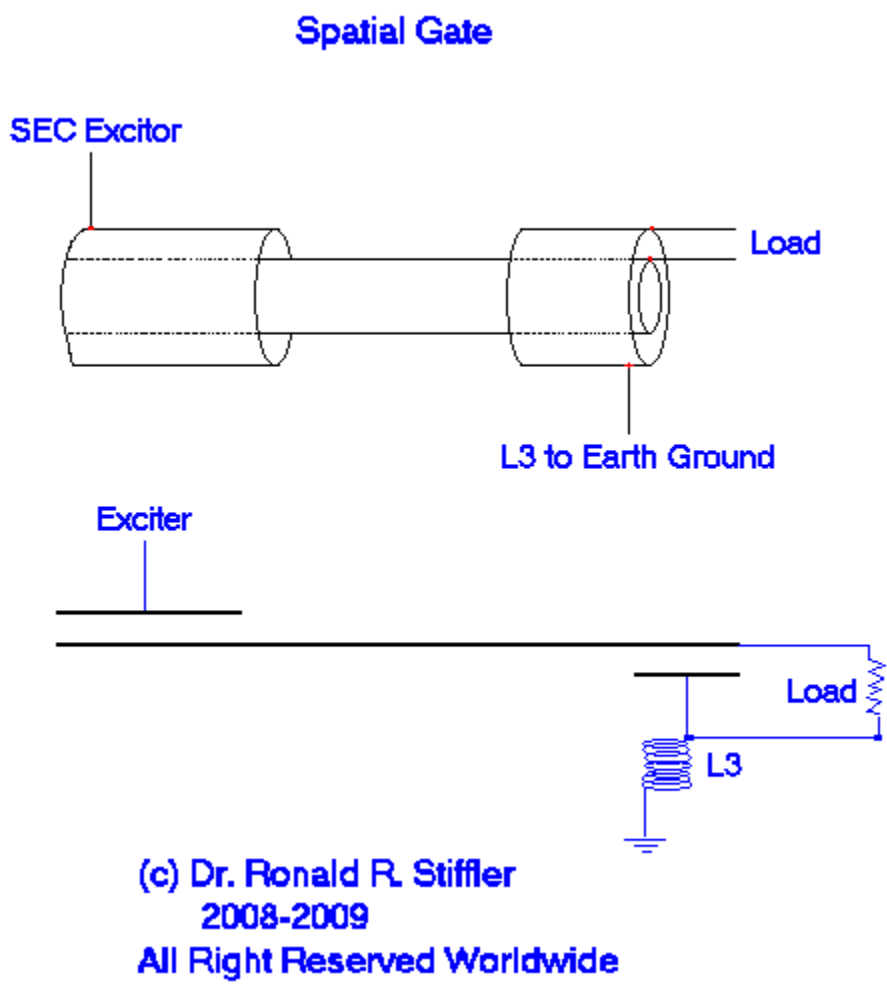
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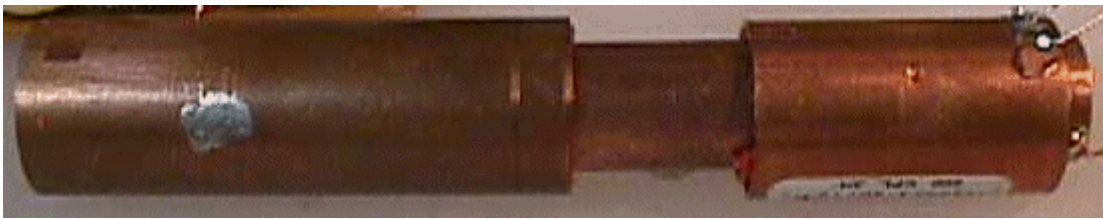
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The 'Spatial Gate' is the AC (Alternating Current) equivalent of the AV Plug used in many SEC Exciter Circuits.

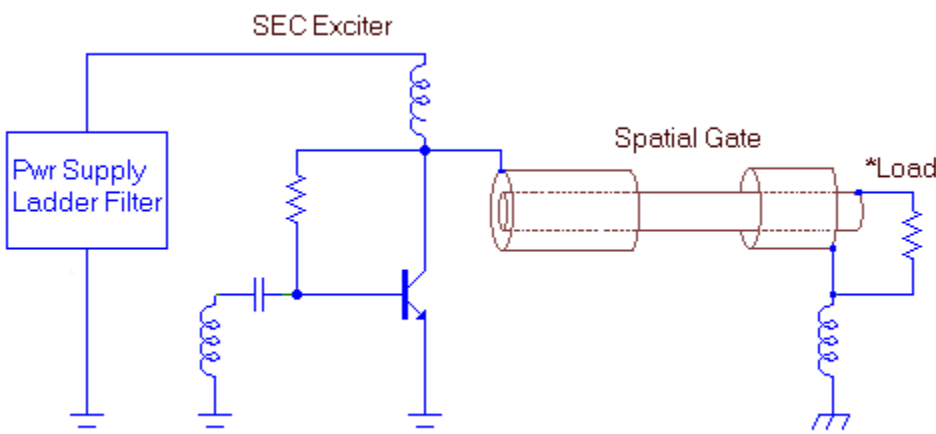
Where DC (Direct Current) is not required, the 'Spatial Gate' produces high voltage AC which can be as much as 30% greater than what can be obtained from a single AV Plug arrangement.



The following picture is a prototype 'Spatial Gate' and in this case the gate is constructed from Copper Tubing.



The following schematic if of a basic SEC Exciter driving a 'Spatial Gate'. The circuit fully illustrates the simplicity of the electronics required to obtain a Energy Interface.



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Abstract

The author offers for discussion an explanation for the excess energy in cold fusion, an explanation which incorporates the concept of negative time. The mathematical basis relies on the work of Dr. N. Kozyrev (Russia), Dr. Nassikas (Greece), and Thomas Bearden (USA).

Introduction

"The Hypothesis and The Equations of The Unified Matter Field" by Dr. A. A. Nassikas [1], is a rare instance of scientific and mathematical publication devoted to fundamental questions that leads to a practical approach to space-time engineering. In some sense it is a new solution for the development of free energy and gravitation technologies. Dr. H. E. Puthoff provided an overview of the topic based on the Casimir-effect [2]. This was quite interesting, but the author's conclusion was "only in principle, yes," but the engineering (practical applications) is "a long way off." Also that the "warp drive" idea in the papers (1994-1997) of Dr. Miguel Alcubierre, Max-Planck-Institute for Gravitationsphysik, Albert-Einstein-Institute, Germany, is a fine idea, but it does not provide any technological solution. The only author who proposed practical approaches to vacuum engineering is Thomas E. Bearden. Let's see what analogies there may be between Nassikas' work and the "Gravitobiology" by T. E. Bearden to indicate the shortest practical way toward the technologies of the future.

The Engine of Space-Time

The vacuum or "space-time medium" of T. E. Bearden is described as cells of so called "gravitons." Those are "the coupled photon/anti-photon pair." Note, that it is a paired process. To make it more clean physically, we have to introduce the negative time axis for the "anti-photon-" So, the notion for the "virtual particles" that is used in many papers as the unlimited sea of free energy can be physically introduced only with the notion of "negative time," and we must take into account the "surface of time" or the "area of possible time directions." In this chonal area, the pair of photon/anti-photon seems to be a balanced situation of two processes that don't require any energy input, but it is a situation that produces both photon and anti-photon forms of energy. In other words, it is the "energy creation mechanics" itself. The law of energy conservation seems to be the law for a "direct time" and "reversed time" balanced situation only. Certainly in our reality it is possible to detect by means of some measurements only half of the process, i.e. the positive time process of the photon energy.

According to the hypothesis of Dr. A. A. Nassikas, there is no space-time without energy since "The existence or the non-existence of energy implies the existence or the non-existence of space-time, and consequently of any geometry." On this point his concept is closely connected with Bearden's "vacuum engine." Next point: by Nassikas, the energy of positive or negative electrical charge of the particle, i.e.. its potential field energy can be presented as "equivalent to its internal time." So, the sign of the charge can be defined by the "time axis direction" and the process of the electron is some opposition to the process of the positron. Bearden's photon/anti-photon pair is a similarly balanced situation. Note, the mass particle here is considered as some dynamical process [3], that is corresponding to some four-dimensional resonance condition, demonstrated in calculations for the DNA-molecule and for other natural material elements.

A practical solution was proposed by Thomas Bearden to create "the local rate of flow of time" that is "determined by the "local time-stress of vacuum potential" is to apply some non-linear materials for translation of energy between different frequencies and harmonics of electromagnetic waves. Normally, i.e. in the ordinary time-flow situation, the non-linear material produce the harmonics from a fundamental wave. But Bearden says that "in a true time-reversed situation, non-linear materials can exhibit the production of a stronger fundamental from a combination of the fundamental and its harmonics." The principle that is designated by Bearden as "Stokes' principle of time reversibility" (G.G.Stokes (Camb. Dubl, Math. J. 4. 1849, p.I) is interesting, but we have to discuss something beyond this that is connected with the potential form of energy, i.e. with Bearden's "stress of vacuum."

Dr. A. A. Nassikas and Dr. Miguel Alcubierre independently proposed to use the difference in local rate of the time flow as the source for a propulsion force. According to Nassikas, if "the space under the object attracts the object" more or less than the upper one in strength of the different relative times around the object, gravitational Propulsion can be achieved. So, all we need to take the next step from theory to technology is to find a way to change the rate of time. Is it too difficult? No, it is quite simple if we take into account some points:

- a) The notion "time" in any case is connected with some certain material system, for example, with some elementary particle or with some planetary system. The different velocity of light in different materials is a demonstration of this connection.
- b) The "space" of some curvature (of some rate of time) is a bi-directional or many-directional energy process. Electricity is one of many possible balanced situations that is described as a bi-directional or two-polarity case. For many-polarity energetic situations there is the possibility of three or more time-flow directions.
- c) There is no difference in principle between an atom and the space around that atom, according to Faraday [4]. So, the balanced chonal situation of the vacuum engine corresponds to some real properties of matter and we can work with matter to reach the changes in the balance of the vacuum engine in the area of this material object.

The vacuum is the medium of some known physical properties, for example, the dielectrical permittivity. Physically, it is connected with the velocity of spreading of the photon, and since we can work with different materials of known properties, it means we have the possibility of changing the parameters of the vacuum engine itself. One quite old example of a practical application is USA Patent number 3,187,206, granted in 1959 to Thomas T. Brown. The gradient of dielectrical permittivity is proposed and experimentally proved as the source of reactionless force. It is necessary to note that the same reactionless force is created at the border between two different dielectrical materials of the electrical capacitor, as it is described in many textbooks on the properties of dielectrical materials. The problem of taking the next step to fundamental conclusions is understanding the physical connection between the permittivity of a material, the velocity of light in the material, and the local rate of time for this area of space.

The patents by Thomas T. Brown include also asymmetrical interaction between electrodes. i.e, the topology of the electrical field. Let's note the analogy between Nassikas' idea above on "energy and geometry of space" and the invention by Brown of reactionless propulsion. The gradient of the electrical potential that is created in the natural way with distance from the electrically charged particle is a demonstration of the natural topology of space, i.e. the electrical field is created according to the law of creation of space itself. It is the reason for the analogy between the formulation for electrical and gravitational interaction. We have the possibility of changing the topology of the electrical field, for example by means of the asymmetrical dielectrical member in the capacitor of Brown. So we have the possibility of compensating the natural gradient created by the properties of space. It is the way to space-time engineering.

So, the conception by Dr. Nassikas and idea of Dr. Alcubierre are a fine theoretical basis for the technology that was discovered and proved in practice by Thomas T. Brown. Modern industry, specialized in dielectrical materials, is ready now for cheap mass production of warp drive systems. The same technology may be the basis for self rotating generators. The way is short and all we need is the commercial demand and engineering formulation of a step-by-step program.

The concept of negative time by Dr. Nassikas can be useful also in understanding the over-unity effect that is demonstrated in some cold fusion cells. The well-known Pons-Fleischmann experimental set-up includes a cathode that is over-saturated by protons when the set-up is operating. So, the local concentration of positively charged protons can be considered as a local imbalance in vacuum engine and the local rate of time in this area is different from the normal one. The processes are produced by this local change of the curvature of space are multilevel complex energy exchange, but the source of over-unity is the local concentration of positive electrically charged protons that is due to the input power source. Let's consider this point more carefully.

Any electrically charged particle can be presented as some volume of space i.e. the gravitational space by Nassikas, G-space of energy Eg, that is joined with some imaginary electromagnetic space of energy Eem. Conservation of energy is presented as:

$$dE_{em} + dE_g = 0 \qquad F.1$$

In my view, it is useful to change equation E1 to the form:

$$dE_{em} = - dE_g \qquad E2$$

In this case it is obviously that mathematically the space of Eem has an "imaginary" value, since the energy and the velocity are connected by the quadratic root of the negative number.

The over-unity output in cold fusion systems means the production of the excess heat energy. Certainly, some cold fusion systems demonstrate power output as the result of nuclear transmutation processes. But if we are considering the water to be distilled H2O in which fusion does not occur, I have to suppose only one way for excess heat production:

$$dE_{em} > 0 \text{ if } dE_g < 0 \qquad E3.$$

I must note that the idea is not a new one since the famous Russian astrophysicist N.A. Kozyrev created in 1947-1980 the "conception for active properties of the time." There is some natural physical mechanism for production of heat energy that is demonstrated by any star and it is not the thermonuclear reaction but the transformation of energy by the mechanism of Kozyrev. In that concept, the kind of energy that is used by the star for heat energy production is the "time flow." On the other hand, we can take into consideration the gravitational description of space instead of its chonal description, and the production of the heat is the transformation of Eg that we noted above.

N.Kozyrev analyzed the wide experimental astrophysical data to find the answer for the question of the common "special condition of matter" inside any star to provide the transformation of energy Eg into energy Eem. His conclusion [5] is quite simple:

$$B/n = 6 \text{ eV} \qquad F.4$$

where "B" is the density of the beam energy of the star and "n" is the density of electrons in the volume of space.

We certainly cannot create the conditions of stellar matter in the laboratory, but for a Pd-cathode in a cold fusion cell, the situation is quite similar to Kozyrev's equation F.4 and heat production can be detected as result of F.3. The difference is the application of protons instead of electrons. To calculate this we have to use the volume density of protons H+ in the material of the cathode instead of the volumetrical density of electrons "n" in star matter.

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Alexander V. Frolov
Publised Infinity Energy, Issue 20. 1998 p.80-81



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Closed Timelike Curve (CTC) Construct
Scale Model prototype

by Thomas G Skeggs

The main aim of this CTC Construct, scale model prototype is to test a hypothetical design (I discovered by accident), for a device or construct to generate closed timelike curves. The CTC Construct is a scale model prototype for a full-sized manned prototype, known as the Flight Test Article (FTA): Defiance. The FTA: Defiance is an 12ft by 12ft by 6ft, prototype Vertical Take-Off and Landing (VTOL) aerospace vehicle, which has taken nearly six years to design. The design for the CTC Construct and FTA Defiance, was largely inspired by the work carried by Thomas Townsend Brown and Nikola Tesla. I have combined their work with quantum theory and the principles of electrostatics and tribo-electrification, to product a vehicle, unlike any other, (See figure one).

I originally planned to begin construction on the FTA in the summer of 2001. But this date maybe put back until the winter of 2001, due to numerous construction problems.

It would be almost impossible for anyone to build a time machine, as it would require an extremely powerful energy source to drive it. But there maybe a more energy efficient way to travel through time, by building a device or construct to use a natural time machine like a quantum or astrological phenomanon, in the form of a worm hole or quantum singularity.

The CTC Construct model consists of two triangular shaped pyramids one placed on top of the other, with a smaller pyramid placed on top to create an apex above the model's centre of gravity. (see figure 2). The model is 2ft by 2ft by 1ft. The frame is made out of balsa wood, and has 3 coats of polyurethane varnish, plus 3 coats of high temperature heat resistant paint to protect the balsa wood frame from igniting.



figure 2

is blown into the MPS, by using a 12 volt air pump.

Inside the top pyramid forms a hollow apex. Inside the hollow apex are 3 small plastic pipe connectors. These connectors are joined by silicone tubes to the Reaction Control & Stabiliser System (RCSS). Ionised gas from the hollow apex is forced down the silicone tubes by pressure within the apex, into the RCSS. The RCSS consists of 3 round pipe sections, fixed to 3 thrust chambers to create an RCSS assembly. Each RCSS assembly are placed in a triangular pattern with the CTC construct and are located at each tip of the model. Ionised gas is forced under pressure into the round pipe sections, where the gas mixture is given an additional high voltage charge. The ionised gas are accelerated out of the RCSS assemblies to produce thrust. Each RCSS assembly will be powered by a 5Kv Cockcroft-Walton multiplier.

The CTC Construct is simple in design, but complex to manufacture. The CTC Construct, Scale Model Prototype has taken 4 months to build so far. And it may require another month of work before it is ready for testing. Due to a small risk of fire caused by the mixing of hydrogen with oxygen. Numerous safety features, equipment and procedures are being added, and this may delay testing until early next year.

The CTC Construct consists of the following unique design features:

- The CTC construct has a unique double triangular pryamid shaped aerospace frame.
- The CTC skin's configuration maybe able to overcome the average weak energy condition, to produce tiny amounts of exotic matter, enough to create an antigravitic effect. The design for this skin configuration is based on the Casimir effect. And on the work carried out by Thomas Townsend Brown.
- The CTC Construct skin configuration maybe able to overcome the average weak energy condition. The space-time within the CTC Construct will move at a slower speed, than the space-time surrounding it.
- The CTC may generate an antigravitic effect, plus drag reduction. This means small ion motors can be used for directional control. Resulting in a massive saving in weight and mass by not having to install large and heavy standard aircraft engines or rocket motors.
- The Main Propulsion System/skin configuration uses tribo-electrification, to generate a very high electrostatic charge. This MPS/skin configuration acts just like a Van de Graaff generator.
- The CTC construct has a unique propellantless fuel system. It uses atomspheric air as a propellent when in the earth's atmosphere and hydrogen when in space. Hydrogen is also used during take-off to generate more thrust.
- The FTA will have a unique water-based propellant. Water is converted into hydrogen and oxygen, the hydrogen is used as fuel for the ion/plasma generator, and on the full size prototype the oxygen is used to maintain life support.
- The water-based fuel system does away with large and bulky cryogenic fuel tanks resulting in a greater payload capability and large savings in weight.
- The CTC construct has a drag reduction skin to reduce friction and wave drag, in a process known as,"Plasma Magic".
- Due to the lack of alervons, rudders, and flaps this offers a considerable savings in weight and can dramatically reduce drag.
- The unique shape of the CTC construct, makes it ideal for taking off and landing vertically.



figure 1

I have been working on a hypothesis that if you build a construct with a high electrically charged skin, then the space-time within the CTC Construct will move at a slower speed, than the space-time surrounding it. This hypothesis is explained in a paper I have written called the Tempus Codex. (This paper is still being written and will be ready at the end of December, or the beginning of January 2001, I have also recently discovered on the Time Travel website, that a Russian scientist, Vadim Chernobrov from the Moscow's Aviation Institute, has also been coducting tests on a model similar to my design. Mr Chernobrov also believes that a device with an electromagnetic skin can create an time dilation to occur within the device).

The skin is energised by the model's Main Propulsion System (MPS). The MPS works in unison with the electroconductive skin, and uses the principle of tribo-electrification. This is where friction can generate and electrical charge. The MPS uses a oxygen and/or hydrogen gas mixture, ionised in a small chamber and is blown upwards through a pipe, where ions hit the inner surface of the electroconductive skin. (The MPS uses a 15Kv transformer to ionise the gas mixture). This results in an very high electricstatic charge building up on the electroconductive skin, due to the friction from the flow of millions of ions. Not only does this MPS/electroconductive skin configuration produce a high electrostatic charge. This configuration may also produce thrust. When the ions strike the inner surface of the skin, they produce kinetic energy. This kinetic energy is focused downwards by the pyramid shape, and the kinetic energy radiates along the skin's surface travelling downwards resulting in a small thrust.

The MPS is positioned inside the CTC Construct, at the centre of gravity. A pipe connects the MPS to the inside of the hollow apex, located in the top of the construct. Located around the apex are 3-1.5mm holes, where ionised gas is allowed to escape. This ionised gas reacts with the surrounding air molecules and gives them an electrical charge. The air molecules are then repelled by the electroconductive skin, and this results in a boundary layer to form around the CTC Construct. This process results in a reduction in drag. This process is known as,"plasma magic", (See New Scientist Magazine. 28th Oct2000).

Due to the small size of the model, not all the necessary systems can fit inside it. So a special jig has been made for the model to sit on during testing. In the centre of the jig, is a small plastic pipe with three inlet pipes. Hydrogen and oxygen gas is produced by a home-made electrolysis cell. The hydrogen/oxygen mixture

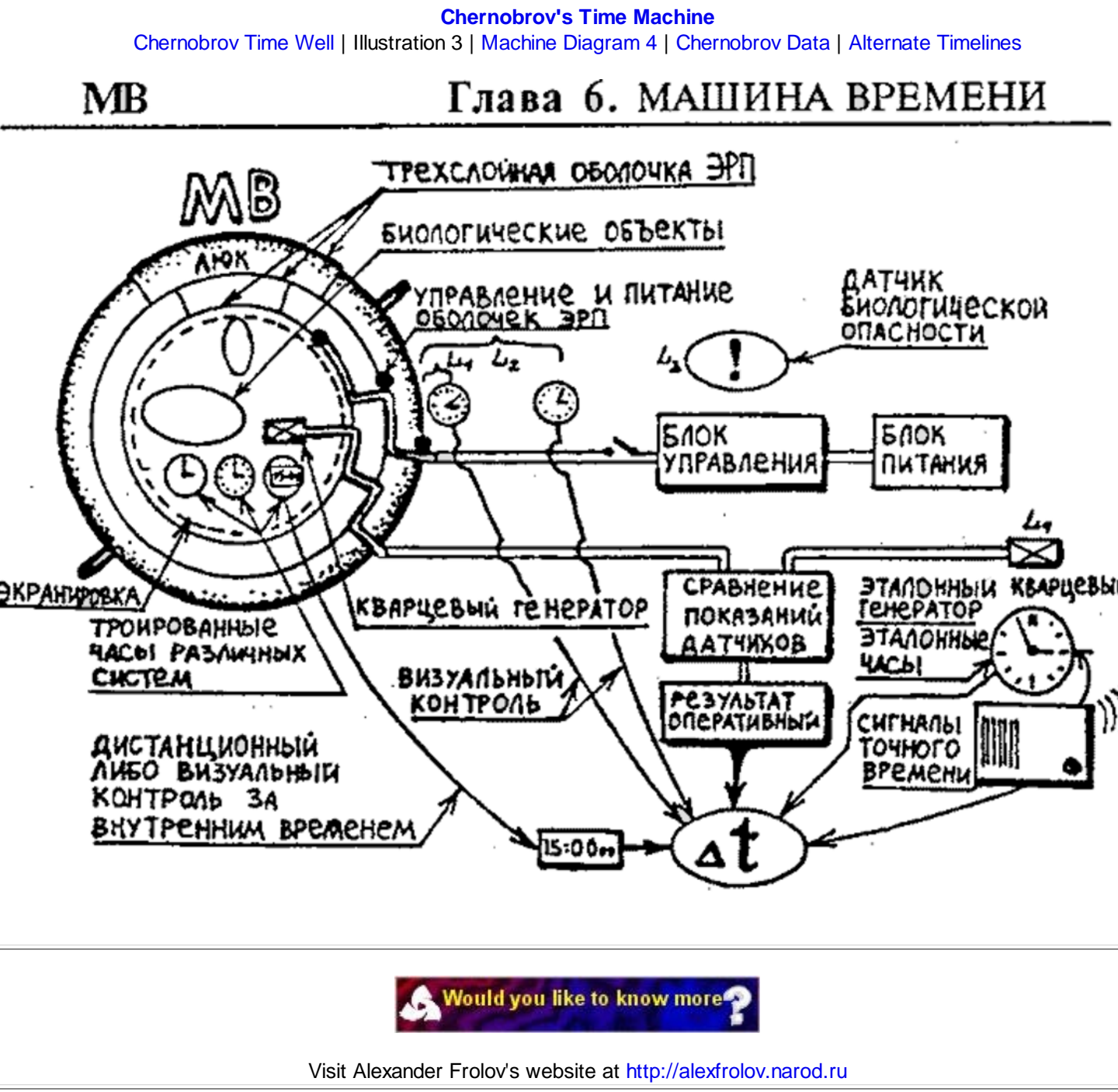


- For further information on related data, check out the web pages below:
<http://sorteria.com/brown/docs/hydro.htm>
http://members.xoom.com/_XMCM/jnlabs/html/elgthk.htm
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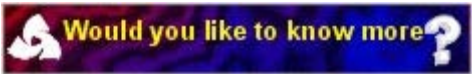
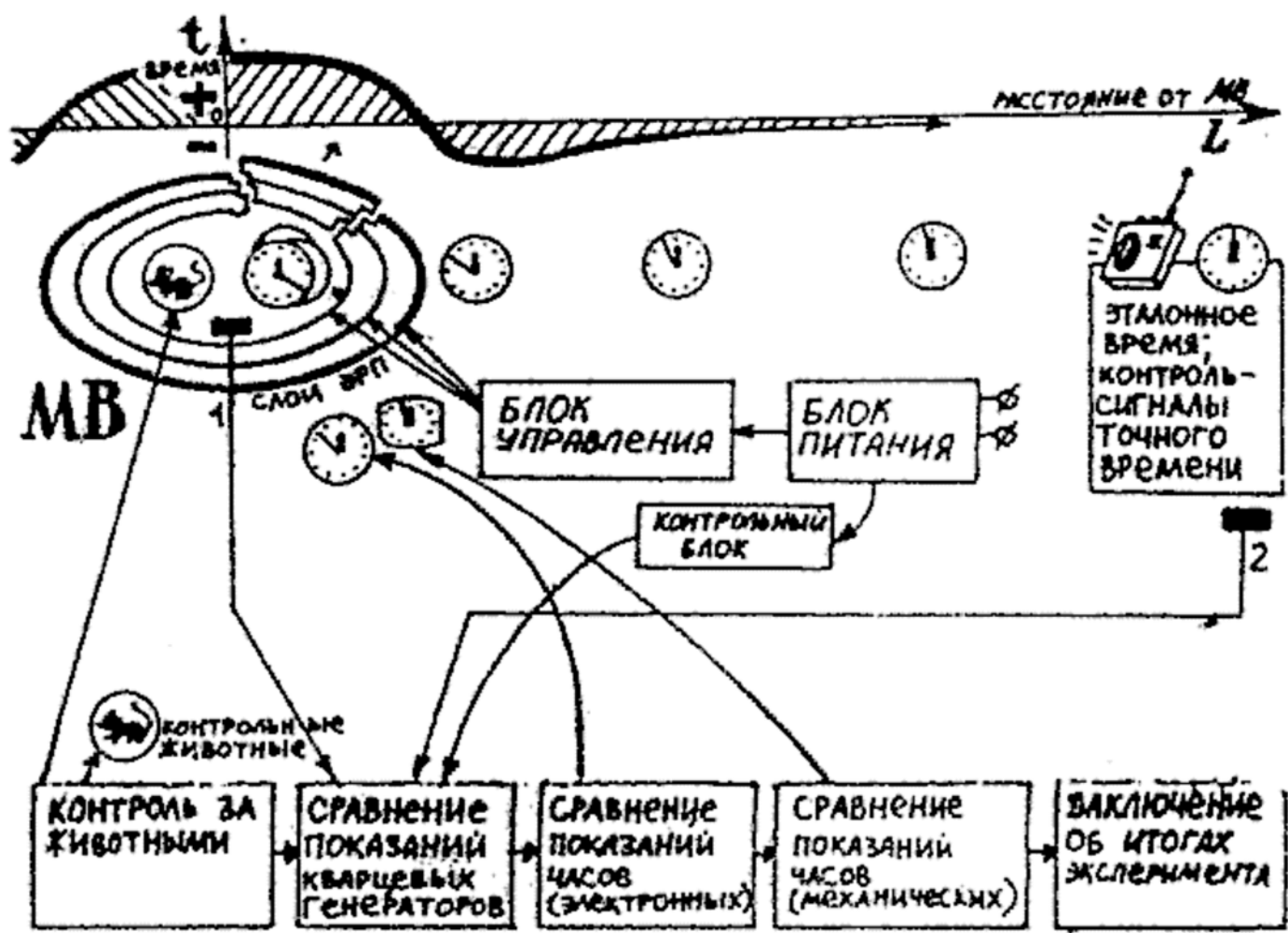
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Illustration 3



Chernobrov's Time Machine

[Chernobrov Time Well](#) | [Illustration 3](#) | [Machine Diagram 4](#) | [Chernobrov Data](#) | [Alternate Timelines](#)



Visit Alexander Frolov's website at <http://alexfrolov.narod.ru>

Chernobrov's Time Machine

[Chernobrov Time Well](#) | [Illustration 3](#) | [Machine Diagram 4](#) | [Chernobrov Data](#) | [Alternate Timelines](#)

Spacelike vs Timelike

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Information theory has a general rule:

Whenever you take a finite bandwidth channel and poke it into an infinite bandwidth channel, you'll get either aliasing or interference depending on whether you look at the communicated information in a space-like or a time-like manner.

If you look at the information in a space-like manner, you will have to accept the notion of non-locality (and aliasing). If you look at the information in a time-like manner, you will have to accept the notion of wavefunctions and wavefunction collapse (and interference).

Aliasing or interference are manifested under non-locality or wavefunction collapse, respectively. The general notion underlying these phenomena is an overlap of states or non-orthogonality.

It is no wonder then that when we take a space-time-like view of the information that we run into trouble integrating QM with Relativity since in this case we should observe both, something like aliasing and something like interference, together.

This is the next conceptual hurdle. How do we represent this ?

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So this effects the probability of where the construct's interior is within space and time, as the interior generates its own locality and connects to other parallel universes. The minimum result is a time dilation effect. A highly efficient, well engineered construct may have the ability to create Closed Timelike Curves and travel in the past. The 3 dimensions of space may become fuzzy, caused by the emission of gravitons effecting the 4th dimension of time.

The only way I can discribe my design, is that its similar to the TARDIS, which appeared in the BBC TV Sci-fi series, "Dr Who". TARDIS is an acronym for Time And Relative Dimension In Space, where it's interior has infinite size, greater than its exterior. The construct is similar. It's not like a conventional vehicle. Its power source does not physically propel it through space and time. The negative energy density and quantum gravity present within its skin, breaks the connection by warping space and time with the exterior locality, so the interior can create its own time and generate non-local connections with other parallel universes, or moments in time. Its a crude and basic form of teleportation.

Russian scientist, Vadim Chernobrov from the Moscow's Aviation Institute, has been working on a prototype design known as the Space Transportation System. Chernobrov's prototype is based on the expermental work carried out by Professor N.A Kozyrev of also of the Moscow Aviation Institute, who carried out work in to the properties of time. Professor's Kozyrev conclusion of his experimental work, is if you can create a device that changes the density of space, this will effect the rate or density of time. Causing time within the device to slow down or speed up. Chernobrov Constructed a prototype made up of electromagnetic layers which fit inside each other like a Russian doll. The differance in time can be worked using the simple equation:

t/TE

TE is the standard Earth time and t is the local time within the device. ⁽¹⁶⁾

Stephen Hawking's Chronology Protection Conjecture, provides a major problem in any design for a device capable of time travel. As his conjecture claims that any device would be destroyed by the vaccum fluctuations, where warped space-time would turn the virtual particles into almost real mass particles, increasing the density of the virtual particles, and reducing the probabilities of other histories existing in the device. But it maybe these vaccum fluctuations which provide the extra energy to time travel. As an increase in density within the skin of the device would also cause an increase in the entrophy within the interior of the device. So the number of probabilities would be low in the skin, but would be high in the interior of the device.

Into the Abyss: Travelling back in time

It's claimed that its impossible to travel to a time earlier than the worm hole first became a time machine. So if a worm hole was created in August 2001, you could not travel back in time to June 2001. The laws of general relativity are unequivocal. ⁽¹⁷⁾ But with a better understanding of the universe, being made up of parallel universes (D-branes) there maybe a way to bend the laws of physics slightly, and thus allowing someone to travel safely back into the past.

For example, if you want to travel back in time to Roswell, New Mexico in July 1947, to investigate the alleged UFO crash that occur there. As the time traveller enters the device, they start to imagine being in Roswell, New Mexico in 1947. As the time traveller thinks of this, a connection has already formed in Roswell, New Mexico in 1947, and connects up to the one the time traveller is about to enter. Its important to point out here, when such connections form, the laws of general relativity and causality begin to breakdown within it. The laws of physics suggest that the connection in our present (2001AD) was created first, but due to the bizarre twist in the nature of time, its means the other connection in 1947 was opened first, some 54 years ago.

Some may claim, from an observer point of view in 2001AD, this is a volation in causality, but the connection in 1947 is some 54 years old and it has been expanding into hyperspace ever since, until it meets up and connects to the one created in 2001AD.

So when the time traveller enters the device and its switched on, the time traveller will travel backwards in time. Thus generating a time-like curve. It will be the thoughts of the time traveller that connect up the two time periods of 1947 and 2001.

But what about observers from 1947 onwards to 2001?. Would they see the connection forming. The answer is no, as the connection in 1947 onwards would be invisible to the naked eye. So no observers would report seeing it. The only time an observer may see the connection is during a process I have nick-named called,"Convergence". This is when two points of the connection link up to create a non-local connection between two differant time periods, so the time traveller can travel back and forth in time.

There are two major drawbacks with this technique. The first is the connection maybe non-transverable. As the time traveller would require the device to travel from the past into the future and appear back in the year 2001. Only whats in the interior of the device travels through time. The device will remain stationary and fixed to its own universe.

The second drawback is some may claim it would be impossible for a time traveller to simply wish themself into another time period, using the construct. But it could be possible. As the interior will become sensitive to conscious thoughts. If nothing can penetrate the skin of the construct, such as light, sound and electromagnetic radiation. Then nothing can escape out into the surrounding local spacetime. Not even the conscious thoughts of the time traveller. The thoughts of the traveller would exist in the construct as probabilities and would simply be focused elsewhere, in this case, July 1947, Roswell, New Mexico.

But there will be limits, and according to quantum physicist, David Deutch from Oxford University. Time travellers could find themselves in any number of alternate realities or alternate histories. Time travellers could find themselves in a reality where the Nazis won the Second World War, or in a alternate reality where Elvis lives on. But probability rules over imagination. So time travellers will not encounter realities where pigs can fly, or discover real vampires biting the necks of lusty young virgins.

Albert Einstein once stated that , "Imagination is more important than knowledge". The hypothetical problems of time travel maybe solved one day by the verification of superstring or M-theory, but the technology needed to make time travel a reality will be developed, by using good old fashioned imagination, ingenuity and inventiveness.

For I dipt into the future, far as the eye could see,

saw the Vision of the world, and all the wonder that would be.

by Alfred Lord Tennyson

Note One

This equation is based on Schwarzschild's radius, which is used to calculate the critical point when a curvature of space is so strong, no mass could escape its gravity and would be compressed down into a singularity. I have just changed the gravitational constant with Planck's constant, as the gravitational constant was to large to measure the effect of the gravitational distortion created by a mass particle. This equation can also be used on any other mass particle.

Summary

Trying to explain how the construct works, has been differcult, so here is a summary on how it works:

- The construct I have designed uses a process to generate a negative energy density within the walls of the device. This reduces the direct connection with the surrounding spacetime.
- The interior of construct it produces it's own local time.
- The presence of a negative energy within the walls of the construct makes interior more probabilistic and sensitive to conscious thoughts.
- Other past or future moments in time will exist as probabilities within the interior of the construct. Thinking of a past moment will cause that probability to become higher than the present time.

This paper is an edited version of the original as it takes me a great deal of effort to produce a paper on such a complex subject such as time travel, as I have no academic qualifications whatsoever. This would explain my poor spelling and grammer.

Recently I have made a grave mistake with the CTC Construct Scale Model Prototype. In a bid to keep costs to an absolute minimum, I tried to combine the ideas of the Tempus Codex into prototype aerospace vehicle I have been also developing. I now realise this idea was to ambitious. But I'm having to abandon all research on time travel until the Spring 2002, due to other commitments.

Further Information

The Fabric of Reality by David Deutsch. A good book which covers subjects such as time travel, quantum computing, virtual reality, alternate realities.

Black Holes and Time Warps: Einsteins Outrageous Legacy by Kip S.Thorne. This book is classic, and anyone with an intrest in black holes, worm holes and time travel, should have a copy of this book.

Time: A Traveller's Guide by Clifford A. Pickover. This is a book for anyone with an intrest in time travel. Includes detailed information for the novice time traveller, plus a few computer programs.

In Search of Schrodinger's Cat: Quantum Phycis and Reality by John Gribbin. This book is a great introduction into the complex subject of quantum physics. This book also details the history of quantum physics, and the scientists who discovered it.

Timeline by Michael Crichton. This is a fictional book, but a great story. This book is about a team of archaeologists sent back into 14th century France. This book maybe made into a film one day.

Contact by Carl Sagan. This is also a fictional book and a film that explores the idea of recieving a message from an extra-terrestrial species. If you want to see a how a CTC Construct may work, then see this film.

Weblinks

David Deutsch's Homepage: <http://www.qubit.org/people/david/David.html>

Stephen Hawking Website at: <http://www.hawking.org.uk>

Check out Hawking's Leature on Time Warps at: <http://hawking.org.uk/pdf/warp.pdf>

John Gribbins paper on Time Travel at: http://www.biols.susx.ac.uk/Home/John_Gribbin/time-trav.htm#time_travel

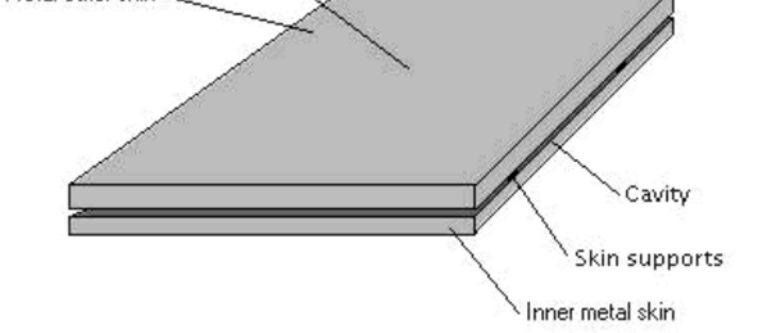
Chernobr's Space Transportation System: chernobr.htm and <http://alex.frolov.narod.ru/ch-paper.htm>

Check out this page on the latest theories on field propulsion systems at: <http://stardrive.org/Jack/puthoff1.pdf>

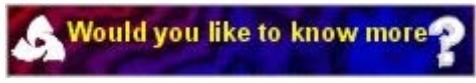
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16. Experiments on the change of the direction and rate of time motion. V.A.Chernobrov. 1996.
17. p.504. Black Holes & Time Warps, K.S. Thorne. Papermac. 1995.

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CTC Construct Skin



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We are living in a period of such overwhelming acceptance of the Cartesian system of co-ordinates, based on three axes in 90 degree co-ordination, that it might be considered intellectual suicide, or at least a risky and eccentric affair, to speak of an alternative system of co-ordinates and to maintain, that such a different system would have considerable advantages over what is now generally accepted. Yet, an alternative system has been discovered and is available for refinement and use.

Ren'e Descartes, whose birth date we celebrate this year as having occurred exactly four centuries ago, has made prodigious contributions to science and philosophy, introducing reasoning where authority had been the dominating factor before his time. We will concern ourselves here with only one of his many feats, the introduction of a rational system of co-ordinates, with which to locate the precise position of any object inside a known space.

According to anecdote, Descartes invented the presently used system of co-ordinates observing and contemplating the erratic course of a fly in his room and realizing that, if he could determine the distance to each one of the three "axes" formed by one of the rectangular corners of the room, he could be sure of its exact position, and that a succession of such co-ordinates would define the otherwise elusive curves that marked the fly's course. Although we cannot be sure that this anecdote correctly survived the centuries, it seems reasonable to assume that the Cartesian system of co-ordinates was in fact based on the geometry of construction that is prevalent until this day, that is, a rectangular configuration of most houses and of the rooms inside.

R. Buckminster Fuller, on the other hand, lived somewhat closer to present time than Descartes; he died in 1983 at the age of 87. Like Descartes, Fuller has made copious contributions to science and philosophy. He is probably best known for his invention of the geodesic dome, a structure of triangularly-interconnected elements that has the best ratio of weight to enclosed space of any artificial construction so far developed. More recently, Fuller has received much public acclaim for having predicted, with his geometry, the existence of spherical molecules. The experimental discovery of the Buckminsterfullerene, a spherical and extraordinarily stable large molecule of carbon, is only a few years old.

Fuller's geometry goes by the name of Synergetics and has been developed by experimentally observing the behavior of spheres of equal diameter, when packed as close as possible to form regular geometric figures. The basic and most simple stable geometric configuration of synergetic geometry is the tetrahedron, formed by four spheres laying next to each other, in perfect triangular configuration forming four angles of 60 degrees (fig. 1). Other important elements are the octahedron (formed by six closest-packed spheres) and the vector equilibrium, which is the result of twelve spheres nested around a thirteenth, central sphere, in omnidirectional closest-packing, 60 degree co-ordinated configuration.

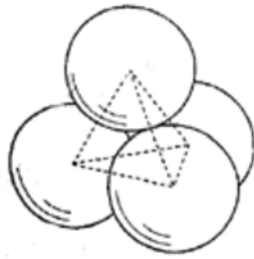


Fig.1

The cube, which is at the basis of our present-day construction methods and of the x-y-z Cartesian co-ordinate system, is not in and by itself a stable configuration. Eight spheres forming a cube are inherently unstable. To gain stability, they must be artificially stabilized by interconnecting them in the way the tetrahedron is connected. In this way, two tetrahedra of four spheres each, joined at their respective centers, form one cube of eight spheres.

It happens that this geometry, as developed by Fuller, is in perfect accord with how crystals grow in their various forms, and that its application in engineering reveals to us the possibility of very efficient structures in terms of economy of raw materials and strength of the resulting construction.

Now how could the discoveries of Fuller be utilized to form a co-ordinate system and why should we venture to do such a task, seeing that the Cartesian x-y-z co-ordinates have done perfect (or almost perfect) service for such a long time?

For one, Cartesian co-ordinates may be a convenient mathematical construct, but they do not accord with nature's ways any more than modern chemistry will ever be able to duplicate the conditions of living organisms.

If we utilize x-y-z co-ordinates not for orientation in a known enclosed space (such as did Descartes), but in space with unknown extension, if our system of three axes in other words does not form one of the corners of a known space, but the point of origin of space extending in all directions, the original three axes are no longer sufficient for orientation. We must double the system, adding a mirror image of the three axes, to be able to describe the space 'on the other side of the corner' (fig. 2).

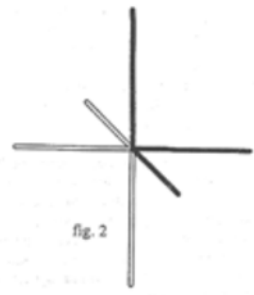
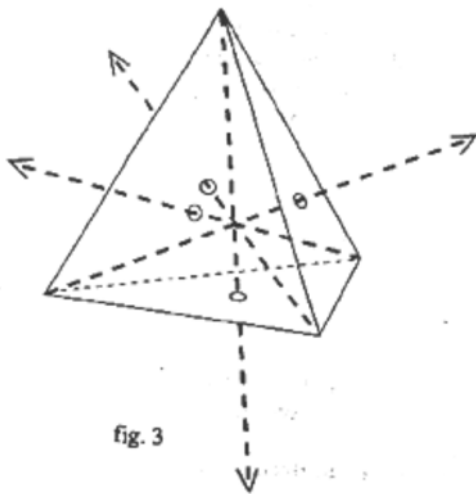


Fig.2

Normally we do not think of this action as a doubling of the axes, as we simply assign negative values to one of the sides, and positive values to the other. But rigorously, we now have six axes: plus x and minus x, plus y and minus y, as well as plus z and minus z. The fact that the plus and minus parts of each axis seem like one continuous axis does not justify considering them to be one. In fact, for the purpose of orientation, we must specify whether we are locating something on the plus axis or on the minus axis, even if we chose to do so by considering positive numbers to belong to the plus axis and negative ones to the minus axis. So we have, in actual fact, six axes to consider and in order to locate an object in space, we must define its position in relation to three out of six axes.

This is where Fuller's synergetic geometry suggests a way of simplifying our task enormously. If we decide to reduce the number of axes from six to four, taking the basic and most simple stable geometric figure, the tetrahedron, as our point of reference, we may locate any point in space by defining its position with regard to three out of four (not three out of six!) axes of reference. The four axes of reference in this system of co-ordinates are the axes that originate at each one of the vertices of the tetrahedron, intersecting at its midpoint and passing through the middle of each one of the triangles opposite these vertexes (fig. 3). These axes are co-ordinated with angles of 120 degrees. The four of them represent the minimum set of reference axes emanating from a common origin needed for defining all possible directions in physical space.



I have developed, in order to make this concept more clear and to allow its application as a tool for instant and intuitive orientation in space, a colour coding system that combines these tetrahedron-based space co-ordinates with the currently widely used method of colour separation for printing purposes, the so-called CMYK colour separation process.

CMYK (cyan-magenta-yellow-black) are the four colours used by present day printing presses. The combination of these four colours in various percentages creates a large number of different colours in almost endless continuous shading. Assigning one of the basic colours to each one of the four axes of the tetrahedron, and blending them towards the other axes, we obtain in fact a unique colour for each one of the thousands or millions of possible directions that we may want to instantly identify. Naturally we can also express direction in terms of degrees, minutes and seconds of arc in relation to the three nearest axes.

In the printed version of the article, a tetrahedron is supplied which can be cut out and pasted together, to illustrate the principle of color coding.

A co-ordinate system of this kind, suitably developed and refined, may be used with profit in astronomy, in navigation (especially space navigation), in holographic representation of images, in crystal-based electronic information storage and possibly a whole range of other, yet-to-be-thought-of activities.

By its use, we transform our four directions of orientation on earth (east-west-north-south) into four directions of orientation in space. We need to develop and use this tool if we are seriously considering to expand our influence into planetary or interstellar space, not only in the sense of observation, but also of exploration and navigation.

One last comment on the concept of 'dimension', which seems to be not very well understood by current scientific inquiry.

We are accustomed to calling this physical universe a three-dimensional universe. Text books and encyclopedias tell us that space has three dimensions, without considering that the number of dimensions we assign to space depends only on the kind of geometric reference we are using. I was tempted to say, in a first moment, that considering tetrahedric space co-ordinates, obviously space must have four dimensions. But that would be making the same mistake as our current authoritative teachings.

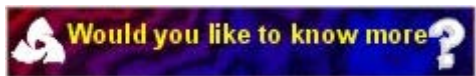
Space in fact has only one 'dimension' which we may also call 'extension'. It extends equally into all directions. It does not matter how many directions we choose to refer to in our systems of orientation, three, four, six, maybe ten. We are still considering the same space. The term three-dimensional has as little physical relevance as would the term four-dimensional or n-dimensional. Dimensions, after all, are only a conceptual tool of convenience for expressing in mathematical terms a particular way of looking at or of trying to comprehend the reality of what we call space.

Josef Hasslberger
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Hypothesis: My hypothesis is yet another speculation of the structure of time. The Wellsian Temporal Theory (or WTT) states that time is governed (controlled, directed, attached to reality) by its own force. This force is similar to electromagnetic fields, and gravity (String force)* in that it both moves time forward in a uniform pace (1 sec/sec), and it keeps it carrying the universe with it.

**Throughout this paper I will refer to gravity and the strong force that binds the nucleus of an atom together as the same force. The WTT adheres to the Grand Unification Theory of atomic and universal forces, and the General Field Theory of electromagnetic spectra.*

Observations: Matter is affected by several forces. Atomic forces (electromagnetic attraction, gravity; strong force) keep mater cohesive. Gravity, on a larger scale, keeps matter on Earth (or whatever body with mass enough to attract matter at a readable level is indicated), and maintains the orbits of planets (and other celestial bodies). Kinetic forces (any motion forces attached to matter on a macroscopic, or slightly microscopic level) are constantly moving things (matter) through the three dimensions of space. I believe a similar force carries matter (the universe) through the forth dimension* (time) at a regular pace.

**By referring to "the fourth dimension" I am calling upon another theory of time. Curiously, this is also a Wellsian temporal theory I have drawn upon, as this theory was first officially and seriously addressed in the novella The Time Machine by H G (Herbert George) Wells.*

Applications: This theory of time opens up many practical options. The first and foremost of these options is time travel (changing of one's rate or direction through which they travel in time). If the force that controls time can be generated as easily as a magnetic field, then traveling through time would be as simple as moving a paperclip across a table by placing a neodymium magnet underneath it.

Observations (contd.) or The Tachyon Connection: Time travel does occur naturally, and most theories of time forbid travel through time. A sub-atomic particle, known as the Tachyon (Tack-ee-on), is constantly traveling forward and backward through time in its cloud orbits. I believe a Tachyon is capable of time travel because of its unique motion*. The motion of a Tachyon is unlike that of any other sub-atomic particle, and I hypothesize that it is fast enough, and in just such a pattern and method that it is able to "outrun" the force that controls time. When a rocket leaves Earth, it has just enough thrust to escape the gravitic forces acted upon it by the Earth's mass. This is similar to the Tachyon's "escape" from the "gravitational pull" of time.

**Also its miniscule size, but that cannot account entirely, for a quark is a far smaller particle, and it shows no evidence of irregular temporal motion (time travel).*

Glossary: In the authoring of this paper, I have generated many as-yet unused, and brand new words. Among these are:

Irregular Temporal Motion (ITM): A two-dollar word for time travel
Time force, Time gravity, Temporal magnetism, Temporal gravity: Theoretical names for the force that is the subject of this paper
Tachyon Escape Protocol (TEP): The specific set of circumstances and motion methods a Tachyon uses in order to travel through time irregularly, by escaping temporal gravity

Ending Notes: These notes are exceedingly preliminary and speculative, but I can see little reason to think that the device used to control the flow of time, by mastering temporal magnetism, would be limited to irregular temporal motion. I think the immediate halting of time, in a targeted area would be easily attained, as well as increase in rate of time, and several other applications. A relatively low energy usage would be easily attained if this force bears any similarity to magnetism. Only the power usage and range of the projector would limit any of the effects previously described in my paper. But I digress, these are only speculations of the actual device, and should not be taken the wrong way. After all, this is only temporal theory and its applications, as great as they may be, are very far down the road of discovery.

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